Towards effective Monitoring, Control and Surveillance policy and implementation in South Africa and its relevance to other Southern African States

A thesis submitted in fulfilment

of the requirements for the degree

of

DOCTOR OF PHILOSOPHY

of

RHODES UNIVERSITY

in the

FACULTY OF SCIENCE

DEPARTMENT OF ICHTHYOLOGY AND FISHERIES SCIENCE

by

LISOLOMZI ASSAPH FIKIZOLO

26 JULY 2021

ABSTRACT

The responsibility of Fisheries Governance Authorities (FGAs) is to ensure that there is sustainable utilisation and exploitation of marine living resources through effective Monitoring, Control and Surveillance (MCS). MCS is a mechanism used to implement agreed policies, plans and strategies for oceans and fisheries governance, and it is key to their successful implementation. In the continent, the African Union (AU), through its agencies, economic and regional structures encourage and supports national and regional MCS programs. South Africa is a SADC coastal State with a fisheries governance branch mandated to ensure sustainable marine living resources' utilisation with support from a national MCS program. This support depends on the effectiveness of the current national MCS organisational structure, capacity, legislative and policy framework, as well as regional cooperation. In addition to an extensive literature review, this study developed a MCS framework, following international fisheries legislation and guidelines, for testing the South African MCS' conformity to such a model. Furthermore, Namibia and Mozambique were included as examples of SADC coastal States to determine their responsiveness to regional cooperation and coordination. Based on the framework, a questionnaire with four parts, Part A: Background Information; Part B: Evaluation of MCS Enablers; Part C: Evaluation of an MCS system process and its effectiveness – reactive approach; and Part D: - proactive approach was developed to collect information. The data was analysed, using appropriate statistical methods to determine, against set characteristics, the level of information that the government respondents could provide to the research topic, and to determine the effectiveness of the South African MCS program. Limited information from Namibia and Mozambique showed readiness in their respective MCS programs for a regional MCS integrated approach, as is the case with South Africa, but there is no serious engagement to implement any regional MCS program. Results showed that the South African MCS program's effectiveness is generally adequate, but there are challenges with planning; financial resources; MCS equipment; stakeholder engagement processes, and governance. A primary recommendation from this study was that business plans, as utilised in the private sector, should be developed by South African Fisheries Governance Authority (FGA) to address MCS governance shortcomings as revealed by this study. A reconfiguration of the MCS organisational structure to include a resource mobilisation unit is considered necessary to effect the much needed improvements.

DECLARATION

I, Lisolomzi Assaph Fikizolo, declare that this is my own work hereby submitted for the degree of Doctor of Philosophy of Rhodes University in the Faculty of Science. It has not been submitted for any degree for examination in any other university.

Lisolomzi Assaph Fikizolo

Dated this 26th day of July 2021 at Cape Town.

TABLE OF CONTENTS

Page

Abstract ii

Declaration iii

Table of Contents iv

List of Figures xii

List of Tables xvi

List of Maps xix

Dedication xx

Personal acknowledgements xxi

List of Abbreviations xxii

Chapter 1: THE ROLE AND POSITION OF MONITORING, CONTROL AND SURVEILLANCE (MCS) IN FISHERIES GOVERNANCE 1

1.1. Introduction and background 1

1.2. An overview of Illegal, Unreported and Unregulated (IUU) fishing 4

1.3. The continental fisheries governance perspective: The African Union (AU) and the New Partnership for Africa's Development (NEPAD) 6

1.3.1. Fisheries governance in the Southern and South African context 14

1.4. Research hypothesis and the problem statement 17

1.4.1. Research hypothesis 17

1.4.2. The problem statement and the research question 19

Chapter 2: INTERNATIONAL AND REGIONAL LEGISLATIVE AND POLICY FRAMEWORK 22

2.1. United Nations Convention on the Law of the Sea (UNCLOS) and some of the international tools on fisheries governance 22

2.2. An overview of the United Nations Fish Stocks Agreement on the conservation

and management of straddling fish stocks and highly migratory fish stocks (UNFSA) 24
2.3. The Code of Conduct for Responsible Fishing 26
2.4. The International Plan of Action against Illegal, Unreported and Unregulated (IPOA-IUU) fishing and its implementation in the SADC Region 28
2.5. The FAO Port State Measures Agreement to Deter and Eliminate Illegal, Unreported and Unregulated fishing (PSM) 31
2.6. Implementation of the Monitoring, Control and Surveillance (MCS) Framework 32
2.7. Technology as an integral part of MCS operations 33

Chapter 3: AN OVERVIEW OF THE SOUTH AFRICAN FISHING INDUSTRY .. 39
3.1. The South African fisheries sector and the implementation of MCS 39
3.1.1. General introduction and background 39
3.1.2. Fisheries governance: Legislative and policy framework in South Africa 41
3.1.3. South African fisheries: Structure and their economic contribution .. 48
3.1.3.1. The abalone fishery (*Haliotis midae*) 49
3.1.3.2. The South African hake fishery (*Merluccius capensis*; *Merluccius pradoxus*) 52
3.1.3.3. The small pelagic (*Engraulis encrasicolus; Sardinops sagax; Etrumeus whiteheadii*) fishery in South Africa 54
3.1.3.4. The South African Squid (*Loligo vulgaris reynaudii*) fishery 56
3.1.3.5. The South African West Coast Rock Lobster (*Jasus lalandii*) fishery 57
3.2. The South African Monitoring, Control and Surveillance (MCS) system 60
3.2.1. A historical background of MCS in South Africa 60
3.2.2. The institutional arrangements of MCS in South Africa 61

3.2.2.1. The Compliance Directorate 64
3.2.2.2. The Fisheries Protection Vessels Directorate 74
i) The South African Vessel Monitoring
System (VMS) 74
3.2.2.3. The Special Investigations Unit / Monitoring and
Surveillance Directorate 77
3.2.3. The CCAMLR Convention area and the South African territories
in the Southern Ocean: Another dimension in the South African
MCS program 80
3.2.3.1. IUU Fishing in the Southern Ocean including the Prince
Edward Island's Exclusive Economic Zone (EEZ) 81
3.2.4. Operation Phakisa and the South African MCS program 85
3.2.5. Review of the South African MCS program..... 90
3.2.5.1. General review 90
3.2.5.2. Inshore fisheries 92
3.2.5.3. Offshore fisheries 99
3.2.5.4. Marine Protected Areas (MPAs) 101
3.2.5.5. Challenges of MCS within existing long-term MPAs 103
3.2.5.6. Conclusion 107
3.3. Cost of Monitoring, Control and Surveillance in South Africa 110
3.3.1. Other sources of funding for the South African MCS program 117
3.3.2. Combined MCS budget for the 2019/2020 financial year 121
3.3.3. MCS budget expenditure for the 2019/2020 financial year 122

Chapter 4. FISHERIES GOVERNANCE IN THE REPUBLICS OF NAMIBIA AND MOZAMBIQUE 123
4.1**.** Republic of Namibia 123
4.1.1. General introduction and background 123
4.1.2. Fisheries governance, legislative and policy framework in the

Republic of Namibia 126
4.1.3. Namibian fisheries: Structure and their economic contribution ... 130
4.1.4. An overview of Monitoring, Control and Surveillance in
Namibia: The institutional arrangements of MCS in Namibia 134
4.1.4.1. MCS operations in Namibia 136
4.1.4.2. Cost of MCS operations in Namibia 142
4.1.4.3. Strengths and weakness of the Namibian MCS Program 144
4.2. Republic of Mozambique 148
4.2.1. General introduction and background 148
4.2.2. Fisheries governance: legislative and policy framework in the
Republic of Mozambique 150
4.2.3. Mozambican fisheries: structure and their economic
contribution 152
4.2.4. An overview of fisheries administration and management in
Mozambique 156
4.2.5. The institutional arrangements of MCS in Mozambique 159
4.2.5.1. MCS Operations and cost of operations in
Mozambique 160
4.2.5.2. Strengths and weaknesses of the Mozambican MCS
Program 163
Chapter 5: RESEARCH APPROACH / METHODOLOGY..... 168
5.1. Introduction 168
5.2. The research approach and design..... 172
5.3. The development and design of the MCS assessment framework 173
5.3.1. The development of the data collection tool..... 173
5.3.2. The structure of the questionnaire..... 174
5.3.2.1. Part A: The background information 174

5.3.2.2. Part B: Evaluation of the MCS System Enablers..... 177
i) B.1. – The enabling environment 178
ii) B.2. – The legislative framework and
Administrative measures..... 183
5.3.2.3. Part C: Evaluation of an MCS system process and its
Effectiveness – the reactive approach 187
i) C.1. – Before/Prior to fishing – At port
Inspections 188
ii) C.2. – During fishing / At sea boarding 192
iii) Part C.2.1. – Safety and catch
Inspections 194
iv) C.3. – During landing / At landing sites 197
v) C.3.1. – Inspection of foreign
Fishing vessels 199
vi) C.4. –Post landing inspection 201
5.3.2.4. Part D: Evaluation of an MCS process and its
Effectiveness – the proactive approach 202
i) Introduction 202
ii) D.1. – Stakeholder engagement / collective
approach 205
iii) D.2. – Risk identification, analysis and
management 207
5.4. The data collection process 212
5.5. Statistical analysis 212

Chapter 6: PRESENTATION AND ANALYSIS OF THE SOUTH AFRICAN NATIONAL MCS PROGRAM RESEARCH RESULTS 216
6.1. Introduction: the framework for evaluating the effectiveness of an MCS System 216

6.2. Responses and respondents 217
6.2.1. Results presentation and analysis for Part A..... 217
6.2.2. Comparison of responses from different respondents 221
6.3. Part B: Evaluation of the MCS system enablers or enabling environment 224
6.3.1. Comparison of responses from different respondents 224
6.3.2. Management / Strategic level assessment and national institutional Arrangements (B.1.1.) 225
6.3.3. Regional and international integration (B.1.2.) 227
6.3.4. Legislative framework and administrative measures assessment (B.2.) 228
6.3.5. Evaluation of infrastructure and physical resources (B.3.) 231
6.4. Part C: Evaluation of an MCS system process and its effectiveness – reactive Approach 234
6.4.1. Effectiveness of before / prior fishing - At port inspections (C.1.) 234
6.4.2. Effectiveness of during fishing / at sea boarding inspections (C.2.) ... 235
6.4.2.1. Safety and catch inspection procedures (C.2.1.) 237
6.4.3. Effectiveness of during landing inspections – At the landing sites; Declared fishing harbours and commercial ports (C.3.) 239
6.4.3.1. Inspection of foreign fishing vessels (C.3.1.) 241
6.4.4. Post landing inspections assessment (C.4.) 243
6.5. Part D: Evaluation of an MCS system process and its effectiveness – Proactive Approach 245
6.5.1. Stakeholder engagement / collective approach (D.1.) 245
6.5.2. Risk identification, analysis and management: Personnel (D.2.1.) 246
6.5.3. Risk identification, analysis and management: mapping and monitoring of activities in hotspots (D.2.2.) 248
6.6. Discussion 251
6.6.1. Introduction 251
6.6.2. Part A: Background information discussion 253
6.6.3. Part B: Evaluation of the MCS system enablers or enabling

Environment 254
6.6.4. Part C: Evaluation of an MCS system process and its effectiveness - The reactive approach 259
6.6.5. Part D: Evaluation of an MCS system process and its effectiveness - The proactive approach 262

Chapter 7: A CRITICAL APPRAISAL OF THE RESULTS SET WITHIN A BUSINESS PLANNING FRAMEWORK FOR THE SOUTH AFRICAN MCS CASE STUDY 266
7.1. Introduction 266
7.2. Strengths and weaknesses of the South African MCS Program 268
7.3. Strengths and weaknesses of MCS in the SADC case studies 271
7.4. Lessons for South Africa and opportunities for improvement 273
7.4.1. The proposed structure of the South African MCS Business plan 276
A. The Executive Summary 276
B. Business description 277
C. Market analysis and strategy 279
D. Marketing and sales plan 281
E. Competitive analysis 283
F. Management and organization description 285
G. Products and services 287
H. Operating plan 289
I. Financial needs projection 299
J. Exhibits and appendices 306

Chapter 8: CONCLUSION AND RECOMMENDATIONS 307
8.1. Background goals of this research 307
8.2. Summary of methods used 308
8.3. Conclusion 309

8.3.1. Structure of the questionnaire and its value as a framework for evaluating MCS Systems 309
8.3.2. Strengths and weaknesses of the South African MCS System 311
8.4. Recommendations 317
References: 320
Appendix A: Questionnaire - Analysis and evaluation of an MCS system 339

LIST OF FIGURES

Figure 1.1: The machinery of IUU fishing 5

Figure 3.1: Annual catches of jig-caught squid off South Africa, 1985–2010. Data are 57

Figure 3. 2: Historical catches of West Coast rock lobster 1890-2010, with the associated ..59

Figure 3.3: Top management structure of the fisheries branch and the management structure 63

Figure 3.4: The Sarah Baartman OPV – Flagship of the South African MCS program 68

Figure 3. 5: Three of the fleet of 8 FPV Directorate Gemini Chase Boats.....70

Figure 3.6: An illustration of the area of operation for the South African Patrol Vessels 72

Figure 3.7: Some of the Special Investigations Unit / Monitoring and Surveillance 79

Figure 3.8: Diagrammatic representation of the organisational structure of CCAMLR 81

Figure 3. 9: Phakisa Command and Oversight Structure.....87

Figure 3. 10: Ocean and Coasts Information Management System (OCIMS) snapshot where the red dots show areas with a possible gill netting activity (MPSG Report: 2019/2020). 89

Figure 3. 11: MCS Annual Budget Allocation from 2006/2007 to 2017/2018 Financial Years 111

Figure 6. 1: Plots of a proportion of correct responses for each characteristic of the background data with (a) years of experience; (b) age; (c) qualification; (d) rank; and (e) gender.....220

Figure 6.2: Boxplots of combined South African respondents for criteria Q22 to Q31 illustrating 10th, Mean and 90th percentile values in their assessment of the South African MCS Management or strategic national institutional arrangement 225

Figure 6.3: Box plots comparing responses of DEFF Managers, DEFF Inspectors, and the SAFIR Group for Section B.1.1 Bold line indicates the median, boxes 25% and 75% quartiles and dotted lines show ranges. 227

Figure 6.4: Box plots of Combined South African respondents for criteria Q32 to Q34 illustrating 10th, Mean and 90th percentile values in their assessment of the Regional and International Integration.....228

Figure 6.5: Box plots of Combined South African respondents for criteria Q35 to Q41 illustrating 10th, Mean and 90th percentile values in their assessment of synchronisation and harmonisation of South African legislative framework and administrative measures with regional and international laws and agreements. 229

Figure 6.6: Box plots comparing responses of DEFF Managers, DEFF Inspectors and the SAFIR Group for Section B.2. The bold line indicates median, boxes 25% and 75% quartiles and dotted lines show ranges.....230

Figure 6. 7: Box plots of combined South African respondents for criteria Q42 to Q52 illustrating 10th, Mean and 90th percentile values in their assessment of MCS related infrastructure and physical resources. 231

Figure 6.8: Box plots comparing responses of DEFF Managers, DEFF Inspectors and the SAFIR Group for Section B.3. The bold line indicates median, boxes 25% and 75% quartiles and dotted lines show ranges.....233

Figure 6. 9: Box plots of Combined DEFF Managers and Inspectors for criteria Q53 to Q57 illustrating 10th, Mean and 90th percentile values in their assessment of before or prior fishing port inspections 234

Figure 6. 10: Box plots comparing responses of DEFF Managers and DEFF Inspectors for Section C1. The bold line indicates median, boxes 25% and 75% quartiles and dotted lines show ranges.....235

Figure 6. 11: Box plots of combined DEFF Managers and Inspectors for criteria Q58 to Q61 illustrating 10th, Mean and 90th percentile values in their assessment of during fishing or at-sea boarding inspection.....236

Figure 6. 12: Box plots comparing responses of DEFF Managers and DEFF Inspectors for Section C2. The bold line indicates median, boxes 25% and 75% quartiles and dotted lines show ranges.....237

Figure 6. 13: Box plots of Combined South African respondents for Q 62(a) to Q 62(d) illustrating 10th, Mean and 90th percentile values in their assessment of safety and catch inspection. 238

Figure 6.14: Box plots comparing responses of DEFF Managers, DEFF Inspectors and the SAFIR Group for Section C2.1. The bold line indicates median, boxes 25% and 75% quartiles and dotted lines show ranges.....239

Figure 6.15: Box plots of Combined DEFF Managers and Inspectors for criteria Q63 to Q67 illustrating 10th, Mean and 90th percentile values in their assessment of during landing inspections.....240

Figure 6.16: Box plots comparing responses of DEFF Managers and DEFF Inspectors for Section C3. The bold line indicates median, boxes 25% and 75% quartiles and dotted lines show ranges.....241

Figure 6. 17: Box plots of Combined DEFF Managers and Inspectors for criteria Q68 to Q71 illustrating 10th, Mean and 90th percentile values in their assessment of the South African MCS program in the inspection of foreign fishing vessels.....242

Figure 6.18: Box plots of Combined DEFF Managers and Inspectors for criteria Q72 to Q73 243

Figure 6.19: Box plots comparing responses of DEFF Managers and DEFF Inspectors for Section C4. The bold line indicates median, boxes 25% and 75% quartiles and dotted lines show ranges.....244

Figure 6.20: Box plots of Combined South African respondents for criteria Q74 to Q78 illustrating 10th, Mean and 90th percentile values in their assessment of the effectiveness of the MCS proactive approach utilising the stakeholder engagement or collective approach. 245

Figure 6. 21: Box plots comparing responses of DEFF Managers, DEFF Inspectors and the SAFIR Group for Section D.1. The bold line indicates median, boxes 25% and 75% quartiles and dotted lines show ranges. 246

Figure 6.22: Box plots of Combined South African respondents for criteria Q79 to Q82 illustrating 10th, Mean and 90th percentile values in their assessment of the effectiveness of the Southern African MCS in personnel-related matters in risk identification, analysis and management 247

Figure 6.23: Box plots comparing responses of DEFF Managers, DEFF Inspectors and the SAFIR Group for Section D.2.1. The bold line indicates median, boxes 25% and 75% quartiles and dotted lines show ranges.....248

Figure 6.24: Box plots of Combined South African respondents for criteria Q83 to Q89 illustrating 10th, Mean and 90th percentile values in their assessment of the

effectiveness of MCS proactive approach utilising the mapping and monitoring of activities in hotspots 249

Figure 6. 25: Box plots comparing responses of DEFF Managers, DEFF Inspectors and the SAFIR Group for Section D.2.2. The bold line indicates median, boxes 25% and 75% quartiles and dotted lines show ranges.....250

Figure 7. 1: Top management structure of the fisheries branch and the management structure of Monitoring, Control and Surveillance…….286
Figure 7. 2: Management organisational structure and functions of the MCS Resources…304

LIST OF TABLES

Table 1. 1: Some of NEPAD's key fisheries-related initiatives from 2005 to 2015 9

Table 3. 1: The number of vessels in some fisheries chosen for this study that are monitored through the VMS.....74

Table 3. 2: Summary of Operation Phakisa compliance and enforcement activities 88

Table 3.3: Compliance Directorate – Summary of the Director and Regional Budget allocations for the 2019/2020 financial year.....113

Table 3. 4: Summary of the annual budget allocation of the two FPVs Cost Centres for the 2019/2020 financial year.....114

Table 3. 5: Annual budget allocation of the M&S Cost Centre for the 2019/2020 financial year.....115

Table 3. 6: Summary of the combined budget of the MCS Directorates for 2019/2020.....116

Table 3. 7: Monthly MLRF budget towards annual vessel management cost for the 2019/2020 118

Table 3. 8: Initiative 5 budget for joint marine environment enforcement for 2019/2020 and 2020/2020 financial years.....119

Table 4. 1: Summary of the Namibian Marine Resources Act Parts and Sections relevant to this study……..128

Table 4. 2: Number and duration of existing harvesting rights 2011/2012……132

Table 4. 3: Value of Fish and Fish Products 2010 – 2011 in n dollars (N$ billion)……..133

Table 4. 4: Number of licensed vessels by fishery monitored and inspected from 2006 – 2012……140

Table 4.5: Namibian Ministry of Fisheries and Marine Resources Budget for 2018/2019……..143

Table 4.6: Namibian Monitoring, Control and Surveillance Directorate Budget for 2019/2020……..143

Table 5. 1: The generic models used to investigate perceptions as outlined in i-iii. Definitions of terms are provided in Table 5.2……..214

Table 5. 2: Terms used in model data given in Table 5.1 ……215

Table 6. 1: The impact of each respondent's characteristics in the background data analysis. 218

Table 6. 2: Estimates of factors and their associated standard errors when fitting of the model 219

Table 6. 3: Expected responses with different characteristics using estimates given in Table 6.2.....220

Table 6. 4: Summary statistics for analyses of results for those sections of the questionnaire that were sent to all three groups of respondents. Kruskal-Wallis and ANOVA results are for pairwise comparisons across the three groups (Manager, Inspectors and SAFIR). The Wilcoxon and Tukey tests indicate which pairs account for differences in the three-way comparisons and are only shown where probabilities were 5% or less. 222

Table 6. 5: Summary statistics for the Wilcoxon tests for testing differences between Managers.....223

Table 6. 6: Average mean scores of each group per part of the questionnaire. The column Statistically significant differences shows cases in which there was a statistically significant difference, with 95% confidence or higher, between any of the groups (from Tables 6.4 and 6.5).....251

Table 7.1. A summary of the output from MCS planning process towards the development and management of an MCS operating plan, showing some examples of aspects that should be included in such a plan……...293

Table 7.2: MCS budget allocation per budget subpart and over-expenditure in 2019/2020 after the first three quarters of the financial year…….……...300

Table 7.3: Proposed MCS stabilisation budget for the 2021/2022 financial year (numbers rounded to the nearest R1000)……302

LIST OF MAPS

Map 1.1: African Economic Regions (Source: UNEP – 2017) 7

Map 4. 1: Map of South Africa showing the biogeographical range of abalone and areas where it is commercially exploited (Source:(Department of Agriculture Forestry and Fisheries (DAFF), 2016)) 50

Map 4. 2: West Coast rock lobster fishing zones and areas. The five super-areas are A1–2 corresponding to Zone A, A3–4 to Zone B, A5–6 to Zone C, A7 being the northernmost Area within Zone D, and A8+ comprising Area 8 of Zone D in conjunction with Zone F. (Source: DAFF 2016 Report) 58

Map 4. 3: Compliance Directorate office and personnel distribution along the South African coastline (Source - DAFF: 2010/11) 64

Map 6. 1: Namibian coastline showing the upwelling system and fishing grounds 123

Map 6. 2: Map of Mozambique showing the Provinces, Regions and major coastal cities (Source: Google, 2020) 148

Map 6. 3: Map of Mozambique with an ideal MCS illustration (Source: Mozambique Ministry of Fisheries – MCS Management Plan, 2006) 161

DEDICATION

This thesis is dedicated to my parents

Thembile Alfred Fikizolo and Nolusapho Stella Fikizolo

And

My wife and children

Chuma Thandeka Tessa Nombekela

Emihle, Liyabona and Chulumanco

For their understanding and unwavering support in the long, arduous and solitary journey of a Doctoral study that I had to pursue.

And

My siblings

Lukhanyiso; Sibusiso and Lutholuhle

PERSONAL ACKNOWLEDGEMENTS

My sincere gratitude goes to my Supervisors, Professor Kevern Cochrane and Professor Warwick Sauer, for their patience; professionalism; excellent guidance, and motivation when I was desperately low in courage to continue. Their broad understanding of the subject matter, meticulous planning; in-depth analysis; the flexibility to explore other facets of the subject as presented, and most of all availability when their guidance was needed contributed immensely in shaping this detailed research. A complex multidisciplinary study in fisheries governance that is seldom researched, but their expertise and knowledge of the subject matter made it all possible. They worked on my endurance levels for academic work of this magnitude and my clarity of mind to delve deep into the finer points of MCS as a concept and its application. Although it is such a great relief to get to this point, but it is sad to bid goodbye to our favourite coffee shop and your wise counsel Prof Cochrane. Thank you ever so much, Sir.

I would like to thank Sobahle Somhlaba as well for the time he gave me to understand programming and coding. His motivation and patience made all the difference towards achieving my goals. The same applies to Dr Azwianewi Makhado who served as my sounding board for my research frustrations and ideas during our long travels from South Africa to CCAMLR meetings in Hobart (Tasmania). My eternal gratitude also goes to my former manager and mentor, Adjunct Professor Monde Mayekiso. He made it his mission that I undertake Doctoral studies, and I will forever be indebted to him for his inspiration that, *"you must always strive to do more even if odds seem stacked against you."* To the late Professor Denzil Miller, my friend, and my mentor in fisheries governance international relations, particularly CCAMLR matters. I know you always asked me about my thesis and how much you would like to read it. Unfortunately, that was not be. May you rest in eternal peace, Sir.

To my MCS former colleagues, particularly Mr Pedro Goosen who in 2006 planted in me the seeds of MCS when we had to share a very small office for six weeks. He used that period to *"teach"* me about the finer points of MCS. It was a difficult period for both of us, but the seed germinated and now, years later, this research work. Thank you Pedro, and how I wish that the Government had continued tapping onto a resource like yourself even beyond your official retirement for all the known reasons. To Messrs Moshani, Maratsane; Balisa Duze and the VMS Staff, particularly Sonwabo Mjelo and Tobisa Kom, thank you for all the MCS information; VMS stats and vessel/s information you provided me with each time I would come asking for more. Much appreciated Colleagues!

LIST OF ABBREVIATIONS

AEC	African Economic Community
AFU	Asset Forfeiture Unit
AIM-Strategy	2050 Africa's Integrated Maritime Strategy
AIS	Automatic Information System
APCICMM	Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas
ALU	Automatic Locating Unit
ANC	African National Congress
ATS	Antarctic Treaty System
AOR	Atlantic Ocean Region
APMA	African Port Management Association
AU	African Union
AUC	African Union Commission
BBWW	Boat Based Whale Watching
CAADP	Comprehensive Africa Agriculture Development Program
CAF	Consultative Advisory Forum
CAMFA	Conference of African Ministers of Fisheries and Aquaculture
CARICOM	Caribbean Community
CCAMLR	Commission for the Conservation of Antarctic Marine Living Resources
CCAS	Convention for the Conservation of Antarctic Seals
CCP	Community Fisheries Co-Management Organizations (Mozambique)
CEWG	Compliance and Enforcement Working Group
CFCO	Chief Fisheries Control Officer
CIFM	Inter-Ministerial Committee on Marine Surveillance and Control
CM	Conservation Measure

COFI	Commission on Fisheries
CSIR	Council for Scientific and Industrial Research
DAFF	Department of Agriculture Forestry and Fisheries
DBC	Departmental Bargaining Council
DEAT	Department of Environmental Affairs and Tourism
DEFF	Department of Environment, Forestry and Fisheries
DHA	Department of Home Affairs
DNID	Data Network Identifier
DNP	Directorate of Fisheries Protection (Mozambique)
DOJCD	Department of Justice and Constitutional Development
DPSA	Department of Public Service and Administration
DRC	Democratic Republic of Congo
DSD	Department of Social Development
EAA	Ecosystems Approach to Aquaculture
EAC	Ecosystems Advisory Committee
EAF	Ecosystems Approach to Fisheries
ECOWAS	Economic Community of West African States
EEZ	Exclusive Economic Zone
EPV	Environmental Protection Vessel
FANR	Food, Agriculture and Natural Resources
FAO	Food and Agricultural Organization
FCO	Fishery Control Officer
FIH	Finance, Investment and Health
FOB	Free On Board
FPV	Fisheries Protection Vessel
FRV	Fisheries Research Vessel
GDP	Gross Domestic Product

GSM	Global System for Mobile Communications
HRD	Human Resources Development
ICSEAF	International Commission for Southeast Atlantic Fisheries
INDESO	Infrastructure Development of Space Oceanography
IMN	Inmarsat Mobile Number
IMO	International Maritime Organization
INTERPOL	International Criminal Police Organization
Inmarsat	International Maritime Satellite
IOSTT	Intelligence for Operations Sub-Task Team
IPOA-IUU	International Plan Of Action against Illegal, Unreported and Unregulated fishing
IRFA	Intergovernmental Relations Framework Act, 2005
IUU	Illegal, Unreported and Unregulated fishing
IVT	Integrated Vessel Tracking System
IWC	International Convention for the Regulation of Whaling
JCPS	Justice, Crime Prevention and Security
KPI	Key Performance Indicators
LES	Land Earth Station
MAP	Millennium Partnership for the African Recovery Program
MCM	Marine and Coastal Management
MCS	Monitoring Control and Surveillance
MDA	Marine Domain Awareness
MDGs	Millennium Development Goals
MES	Macro-Economic Strategy
MFR & LA	Marine Fisheries and Resources and Legal Affairs
MGM	Mozambican Navy / Defence
MICOA	Ministry of the Environmental Coordination (Mozambique)

MICT	Ministry of Tourism (Mozambique)
MINT	Mozambican Police and Immigration
MLRA	Marine Living Resources Act
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MOWCA	Maritime Organization of West Africa
MPA	Marine Protected Area
MPG	Marine Protection Services and Ocean Governance
MRAC	Marine Resources Advisory Council
MSC	Marine Stewardship Council
MZA	Maritime Zones Act
NATJOC	National Joint Command
NATJOINTS	National Joint Operational Intelligence Structure
NEPAD	New Partnership for Africa's Development
NGO	Non- Governmental Organization
NM	Nautical Mile
NPA	National Prosecuting Authority
NPCA	NEPAD Planning and Coordinating Agency
OAU	Organization of African Unity
OECD	Organisation for Economic Co-operation and Development
OPV	Offshore Patrol Vessel
PAF	Pan African Fisheries
PAIDF	Pan African Infrastructure Development Fund
POCA	Prevention of Organised Crime Act
POR	Pacific Ocean Region
PPE	Personal Protective Equipment
PROVJOC	Provincial Joint Command

PSM	Port State Measures Agreement
REC	Regional Economic Community
REPMAR	Marine Fisheries Regulations (Mozambique)
RFMO	Regional Fisheries Management Organization
RMs	Regional Mechanisms
RSC	Credit Groups (Mozambique)
SADC	South African Development Community
SAR	Synthetic Aperture Radar
SARS	South African Revenue Service
SADCC	Southern African Development Co-ordination Conference
SAFMAR	Autonomous Institutions of the Transport Ministry (Mozambique)
SAM	Subgroup on Assessment Methods
SAMSA	South African Maritime Safety Authority
SAN	South African Navy
SANDF	South African National Defence Force
SAPS	South African Police Service
SATTCC	Culture, Information, Sport and the Transport and Communications Commission
SC	Scientific Committee
SCA	Supreme Court of Appeals
SCAF	Standing Committee on Administration and Finance
SCIC	Standing Committee for Implementation and Compliance
SEAFO	South East Atlantic Fisheries Organization
SIU	Special Investigation Unit
SOP	System Of Procedure
SPAP	Provincial Fisheries Administration Services (Mozambique)
SSP	Satellite Service Provider

SRFC	Sub-Regional Fisheries Commission
STC	Specialised Technical Committee
SWA	South West Africa
TAC	Total Allowable Catch
TAE	Total Allowable Effort
UASC	Union of African Shippers Council
UN	United Nations
UNCED	United Nations Conference on Environment and Development
UNCLOS	United Nations Convention for the Law of the Sea
UNCLOS III	The Third United Nations Conference on the Law of the Sea
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Program
UNFSA	United Nations Fish Stock Agreement on the conservation and management of straddling stocks and highly migratory fish stocks
UNGA	United Nations General Assembly
USA	United States of America
USD	United States Dollar
VDS	Vessel Detection System
VHF	Very High Frequency
VMS	Vessel Monitoring System
WG	Working Group
WG-EMM	Working Group for Ecosystem Monitoring and Management
WG-FSA	Working Group for Fish Stocks Assessment
WG-IMAF	Working Group on Incidental Mortality Associated with Fishing
WPMFP	The South African White Paper on Marine Fisheries Policy
WSCD	White Shark Cage Diving
WWI	First World War

1. THE ROLE AND POSITION OF MONITORING, CONTROL AND SURVEILLANCE (MCS) IN FISHERIES GOVERNANCE

1.1. Introduction and background

In South Africa, and the rest of the Southern Africa coastal States, fisheries have a meaningful contribution in the respective countries' Gross Domestic Product (GDP). Volumes of existing literature indicate the central role that fisheries play in coastal communities' livelihoods at a lower level and its contribution to the country's GDP at a higher level. In the 2014 Food and Agriculture Organization (FAO) study on African fisheries, an estimation was that fisheries' total contribution in all African states' GDP is at 1.26%, which in monetary terms translates to USD24 billion. The FAO study further states that a total number of 12.3 million people, which represents 2.1 % of Africa's population for the ages between 15 and 64, are working in the fisheries sector as either full-time fishers or full-time and temporal processors. Fishers are only a fraction of all people employed by the sector, for example, 42.4% are processors, whereas a further 7.5% of the total number of employees are in the aquaculture sector (de Graaf et al., 2014). Heck, *et al*. (2007) bring the matter closer home by stating that the importance of fish in Africa is evident when viewed from the fact that in 34 coastal African States, an estimated two and a half million people are involved in fulltime fishing activities. The wide range of roles in the sector includes, but is not limited to, boat and fishing gear owners; fishing crews and boat crews that operate in the coastal waters of Africa, as well as lakes and rivers that are so important in the inland fisheries of the continent.

Heck, *et al*. (2007) continue to raise an essential point to this study, that in Africa there is an essential coexistence of both the artisanal fisheries and commercial fisheries, even though the artisanal fishery is in the majority. In the South African context, there are 22 commercially exploited fisheries, two non-consumptive fisheries sectors which are the Boat Based Whale Watching (BBWW) and the White Shark Cage Diving (WSCD), as well as subsistence fisheries together with recreational fisheries, and MCS is a central component of its fisheries management strategy as mandated by the Marine Living Resources Act (MLRA)[1]. South Africa is a developing country, thereby predisposed to all developing countries' general

[1] www.daff.gov.za/daffweb3/Branches/Fisheries-Management/Monitoring-Control-and-Surveillance Accessed 07/01/2016

problem, particularly limited resources, which does not make its position any simpler. While fisheries provide essential social and economic services to many countries, they face many challenges that threaten the sustainability of the biological resources and the ecosystems that support them and their benefits. According to Brigham (2007); Falk *et al.*(2014) and Soliman (2014) fisheries, in general, are a typical example of the tragedy of the commons and that is because there are incomplete property rights and that is worse where access to resources is open. He further elucidated his assertion by stating that developing a fisheries property rights framework to protect rights to fish at sea is extremely difficult and the migratory nature of fish compounds that. The direct results of this inability to create property rights to fish at sea are that the rule of capture prevails and that in many cases that inevitably leads to overexploitation of the resource (Falk *et al.*, 2014). Benjamin was not the first to mention fisheries and the term "tragedy of commons" simultaneously, as Hardin in 1968 did so. Hardin (1968) stated that *"ruin is the destination towards which all men rush, each pursuing his own best interest in a society that believes in the freedom of the commons. Freedom in acommons brings ruin to all."* He further said oceans of the world have always been viewed and treated in that manner by many Maritime nations due to a long-held belief that resources in the oceans are inexhaustible (Hardin, 1968). Lackey (2005) further supports this view by stating that, before the 1800s a dominant belief was that resources from both inland and marine water masses were inexhaustible, a view which is attributable to both the numbers of people involved in fishing at the time, together with the primitive nature of the fishing gear of the era.

Given these preceding arguments about the right of access to the marine resources and the subsequent sustainable utilisation thereof, where overexploitation is eliminated or reduced, at the centre should be the formulation of a management regime to govern fisheries. In exploring that route, noteworthy is that fisheries management began long before the 1800s. Caddy and Cochrane (2001) are of the view that during the early part of the second millennium, an increase of participation to high seas fishing activity by various communities gave rise to both parties' conflicting interest and precursors of fisheries management. Furthermore, Cochrane and Garcia (2009) state that there is no precise or universally accepted definition of the fisheries management concept, which creates some uncertainties in applying the essential managerial aspects of fisheries management as practised today. However, Cochrane and Garcia (2009), point out that fisheries management is viewed as an integrated process of information gathering, analysis of the collected body of information, utilisation of that particular body of information in planning, and an array of other tasks with a varying degree of complexity that

all as a collective are for the sustained optimal benefits from the resources. Monitoring, Control and Surveillance (MCS) is one of such tasks, and a standard view is that it is central in all efforts to achieve a higher level of sustainable utilisation of living marine resources.

The definition of MCS as provided by the Food and Agricultural Organisation (FAO) is that it is a mechanism used to implement agreed policies, plans or strategies for oceans and fisheries management. A prominent view regarding MCS is that it is key to the successful implementation of any fisheries management and planning strategies[2]. Also, FAO states that its absence in any country's fisheries management scheme renders that scheme incomplete and ineffective. MCS is made of three components as can be seen in the term itself, and the FAO webpage on Monitoring, Control and Surveillance provide a complete definition of each term as follows,

- ***"Monitoring*** *- the continuous requirement for the measurement of fishing effort characteristics and resource yields."* Therefore, it is about the collection, measurement, and analysis of fishing activity including, but not limited to: catch, species composition, fishing effort, by-catch, discards, and the area of operations. Definitely, in the absence of this information or inaccurate and incomplete information, managers cannot be better poised to develop and implement powerful fisheries management strategies.

- ***"Control*** *– the regulatory conditions under which the exploitation of the resource may be conducted."* Therefore, control involves the specifications of the terms and conditions under which the marine resources can be harvested or collected. These specifications are generally contained in national fisheries legislation, as is the case with the MLRA in South Africa. In addition to that, these specifications can either be part of the regional and sub-regional agreements and other arrangements.

- ***"Surveillance -*** *the degree and types of observations required to maintain compliance with the regulatory controls imposed on fishing activities."* In essence, surveillance involves the regulation and supervision of fishing activity to ensure that national legislation, terms and conditions of access, and management measures are observed.

[2] http://www.fao.org/3/V4250E/V4250E03.htm. Accessed on 29 June 2021

This activity is critical to ensure that resources are not overexploited, poaching is minimised and management arrangements are implemented."

1.2. An overview of Illegal, Unreported, Unregulated (IUU) fishing

According to Pauly *et al.* (2002), the problematic situation to contend with for the global community is global fisheries regulation. The advent of Illegal, Unreported and Unregulated (IUU) fishing further compounds the situation. According to Miller (2010), although it is only in recent times that IUU fishing has been defined in various forms, the first formal use of the term can be traced back to the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) in 1997. Miller (2010), similarly with Part II, Article 3 of the IPOA-IUU, state that IUU fishing is comprised of the following,

- *Fishing practices that are devoid of any consideration of conservation, management and the broad principles of sustainable exploitation and utilisation of marine living resources.*
- *Fishing expeditions that are undertaken within national jurisdiction areas without the necessary documentation more often leads to non-compliance with existing reporting regimes.*
- *Inability or complete failure of flag states to discharge their national and international obligations regarding proper and total control of ships flying their flag and their nationals that are participating in fishing activities.*

Over the past two decades, IUU fishing has been a severe cause for concern globally. The main reason for the world, in particular fisheries management authorities and institutions, to be austerely concerned with IUU fishing is the threat it poses to effective ocean governance (Miller: 2010). The basis of this argument is that IUU fishing tends to be insidious in approach as by its nature it does not have any regard to potential effects on non-targeted species like birds. Furthermore, it amplifies uncertainty in estimating stock status through its operations; as no data is provided on catch levels and target species demographics. According to Miller (2010), due to its tremendous negative impact not only on the respective individual or isolated national fisheries authorities globally but also to numerous Regional Fisheries Management

Organisations (RFMOs). Therefore, substantive commitment and valuable resources to combat its effects are urgently needed. IUU fishing comprises three interlinked chains of events: the at-sea operations, the mainstay of IUU fishing, port activities, and trade activities as depicted in Figure 1.1.

Figure 1. 1: The machinery of IUU fishing

Miller (2010) argues that a holistic and well-structured MCS system should attend effectively to all the three interlinked IUU fishing operational spheres. Hence MCS is viewed as the critical element in the enforcement triangle made up of various interrelated legal processes that are critically important in combating IUU fishing. The impact of IUU has been felt long and hard by Africa too, and the Partnership for African Fisheries (PAF) in their website states that the escalation of global demand for fish has resulted in the African sea waters being a hunting ground for global fishing fleets. The presence of these global fleets has, in turn, led into Africa losing an estimated USD1.2 billion worth of fish to illegal fishing[3]. PAF (2014) further states that IUU fishing has far-reaching implications as it does not only drain Africa of revenue, but it harms the environment, coupled with low local catches as a direct result of overfishing.

South Africa as well has been a victim of IUU fishing, including around its offshore territories, i.e. Prince Edward and Marion Islands in the sub-Antarctic waters of the Southern Ocean. Österblom and Bodin (2012), state that in the Southern Ocean, the most productive areas with regards to fishing are within and around the sub-Antarctic islands. Most islands in this area

[3] www.globaloceanscommission.org/wp.../GOC-paper08-IUU-fishing.pdf Accessed 10/02/2016

are under the national jurisdiction of member States to CCAMLR, as is the case with South Africa. The difficulty is to ensure that there is sufficient MCS capacity to monitor the area. This fact is clearly articulated by Österblom and Bodin (2012) when they state that, remoteness and the Southern Ocean's expansiveness are the key contributing factors in making it difficult for respective States to detect IUU fishing vessels. Although that may be the case, in their observations they suggest that a collaborative MCS effort by all member States in the Southern Ocean is central in ensuring that the detection ability of IUU fishing activities by all those concerned is escalated to a level which is beneficial to all. In essence, this stance provides a solution that leans towards the provisions of the global tools, as discussed in the preceding text. At the continental level, PAF (2014) does mention that lack of capacity to monitor and enforce all fisheries laws, whether inside or outside the jurisdiction of all African coastal States, is the main reason for all illegal fishing activities that have since reached alarming rates. Therefore, the argument holds that MCS is central in deterring and eradicating IUU fishing.

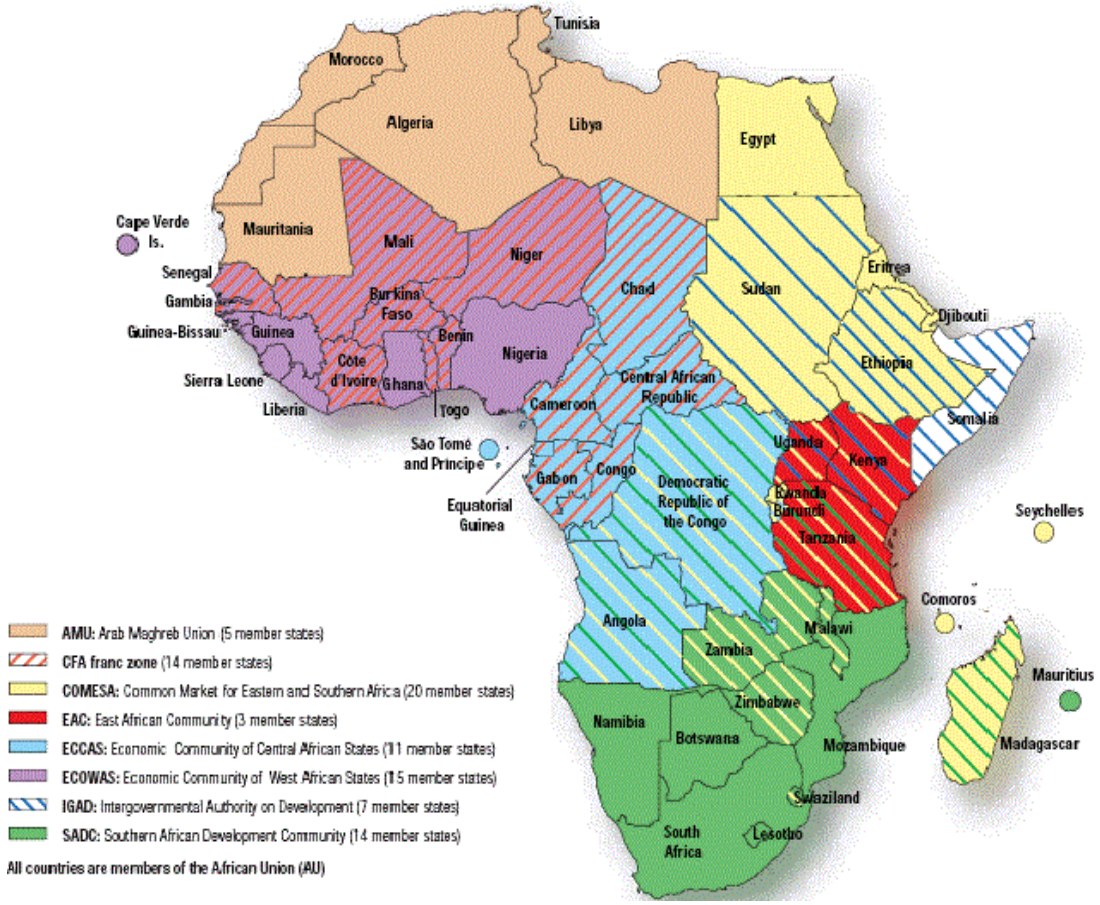
1.3. The continental fisheries governance perspective: The African Union (AU) and the New Partnership for Africa's Development (NEPAD)

South Africa is a member of the Southern African Development Community (SADC) region, and institutional arrangements for fisheries governance of the region are better explained if the starting point is the broader continental fisheries governance outlook, i.e. the African Union's perspective of fisheries governance within the continent. The African Union (AU) is the union of 54 countries in the African continent.[4] The Heads of States and Governments who were the members of the erstwhile Organization of the African Unity (OAU) issued a declaration, the Sirte Declaration, which was the Sirte extraordinary session's product on 09 September 1999 which called for the establishment of the African Union (AU). The African States formed the AU to be a platform to advance the development and integration of the African continent. That was a distinctive character from the OAU dominant stance since 1963, that of supporting liberation movements in the African territories under colonialism and apartheid. Whilst that may have been the main thrust of the OAU's existence, it also provided a dynamic

[4] Information sourced from the African Union website, www.au.int/web/en/au-nutshell which was accessed on the 21 January 2017

organisational platform that enabled all of its Member States to adopt coordinated positions on matters of common interest to the continent in the international arena.

Furthermore, under the banner of OAU, African countries developed several initiatives that contributed towards unity, economic and social development in the continent. Most importantly, some of these initiatives did lay a good foundation for establishing the AU, particularly the Abuja Treaty. The Abuja Treaty of 1991 provided a roadmap for creating the African Economic Community (EAC) using the concept of Regional Economic Communities (RECs). That resulted in the eight (8) RECs currently recognised by the AU, which are groups of individual sovereign States in the continent's sub-regions. Map 1.1, hereunder, depicts Africa's economic regions and countries that are party to those economic regions.



Map 1.1: African Economic Regions (Source: UNEP – 2017)

The Economic Community of Western African States (ECOWAS) comprises 15 countries in an area of Africa that since 1999 is known as West Africa, and it is an example of a REC as

defined in the Abuja Treaty.[5] The Southern African Development Community (SADC), a focus of this study, is another example. Among the AU's primary objectives, limiting them only to those relevant to this study, are the following:

- "*To accelerate the political and socio-economic integration of the continent.*
- *"To promote democratic principles and institutions, popular participation and good governance."*
- *"To establish the necessary conditions which enable the continent to play its rightful role in the global economy and international negotiations."*
- *"To coordinate and harmonise the policies between the existing and future Regional Economic Communities for the gradual attainment of the objectives of the Union."*

To successfully implement AU objectives with success, suitable governance structures must be put in place, i.e. within the organisation. The AU Commission (AUC), and its Portfolios of the Commission, is the central structure responsible for the AU's management and operations. There are eight Portfolios of the Commission but, for this study focus will only be on the Rural Economic and Agriculture (REA) activities, of which its work relates to that of the Committee on Rural Economy and Agricultural Matters. The Committee on Rural Economy and Agricultural Matters is a Specialized Technical Committee (STC) of the AU formed following Article 14 of the AU Constitutive Act. All STCs were established to work closely with the Commission to ensure alignment and harmonisation of AU projects and programs. The New Partnership for Africa's Development (NEPAD) is one such program.

NEPAD is generally accepted as the roadmap for the continents' development, and the African leaders adopted that in July of 2001[6]. Although there are different views about the performance of NEPAD since its inception, there are developments worth mentioning, for example the formation of the NEPAD Planning and Coordinating Agency (NEPAD Agency or NPCA) in 2010. The NPCA replaced the NEPAD Secretariat. Its development was due to the impetus to integrate the structures and processes of the AU and NEPAD. Therefore, the NEPAD Agency is the implementing agency of the AU that is mainly responsible for resource mobilisation, facilitation, coordination and implementation of the NEPAD programs and

[5] Information sourced from the ECOWAS website, http://www.ecowas.int/, accessed on the 29 January 2017
[6]. This information is contained in the www.un.org/africarenewal/magazine/december-2011 website which was accessed on the 23 January 2017.

projects throughout the continent[7]. Also, among many projects that it is currently implementing throughout the continent, the NPCA is depicted as mainly focusing on developing the African agricultural sector, which is inclusive of fisheries and aquaculture.

This commitment is through two overarching but interrelated programs, the Comprehensive Africa Agriculture Development Program (CAADP) and the Rural Futures Program. The establishment of these programs was to address the aggregated negative impact that Africa's ineffective policies were having on Africa's returns in the trade of its natural resources. In broad terms, CAADP is an agriculture-led development framework which predominantly outlined Africa's vision for agriculture. The primary CAADP intent, which amplifies the underlying reason for its establishment, is better articulated in its objectives where it is stated that by 2015 Africa should attain food and nutrition security[8]. With a specific focus on fisheries' contribution to the African agriculture-led economic agenda and align fisheries activities to CAADP objectives, NPCA developed the NEPAD Agency Fisheries and Aquaculture Program, which was first implemented in 2009 to run for five years. The latest revision of that program was also over another five years starting from 2015 to 2020.

This program was not the first for NEPAD in the fisheries sector, and Table 1.1 provides a brief overview of some of the fisheries-related initiatives of NEPAD that have had a significant impact on African fisheries governance between the years 2005 and 2015.

Table 1. 1: Some of NEPAD's key fisheries-related initiatives from 2005 to 2015[9]

INITIATIVE	INTENTIONS	OUTCOMES	YEAR
AU/Fish for All Summit	This conference's primary purpose was about determining the level of importance of fisheries and their economic contribution to the continent.	The significant output was the Abuja Declaration and the NEPAD Action Plan to develop African Fisheries and Aquaculture, which is about revitalising the sector.	2005

[7] Organisational structure evolution of NEPAD sourced from the http://www.nepad.org/content/about-nepad website on 29 January 2017

[8] https://www.nepad.org/cop/comprehensive-africa-agriculture-development-programme-caadp. Comprehensive Africa Agriculture Development Programme (CAADP): Who We Are; Mandate and Results; The NEPAD Agency Fisheries and Aquaculture Program: 2015-2020. Accessed 15 January 2021

[9] http://pubs.iclarm.net/resource_centre/NEPAD.pdf. Comprehensive Africa Agriculture Development Programme Integrating livestock, forestry and fisheries subsectors into the CAADP. Accessed 12 June 2016

Development of the Pan-African fisheries development program	It became responsible for the extensive research process and spearheaded a broad consultative process in all the RECs.	In the SADC region, the efforts of this program resulted in the SADC Statement of Commitment to deter Illegal, Unreported and Unregulated fishing	2007-2008
The NEPAD Agency was a major partner in the development of the DFID-funded fisheries program	Its main objective, concerning fisheries, was to ensure that the African fisheries and aquaculture sector had a sustained contribution in the African comprehensive, inclusive growth.	The development and adoption of a Pan-African Fisheries Reform Strategy which continued until late 2014.	2008
The partnership of NEPAD and FAO to form NEPAD-FAO Fish Program.	To ensure that there are continentally wide development adoption and implementation of responsible and sustainable fisheries practices.	Many interrelated outputs can be grouped into three broad areas: • Governance, economic integration & policy coherence. • Responsible management (Ecosystems Approach to Fisheries) EAF & Ecosystems Approach to Aquaculture (EAA) • Disaster risk management & climate change adaptation	2011
NEPAD's support to the Sub-Regional Fisheries Commission[10] (SRFC)	Provide the essential technical support to African states to ensure proper representation and engagement in international forums in their quest to conform to the global regulatory framework of fisheries governance.	A submission was made to the UN Tribunal on the Law of the Sea to seek Advisory opinion under Article 33 of the *Convention on the definition of minimum access conditions, and exploitation of fisheries resources within the maritime zones under the jurisdiction of SRFC Member States (MAC Convention)*	2015

The new strategic direction for the African fisheries governance that came with the establishment of the NPCA resulted in the conception of many other initiatives that were

[10] The Sub-Regional Fisheries Commission constitutes of 7 member states in West Africa which are, Cabo Verde; Gambia; Guinea; Guinea Bissau; Mauritania; Senegal and Sierra Leone

focusing on the development, protection and management of African fisheries. This development of strategic initiatives occurred during the same period when African fisheries' status was elevated to a level where they were increasingly viewed as part of the solution to the food security and economic development in the continent. Further enunciation of this argument is in the NPCA 2015 – 2020 program[11], where it is stated that *"the fisheries and aquaculture value chains make a major contribution to African development in the broadest sense. Output from the sector contributes greatly to food security…"*.

Developments in Africa have also progressed tremendously in the AU's first decade. Worth mentioning for the benefit of this study is the development and proclamation of both the 2050 Africa's Integrated Maritime Strategy 2050 (AIM Strategy)[12] and Agenda 2063[13]. The 2050 AIM Strategy was a product of an extensive consultative process, both at the continental and international levels. At the international level consulted organisations that provided inputs during the development of the 2050 AIM Strategy include, but are not limited to, United Nations Conference on Trade and Development (UNCTAD); International Maritime Organization (IMO) and the Food and Agricultural Organization (FAO).

Considering the AU's developmental agenda that promotes human capital and improved standard of living, among other things, in the development of the 2050 AIM Strategy, one of the critical pillars for its development was an urgent need for Africa to manage her inland waterways, oceans and seas. The proposed mechanism to deliver on this anticipated development path was the blue economy, whereby the utilisation of the marine resources in improving the standard of living of the African citizens would be done so that it does not impact negatively on the broader spectrum of marine ecology and biodiversity. To put this into perspective, and according to Article 9 of the 2050 AIM Strategy, African Heads of State and Government mandated the AUC, together with the RECs and RMs, during its 13 Ordinary Session of the AU Assembly to develop an all-encompassing and intelligible strategy[14] that

[11] https://au.int/sites/default/files/decisions/9560-assembly_en_1_3_july_2009_auc_thirteenth_ordinary_session_decisions_declarations_message_congratulations_motion_0.pdf. This information is contained in the Assembly/AU/Dec.252 (XIII) decision which was adopted during the proceedings of the 13th Ordinary Session of the Au Assembly held in Sirte, Libya in July 2009. Accessed 12 June 2016

[12] https://au.int/en/documents-38. Africa's Integrated Maritime Strategy 2050 and all its Annexures (A to C) in English, French and Arabic. Accessed 15 January 2021

[13] https://au.int/en/agenda2063/overview. Agenda 2063 -The Africa We Want. Accessed 15 January 2021

[14]. https://au.int/sites/default/files/decisions/9560-assembly_en_1_3_july_2009_auc_thirteenth_ordinary_session_decisions_declarations_message_congratulations_motion_0.pdf. This information is contained the Assembly /AU/Dec.252 (XIII) decision was adopted

will seek to, *"coordinate and harmonise policies and strategies and improve African maritime security and safety standards as well as African maritime economy for wealth creation from its oceans and seas…."*.

In implementing this pronouncement, Article 35 under Fisheries and Aquaculture of the 2050 AIM Strategy, states that the strategy will build on the NEPAD's 2005 Abuja Declaration, the 2010 Conference of African Ministers of Fisheries and Aquaculture (CAMFA) as well the UN Conservation and Fish stocks management agreements to ensure sustainable fisheries and aquaculture in Africa. Also, that it will ensure incorporation and implementation of an ecosystem precautionary approach to conservation and exploitation of fish stocks in and around the African continent. Furthermore, under Article 36, it is stated that sanctions that are following the 2005 Rome Declaration on IUU Fishing should be imposed on all offenders that are participating in fishing activities that are deemed to constitute IUU fishing. This Article further states that sanctions should primarily be aimed at depriving offenders of benefits accruing from their illegal activities.

Central to these proposals is the African continent's ability to implement its programs, but recognising disparities in available resources and skills among States and RECs, cooperation and collaboration becomes the best possible solution. That is well articulated in Article 37 of the 2050 AIM Strategy, where it is stated that successful implementation of plans to carry out the universal duty of the conservation of marine living resources requires cooperation. This cooperation is premised within the international ocean governance framework, and a direct linkage is to Articles 62, 63, 64, 117 and 118 of the UNCLOS. Also, the global scourge of IUU fishing is mentioned as a menace that is exerting massive pressure on the sustainability of African fisheries. Given that, in Article 38, it is recommended that Member States of the AU impose preventative measures driven by MCS. Closely linked to the 2050 AIM Strategy is another continental socio-economic development strategy known as Agenda 2063.

Agenda 2063 is defined as a continental socio-economic transformation strategy that should extend over the next 50 years. Furthermore, it seeks to build on, and significantly accelerate the implementation of past and existing continental initiatives that are to enhance growth and sustainable development[15].South Africa, as part of the continent and the SADC region, will

during the proceedings of the 13th Ordinary Session of the AU Assembly held in Sirte, Libya in July 2009. Accessed 12 June 2016

[15] www.un.org/en/africa/osaa/pdf/au/agenda2063.pdf. The African Union and the New Partnership for Africa's Development (NEPAD): Restoring a relationship challenged? Accessed on the 29 June 2021

benefit from this renewed inward-looking drive by the continent, i.e. with specific emphasis to the development of the continent. In most cases, food security is the basis of survival for any community, and fisheries in most of the continent's coastal countries and some landlocked countries serve that purpose. In South Africa, as is the case in the SADC region and the rest of the continent, many poor coastal communities rely heavily on fish as their primary protein source (SADC, 2016). Therefore, it becomes critically important that fisheries governance is among the top priorities in the country, and that may be achievable through the utilisation of well-established global systems and programs.

Continental programs developed through the African Union and its institutions, for example, the NEPAD fisheries program should be prioritised. Their institutionalisation or adoption and implementation, by various countries or regions in the continent, can go a long way in ensuring sustainability in fisheries. NEPAD is viewed by its proponents as both Africa's "Marshall Plan" for development, as well as part of a broader progressive agenda for governance and economic development (Landsberg, 2012). Therefore, it is taken as an ideal institution to administer a fisheries program as it contributes to development, peace and security and economic growth. Under NEPAD, this approach for other sectors has been proven to work effectively; an example is infrastructure development. NEPAD, in collaboration with the South African government, spearheaded the formation of the Pan African Infrastructure Development Fund (PAIDF) (Ugwu & Odo, 2014). A similar approach to fisheries governance is needed, and through NEPAD, and its institutions as explained, the desired outcomes are highly possible. Fisheries management researchers on the continent have stated that fisheries' sustainability was achievable if there was a proper enforceable regulatory framework (AUC-NEPAD, 2014). South Africa is part of the African continent, and as seen in the preceding text, it has played a significant role in the development of all the current fisheries governance frameworks that seek to shape the management and governance of fisheries in Africa. Therefore, South Africa needs to maintain its active role in all the institutions responsible for fisheries governance in the continent and developing and implementing fisheries governance programs. Development and implementation of MCS programs, whether regionally or in the continent at large, is an involvement that South Africa needs to maintain to benefit its national fisheries.

1.3.1. Fisheries governance in the South and Southern Africa context

The South African Development Community (SADC) was established after a Declaration, and a Treaty for its establishment was signed by Heads of State or Government in Windhoek, Namibia on the 17 August 1992. It replaced its precursor, the Southern African Development Co-ordination Conference (SADCC) which was formed after the adoption of the Lusaka Declaration on the 01 April 1980 in Lusaka, Zambia[16]. Countries that are member States of SADC are a combination of coastal States, landlocked countries and the small and island States, and they are, Angola; Botswana; Democratic Republic of Congo (DRC); Lesotho; Malawi; Mauritius; Mozambique; Namibia; Seychelles; South Africa; Swaziland; Tanzania; Zambia and Zimbabwe. The fundamental reason behind the establishment of SADC was to drive national priorities of each member State through a coordinated regional effort, within a structure that has full regional political support to address regional socio-economic development agenda as a regional collective. South Africa acceded to the SADC Treaty on the 29 August 1994, and the Senate and the National Assembly approved this accession on the 13 and 14 of September 1994 respectively.

An agreed framework with SADC to drive all regional programs was to adhere to the principle of ensuring that each member State's national priorities are addressed adequately through regional action, and that here should be an attempt to allocate each member State responsibility of coordinating one or more sectors. South Africa as a primary focus of this study, and Mozambique and Namibia in their respective supplementary role for this study are all SADC members that were allocated their respective responsibilities. Culture, Information, Sport and the Transport and Communications Commission (SATTCC) was allocated to Mozambique. Namibia was allocated Marine Fisheries and Resources as well as the Legal Affairs (MFR & LA). The Republic of South Africa was allocated Finance, Investment and Health (FIH). Central to each member State's responsibilities in the allocated sector is the proposal of sector policies, strategies and priorities to be developed and adopted, processing of projects for inclusion in the sectoral programme; monitoring of progress and reporting to the SADC Council of Ministers.

[16] www.dfa.gov.za/foreign/Multilateral/africa/sadc.htm Accessed on 07/02/2016

Fisheries in the SADC context is a sector that is subject to all the management processes as outlined above. According to the information in the SADC website, fisheries play a significant role in the region's food security, and even though the region is prone to water scarcity, which frequently results in crop failure, fisheries can still be reliably managed throughout the year.[17] What also contributes to that are the different habitats in which many fisheries are established in the region. They range from rivers, lakes and reservoirs, and oceans, which when combined yield about 2.6 million tonnes of fish every year. All fisheries programmes within the SADC region are managed through the Food, Agriculture and Natural Resources (FANR) Directorate. However, for their implementation, monitoring and evaluation, they are guided by the SADC Protocol on Fisheries[18].

In recognition of the vital role that fisheries play in the socio-economic aspects of the people of the region, SADC embarked on developing a regional official procedure or systems of rules governing fisheries in the region, i.e. the SADC Protocol on Fisheries. The SADC Member States signed the Protocol on Fisheries in 2001, it entered into force in 2003 and ratified in 2008. In 2010 the Protocol's implementation strategy on Fisheries was approved, wherein aquaculture; management of shared fisheries resources and the combating of Illegal, Unregulated and Unreported (IUU) fishing were prioritised. Although the SADC Protocol on Fisheries is fundamentally a tool to ensure food security and alleviating poverty in the region, its existence also serves to support member States' national initiatives and support the implementation of international conventions. Besides, and putting more emphasis on the implementation of international conventions as clearly stated in the SADC website, it promotes sustainable utilisation and protection of the living aquatic resources and the region's aquatic environment. The text of the Protocol on Fisheries reflects this fact, but for this study, the focus will only be on its parts relevant to MCS.

According to Article 3 of the SADC Protocol on Fisheries, the Protocol's objective is to promote responsible and sustainable use of the living aquatic resources and aquatic ecosystems of interest to State Parties. This undertaking's underlying reasons are to ensure that such efforts lead to more economic opportunities for the nationals in the SADC region, and that future generations can benefit from these renewable resources. The same sentiments are expressed in

[17] www. sadc.int/themes/agriculture-food-security/fisheries/ Accessed on 07/02/2016
[18] https://www.sadc.int/files/8214/7306/3295/SADC_Protocol_on_Fisheries.pdf. SADC Protocol on Fisheries. Accessed on 15 January 2021

Article 6 of the Food and Agriculture (FAO) Code of Conduct for Responsible Fisheries (FAO, 1995b) that fisheries management activities should be in existence to ensure availability of fish resources in sufficient quantities for present and future generations. Various approaches to achieve this objective are covered in these documents of which Regional cooperation is among themes that are dealt with extensively. For example, in Article 8 of the SADC Protocol, regional cooperation is addressed by harmonising legislation. Although the emphasis is on harmonising legislation as a tool through which proper management of shared resources could be achieved, it also touches on MCS and law enforcement issues. The proposal of harmonising legislation is on matters that include, for example, hot pursuit of vessels that violate the laws of one Member State and subsequently enter the jurisdiction of another Member State. That is a law enforcement matter which is related to MCS, as covered under Article 111 of the United Nations Convention on the Law of the Sea (UNCLOS)[19]. Furthermore, regional cooperation is supported by the Code of Conduct wherein in Article 10.4.1 it is stated that States should establish mechanisms for cooperation and coordination among their relevant national institutions and authorities that are responsible for conservation and management of coastal areas.

South Africa, as part of SADC, is bound by these responsibilities. However, at a glance, that may seem an insurmountable task to achieve, given its geographical position. The geographical position of South Africa is at the tip of the African continent, and it is bounded by three oceans, the Indian Ocean in the east; the Atlantic Ocean in the west and the Southern Ocean in the south where it also has two islands in the sub-Antarctic waters of the Southern Ocean. According to the information in the South African Department of Environment, Forestry and Fisheries (DEFF) website, what compounds the South African situation, even more, is that it has a coastline of about 3 200 kilometres which covers an Exclusive Economic Zone (EEZ) of about 1 million square kilometres[20]. That excludes Prince Edward and Marion Islands which are South African territories in the Southern Ocean, and they both add 100 000 km^2 of ocean requiring protection. Another related precarious situation for South Africa, which is inherent to it being a developing country, is about fulfilling its various national programs which have their foundations in international obligations and initiatives.

[19] https://www.un.org/depts/los/convention_agreements/texts/unclos/unclos_e.pdf. United Nations Convention on the Law of the Sea pdf document. Accessed on 15 January 2021

[20] www.daff.gov.za Accessed on 07/02/2016

Given all those considerations, it becomes imperative for South Africa, and all other developing nations that are in a similar situation to that of South Africa, to continue to pursue all innovative ways that can lessen the burden of MCS as a program together with all its respective processes while still achieving its purpose. Harmonisation of laws, sharing of resources and thus subdividing the burden of payments, reliance on the latest technological advances, common policy positions and attainment of political will, are some of the approaches that have been touted in many international and regional fisheries governance institutions. Also, management tools, for example, the United Nations Fish Stock Agreement on the Conservation and Management of Straddling fish stocks and highly migratory fish stocks (UNFSA: 1995) and the SADC Protocol on Fisheries (2002) are other considerations that may insist in increasing effectiveness of their overall fisheries governance regime. However, it is essential to note that some of these global tools and initiatives may or may not be legally binding. South Africa and the other SADC States covered in this study are already party to some of them, and are discussed in detail in the following Sections of this research work.

1.4. RESEARCH HYPOTHESIS AND THE PROBLEM STATEMENT

1.4.1. Research hypothesis

The existence of fisheries management units ensures sustainable utilisation and exploitation of marine living resources, particularly fisheries (Hauck & Kroese, 2006; Pramod, 2018; Sjöstedt & Sundström, 2013). Fisheries Governance Authorities (FGAs) as part of their mandate, have a responsibility to ensure sustainable exploitation and utilisation of the living marine resources[21]. That is underpinned by a system of governance which has pre-determined objectives as developed from both fisheries science and a fisheries management regulatory framework[22]. An essential component of a governance system must be to ensure and monitor compliance by all active participants through a well-structured Monitoring, Control, and Surveillance system (Flewwelling & Cullinan, 2001; van der Geest, 2017). South Africa is one of the SADC coastal States with a fisheries governance branch, within a national government

[21] http://www.fao.org/tempref/docrep/fao/005/y4411e/y4411e00.pdf - FAO technical paper 415 – Accessed 30 October 2019

[22] http://www.fao.org/3/y3427e/y3427e03.htm - Chapter 1: Fisheries Management by K.L. Cochrane – Accessed 30 October 2019

department that is mandated to ensure sustainable utilisation of marine living resources with support from a national MCS programme.

Noting that South Africa is a developing country, with all the associated characteristics, for example, limited financial resources, high unemployment rate especially among youth and food security challenges[23]**.** Furthermore, the geographical position of South Africa is at the southernmost tip of the African continent, and it shares borders with other developing countries. Therefore, for this study, Namibia on the West Coast and Mozambique on the East Coast are also included, albeit in less detail. Apart from the developmental State commonalities that these three countries share, which are premised on the scarcity of resources as outlined above, the assumption is that they also share similar challenges with regards to fisheries governance of their respective national fisheries stocks. Therefore, the hypothesis of this study can be summarised as follows:

- The South African MCS system's structure and functioning conform to the internationally accepted MCS standards as outlined in international fisheries law, fisheries binding and non-binding agreements; continental and regional legislative and policy frameworks.

- The South African MCS program is an MCS model that is significantly responsive to regional cooperation and collaboration. The measure of that individual assessment follows several international law frameworks that promote regional MCS cooperation to realise a high success rate and effectiveness of regional MCS programs.

- The South African MCS model is a useful MCS model that other developing countries, especially in Africa, can refer to for structural and operational effectiveness and efficiency.

[23] https://www.intelligenteconomist.com/characteristics-of-developing-economies/ accessed on the 05 October 2019

1.4.2 The problem statement and the research question

An assumption is that, in any fishing environment where there are high compliance levels, data collected will mostly be reliable. The reality is that compliance typically occurs if there are adequate governance structures and the relevant infrastructure to encourage it. Therefore, there needs to be a well-structured and well-resourced Monitoring Control and Surveillance (MCS) program in a fisheries governance environment. However, there may be views that MCS is not in the mainstream of fisheries governance functions, but it is an enabler to most fisheries governance functions, including the role of science. For example, fish stock assessments are one of the mainstays of fisheries research, involving collecting data that is used to estimate the status of a particular fishery and advise management decisions. Therefore, the collected data should be reliable, and an appropriately structured and adequately resourced MCS program has a vital role in ensuring reliability and therefore, in fisheries governance.

There are also social aspects that directly impact how the State manages fisheries, which is about regulating access and monitoring extraction of resources. Numerous traditional fishing coastal communities, common in almost all the coastal developing nations, play a crucial role as a reliable source of protein and may contribute significantly to a government's food security strategy. Therefore, it is imperative to ensure that a pragmatic fisheries governance regime exists to safeguard the sustainable utilisation of marine resources and, for that to succeed, it should have at the core an effective national Monitoring, Compliance and Surveillance program.

Experts have identified a national MCS program as the most resource-intensive fisheries governance intervention. [24] This assertion implies that, in order to realise a highly effective and efficient MCS program, a substantial amount of money is required for its implementation, including infrastructure and other relevant physical resources essential for all its operations, and an adequate number of appropriately qualified personnel for planning, implementation and oversight of the program. However, finances and relevant physical resources tend to be a significant challenge in developing and implementing MCS programs, especially in developing countries. Furthermore, at a regional level the economic disparities of individual States, for

http://www.fao.org/3/X5599E/X5599E00.htm. FAO Fisheries Circular No. 882 FIPP/C882: TECHNICAL ASSISTANCE IN FISHERIES MONITORING CONTROL AND SURVEILLANCE: A HISTORICAL PERSPECTIVE OF FAO'S ROLE. Accessed on the 21 December 2020

example SADC States, are considered a significant impediment in developing and implementing an effective regional MCS strategy. Such shortcomings often manifest themselves through lack of crucial infrastructure to MCS operations, for example, harbours; airstrips, and storage facilities. Available funding also impacts the options for the acquisition and operation of critical MCS hardware, such as a Vessel Monitoring System (VMS), aircraft and sea-going patrol vessels.

Therefore, recognising complexities that surround the development of an MCS program and its implementation thereof, the research problem and the research questions can be stated as follows:

- What is a universally acceptable MCS Model? (Chapter 1)
- Is the South African MCS program structured in a manner that conforms to a universally acceptable MCS model, that has been developed following the FAO MCS guidelines? (Chapters 1; 3, 5 and 6)
- What are the benefits for South Africa and the other SADC countries of cooperating in MCS at the regional level and is the cooperation working the way it should? (Chapters 2; 3; 5; 6 and 7)
- Is the South African MCS program adequately funded? (Chapters 3; 6 and 7)
- How responsive is the South African MCS program to regional cooperation and collaboration? (Chapters 3; 6 and 7)
- What are fisheries' characteristics in Namibia and Mozambique, and what does that mean for the design and implementation of their respective MCS systems? (Chapter 4)
- How effective are the MCS systems in those two countries and what are their main strengths and weaknesses? (Chapter 4)
- What can be learnt by comparing the three countries' MCS systems, including their strengths and weaknesses? (Chapters 4 and 7)
- What is the status of human and physical resources for the South African MCS program? This question is expanded with the following sub-questions: (Chapter 6)
    - In the management and inspector ranks, are there enough qualified personnel to undertake their respective allocated responsibilities?
    - Is there sufficient MCS coverage along the South African coastline?
    - What is the status of vehicles, sea-going watercrafts, and other relevant MCS equipment?

- What active measures have the South African MCS program taken to encourage a collective approach in responsible fishing? Were those interventions successful? (Chapters 6 and 7)
- How effective is the South African MCS system overall, and are there differences in effectiveness between different fisheries types? (Chapters 6 and 7)
- What steps should be taken to improve regional MCS systems and effectiveness? (Chapters 7 and 8)

2. INTERNATIONAL AND REGIONAL LEGISLATIVE AND POLICY FRAMEWORK

2.1. The United Nations Convention On the Law of the (UNCLOS) and some of the international tools on fisheries governance

According to the United Nations (UN),[25] a long-standing view that gained much traction during the 17th century is the doctrine of the freedom of the seas. This doctrine perpetuated a standpoint of limiting national rights and jurisdiction over their respective adjacent oceans to a narrow belt of three miles or five kilometres of the sea surrounding a particular nation's coastline. A major significance of this view was that apart from the thin coastal belt that belonged to the coastal State adjacent to it, the remaining vast part of the ocean was proclaimed free to all and belonged to none. From the 17th to the mid-20th century, the status quo prevailed. Still, the latter part of the 20th century brought all changes that are experienced today regarding ocean governance, and the utilisation of all marine resources, living and non-living resources. Central to that change was the development of the United Nations Convention on the Law of the Sea (UNCLOS). Intense discussions about UNCLOS began to gather momentum in 1967, followed by a formal conference convened in 1973, culminating in its adoption in 1982. Although UNCLOS is of utmost importance in its entirety, for this study focus will only be on some of its articles that portray the central position it occupies in the ownership, management, protection, and utilisation of marine living resources.

In Part II, Article 2 of UNCLOS, any coastal State's jurisdiction regarding the adjacent ocean is clearly defined. The coastal State jurisdiction extends beyond its land territory and internal waters to its territorial sea. As stated in subsection 2 of Article 2, the territorial sea extends to the territorial sea's airspace, including the seabed and the subsoil. Subsection 3 of Article 2 further emphasises that, although sovereignty is fully recognised and accepted, all States should exercise their rights in full accordance with UNCLOS and other relevant international pieces of law. Rights and jurisdiction of coastal States in the Exclusive Economic Zone (EEZ) with regards to the rational utilisation of natural resources are explained in Part V, Article 56 1(a) that, *"In the exclusive economic zone, the coastal State has sovereign rights for exploring and exploiting, conserving and managing the natural resources, whether living or non-living, of*

[25], www.un.org/texts/unclos/unclos_e Accessed on 07/02/2016

the waters superjacent to the seabed and the seabed and its subsoil, and concerning other activities for the economic exploitation and exploration of the zone, such as the production of energy from the water, currents, and winds." Article 56 1(b) further emphasises the role and responsibility of coastal states in the management and protection of the marine environment by stating that, *"... jurisdiction as provided for in the relevant provisions of this Convention concerning… (iii) the protection and preservation of the marine environment."*

UNCLOS elaborates more on the EEZ matters, especially on its dimensions and how the coastal State should manage the resources within the different areas of the EEZ. For example, Article 57 of the UNCLOS specifies that the EEZ shall not extend beyond 200 nautical miles. Management and conservation of marine living resources are taken further by Article 61 (1-5), i.e., regarding their management within the EEZ, where among other things, also coastal States are mandated to determine the allowable catch of the living resources in its EEZ. Furthermore, through utilising the best available scientific evidence, they will ensure that proper conservation and management measures are in place to safeguard against over-exploitation of the resources. Also, Article 61 (2) states that coastal states and other relevant competent international organisations, whether sub-regional, regional, or global, shall cooperate towards achieving this noble goal. The utilisation of marine living resources is further articulated by Article 62, that the coastal State shall promote the objective of optimum utilisation of the living resources in the EEZ without prejudice to Article 61.

Protection of marine living resources is dealt with in several Articles of the UNCLOS, but most importantly in three places. Article 145 (1a-b) addresses the conservation of marine living resources from the point of view of pollution and harmful effects. Although also critically important, for this study focus will be on Articles 61 and 62, of which specific reference is in the preceding text. Additional to Article 62, is Article 62 (4a-k), where even though the emphasis is on foreign nationals or foreign fleets, the requirement for compliance with conservation measures and other policies and regulations of the coastal State applies equally to citizens of the State itself. Of importance and relevant to Monitoring, Control, and Surveillance (MCS) are all the subsections of Article 62 (4), which all constitute MCS aspects. These, for example, cover regulation of fishing seasons and areas of fishing, number of fishing vessels allowed to participate in a specified fishery for a specific period, types of gear to be used in a particular fishery, and a host of other measures that are the basis of MCS.

Furthermore, UNCLOS laid a good foundation for nations' cooperation, starting at the regional level and extending to the global level, as stated in Article 61 and Section 2, Article 197. Article 197 covers cooperation in the formulation of international rules, practices, and procedures, mainly for protecting the environment, which is also crucial for the marine living resources and their exploitation. However, of more relevance to this study are the pronouncements of Article 61 (1-5), emphasising the cooperation of States at the regional and global level on the management and sustainable utilisation of marine living resources. Article 61 (2) captures this point succinctly that: *"The coastal State, taking into account the best scientific evidence available to it, shall ensure through proper conservation and management measures that the maintenance of the living resources in the exclusive economic zone is not endangered by over-exploitation. As appropriate, the coastal State and competent international organisations, whether sub-regional, regional or global, shall cooperate to this end."*

2.2. An overview of the United Nations Fish Stocks Agreement on the conservation and management of straddling fish stocks and highly migratory fish stocks (UNFSA)

The development and adoption of the United Nations Fish Stocks Agreement on the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (UNFSA) followed about ten years after UNCLOS came into force. The fundamental principles of UNFSA, as said by Løbach (2010), are that UNFSA lucidly articulates the essence of fisheries management standard practices and procedures. However, it is mainly focusing on migratory and straddling stocks. Regarding the roots of UNFSA, Juda (2002) states that the challenge facing the management of highly migratory and straddling stocks is long-standing, and was noted first during UNCLOS III. UNCLOS III is the third United Nations Conference on the Law of the Sea, convened in New York in 1973. The Convention introduced several topical issues that included the management of highly migratory and straddling stocks. It recommended that all issues about migratory and straddling stock be the responsibility of regional or subregional organisations that must agree on a set of measures to be utilised to ensure the conservation of stocks in their respective adjacent EEZ areas (Juda, 2002). However, challenges identified in the management of world fisheries were not solved after

UNCLOS came into force. Therefore, the intentions of introducing UNFSA were to resolve those outstanding challenges. However, as stated in the preamble of UNFSA, it was also an intervention meant to address a range of problems incorporating those identified in Chapter 17 of Agenda 21. Agenda 21 is a product of the United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro in 1992. It is a non-binding but voluntarily implemented UN tool with specific emphasis on sustainable development. Chapter 17 deals explicitly with protecting the oceans, all kinds of seas, including enclosed and semi-enclosed seas, and coastal areas and the protection, rational use, and development of their living resources. The preamble to the UNFSA states that,

> *"Seeking to address in particular the problems identified in chapter 17, program area C, of Agenda 21 adopted by the United Nations Conference on Environment and Development, namely, that the management of high seas fisheries is inadequate in many areas and that some resources are over utilised; noting that there are problems of unregulated fishing, over-capitalisation, excessive fleet size, vessel reflagging to escape controls, insufficiently selective gear, unreliable databases and lack of sufficient cooperation between States."*

This particular focus of Agenda 21 expresses the core of UNFSA's objective under Article 2, as *"…to ensure the long-term conservation and sustainable use of straddling stocks and highly migratory fish stocks…"*. That, in turn, directly links with Article 2 of UNCLOS, whereby the effective implementation of relevant provisions of the Convention is to ensure long-term sustainable use and conservation of straddling fish stocks and highly migratory fish stocks. Furthermore, the application of UNFSA with regards to UNCLOS as captured in Article 4 of UNFSA, is the interpretation and application of UNFSA, which should be following all the provisions of the Convention. The process further states that the UNFSA shall not prejudice the rights, jurisdiction, and duties of all States that are signatories to UNCLOS.

As already explained, implementation of the provisions of UNFSA is applicable both inside and outside national jurisdiction areas. Article 3 of UNFSA elaborates further on the application of this agreement. It refers to Articles 6 and 7 that focus on conservation and management of stocks within national jurisdiction. In Article 6, for example, paragraphs 1 and 3(a), States are encouraged to apply the precautionary approach in management and exploitation of straddling and highly migratory fish stocks within their areas of national jurisdiction, all for the protection of marine living resources and preservation of the marine

environment. Concerning high seas and where management measures were adopted for areas under national jurisdiction, Article 7 (2a) states that these areas' conservation and management measures must be compatible if the conservation and management of straddling and highly migratory fish stocks are to be guaranteed.

Under Article 8 of the UNFSA, there is emphasis on cooperation and collaboration between States to ensure that sustainability of the living marine living resources. Furthermore, coastal States and range States fishing on the high seas are expected to put all possible efforts into pursuing cooperation as individual States or subregional and regional formations within the UNCLOS prescribed cooperation framework to ensure further that there are effective conservation and management of highly migratory and straddling fish stocks. In closing the matter on the cooperation of States, as pronounced by UNFSA, specific reference can be made to Article 9 of the UNFSA. Article 9, pronounces that States should agree on cooperative mechanisms to obtain scientific data and review the status of the fish stocks and the establishment of the scientific advisory body. This scientific advisory body's primary function is to advise all parties in the region or subregion, through the interpretation of the relevant and valid scientific data, among other things, on the status of stocks. Flowing directly from that kind of interaction would be the determination and implementation of required actions to ensure sustainable utilisation of marine living resources, and that always includes MCS strategies and plans.

2.3. The Code of Conduct for Responsible Fisheries

In 1991 the United Nations Committee on Fisheries suggested that there be a development of new concepts that would lead to responsible and sustained fisheries[26]. The preface of the Code of Conduct for Responsible Fisheries (FAO, 1995b), states that the Declaration of Cancún, which is the outcome of a meeting that was in Mexico in 1992, resolved that FAO prepare an international Code of Conduct to address these concerns[27]. It further stated that apart from the vital contribution that the Declaration of Cancún lent into Agenda 21 of the United Nations Conference on Environment (UNCED), it inevitably led to the establishment of the United

[26] www.seafish.org/industry-support/guide-to-seafood-standards/measurements/fao-code Accessed 08/02/2016

[27] www.fao.org/fileadmin/user_upload/legal/docs/2_037t-e.pdf Accessed 08/02/2016

Nations Conference on Straddling Fish Stocks and Highly Migratory Fish Stocks where FAO provided the necessary technical back-up. That was followed by adopting the Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas in November of 1993. In October of 1995, the FAO Conference unanimously adopted the Code of Conduct for Responsible Fisheries, which in essence provided a framework for national and international efforts in the sustainable utilisation of marine living resources in harmony with the environment.

According to Article 1, and specifically Article 1.2 of the Code of Conduct for Responsible Fisheries, the Code is global in scope as it is targeting the entire fishing fraternity. Both members and non-members of the FAO, which among other things would include fishing entities, sub-regional, regional and global organisations and all persons concerned with the conservation of fishery resources and management of fisheries. Furthermore, Article 1.1 states that the Code is voluntary, i.e., it is non-binding even though certain significant parts of it are modelled after important international pieces of law, for example, the UNCLOS. It is also further stated in Article 1.1 that the Code contains parts that may be or have already been given binding effect through other obligatory international fisheries governance tools. Therefore, its non-binding nature may be viewed from the fact that those involved in fisheries are applying the Code to give effect to it. Article 3.1 further emphasises this point that,

"The Code is to be interpreted and applied in conformity with the relevant international law rules, as reflected in the United Nations Convention on the Law of the Sea, 1982. Nothing in this Code prejudices the rights, jurisdiction, and duties of States under international law as reflected in the Convention."

Central to this study is MCS, and more focus is on the Code from the national point of view and to a lesser extent the regional or collaborative point of view. In addressing this, further focus will be on the objectives of the Code, as reflected in Article 2 (a-j), and to cite Article 2(g) in particular, which is about ensuring the protection of aquatic living resources and their respective natural habitats which includes water bodies as well as coastal areas. Article 2(g) can be conjoined with Article 2(j), where the set of standards to guide the behaviour and conduct of all persons involved in fishing features intensely. That is critically important because most of the fisheries' experienced problems can be linked to human interaction with the fisheries. Article 2 (c) further addresses how the Code is intended to assist the Member States in developing their respective national policy and legislative frameworks that promote a

balanced, responsible fishing approach between conservation and utilisation of resources. That is at the backdrop of Article 2 (a), which promotes establishing the principles of fisheries governance that are in line with international law, as informed by a wide range of inclusive factors, but not limited to socio-economic and environmental factors.

South Africa is a developing country, and the Code of Conduct's sensitivity towards developing countries and small island States in their ability and resources needed towards the implementation of the Code of Conduct should be motivational to the country. Article 5 articulates special requirements of developing countries wherein Article 5.1; a plea is that the difference in countries' abilities to implement the Code of Conduct recommendations should be considered. Article 5.2 goes further into galvanising support in developing countries towards its implementation to a point where all relevant institutions are encouraged to assist where possible to enable the respective countries to build their fish stocks and improve their participation in high seas fisheries. Such institutions include governmental and non-governmental institutions; national and international, that are financial, technological and human capital development institutions.

Given the importance of the collaborative approach for the SADC region, Article 6 of the Code, which is General Principles of the Code, does give a framework for regional cooperation in particular Articles 6.4; 6.5; 6.12 and 6.15. Article 6.12, declare that,

> *"States should, within their respective competencies and following international law, cooperate at sub-regional, regional and global levels through fisheries management organisations, other international agreement or other arrangements to promote conservation and management. Furthermore, to ensure responsible fishing and effective conservation and protection of living aquatic resources throughout their range of distribution, taking into* account *the need for compatible measures in areas within and beyond national jurisdiction."*

To give effect to the pronouncements of Article 6.12, Articles 7.1.3 and 7.1.4 provide a management framework which focuses on the management of both straddling stocks and highly migratory stocks, which are exploited by two or more States in whose waters these stocks are found. A management framework provided by these two articles is that of a sub-regional or regional fisheries management organisation, whose terms of reference should be around the inclusion of representatives from all States involved in fishing activities in that particular region sub-region. Also, in line with conservation and management measures, as

explained above, is Article 8.1.4. Article 8.1.4 states that subregional and regional fisheries governance structures should establish MCS systems following all applicable and relevant international law as part of their cooperation agenda. These MCS systems should cover all matters in fishing operations and related activities within and outside of areas of national jurisdiction.

2.4. The International Plan of Action against Illegal, Unreported and Unregulated fishing, and its implementation in the SADC region

In the recent past, numerous new fisheries governance tools emerged out of necessity, given the tremendous pressure that has been experienced by fisheries globally. A typical example of such a negative pressure was the growth of Illegal, Unreported, and Unregulated (IUU) fishing. A direct response to this was the FAO International Plan of Action on IUU Fishing (IPOA-IUU), a voluntary tool developed through the FAO's processes and adopted by the FAO Committee on Fisheries (COFI) in 2001. This tool is a comprehensive approach in the fight against IUU fishing activities. It outlines various parties' responsibilities which are inclusive of port States, flag States, coastal States, and Regional Fisheries Management Organisations (RFMOs), and other relevant parties to achieve those objectives. According to Part III, Article 8 of the IPOA-IUU, the IPOA aims to prevent, deter, and eliminate IUU fishing by providing all States with comprehensive, effective, and transparent measures to act, including through appropriate regional fisheries management organisations established following international law. Besides, and to further emphasise the point, Article 9.1 encourages full implementation of the IPOA if maximum effectiveness of the tool is to be realised, which can be done through cooperation among states or through regional fisheries management organisation, or even through the FAO and other international organisations of the same calibre. However, for this anticipated cooperation to be efficient, it must be rooted in effective coordination and consultation, coupled with institutionalised information sharing.

Focusing on SADC, the region formally adopted the IPOA-IUU through the Statement of Commitment (SoC) by SADC Ministers responsible for Marine Fisheries on Illegal, Unreported and Unregulated Fishing as was signed in 2008. Furthermore, this regional collective approach did follow after individual countries in the region have, in line with their

respective national programs, adopted the IPOA-IUU. In so doing, they developed their National IPOA-IUU programs, of which South Africa was still in the process of finalising its own when this research work was conducted. However, it is also during the same period that South Africa became the sixth country in Africa to ratify the Port State Measures (PSM) Agreement which is an international treaty to prevent, deter and eliminate IUU fishing.[28] PSM is covered in detail later in this chapter. The IPOA-IUU is the source document from which the SADC Declaration is modelled, and in it, there are four priority areas identified as the four pillars upon which all Regional MCS efforts should focus in the eradication of IUU fishing, and they are as follows:-

- *to improve regional and inter-regional cooperation concentrating more on eradicating IUU fishing*
- *properly constituted fisheries governance institutions as well as legal frameworks aimed at the elimination of illegal fishing,*
- *the development of a regional MCS strategy and regional plan of action that is biased towards total eradication of the illegal fishing,*
- *and to implement this undertaking by developing a regional MCS strategy and a regional plan of action about IUU fishing.*

Although the entire SoC is relevant to this study's aims, more focus is directed to what is encapsulated in resolution 5. In resolution 5, a reference to the SADC Protocol on Fisheries is made, emphasising instituting reactive cooperation initiatives in fisheries MCS and law enforcement. That is proposed through establishing a regional MCS centre, an intensive MCS capacity building programme, and collectively developed standard boarding and inspection procedures. A further commitment undertaken by the SoC is implementing all resolutions as outlined in the document by committing to developing and adopting an Annexure to the SADC Protocol on Fisheries, which will detail the implementation process as collectively agreed upon by all SADC states that signed the SoC.

[28] https://www.pewtrusts.org/en/research-and-analysis/articles/2016/02/19/south-africa-joins-global-effort-to-end-illegal-fishing. South Africa Joins Global Effort to End Illegal Fishing: Latest African nation to ratify PSMA. Accessed 29 June 2021

2.5. The FAO Port State Measures Agreement to Deter and Eliminate Illegal, Unreported and Unregulated fishing (PSM)

In the recent past, due to an escalation in IUU fishing activities, all fisheries governance institutions and organisations intensified the development of new and more relevant international fisheries management tools to fight the scourge of IUU fishing. Among the recent fisheries governance, tools are the FAO Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing (PSM) or the Agreement as it is commonly known, which was adopted by the FAO Conference in 2009. According to FAO[29] the PSM is a legally binding international instrument, and its primary purpose is to prevent, deter, and eliminate IUU fishing, and South Africa, Namibia and Mozambique are all signatories to the Agreement[30]. Løbach (2010) further states that the PSM is a toolbox at the disposal of Regional Fisheries Management Organizations (RFMOs) and all party States that may be port or coastal or flag States, to combat IUU fishing in all of its forms. It is perceived as proposing minimum port State measures in its current state, but all States that are party to it are encouraged to adopt more stringent measures if they wish to do so. to The FAO further states that the PSM proposes to address IUU fishing through the implementation of rigorous port State measures by all party States to the PSM, i.e., port States in this instance. Article 2 further emphasises this point of PSM, but as an objective of the PSM, that its purpose is to ensure long-term sustainable utilisation and conservation of marine living resources and marine ecosystems. Also, that implementing effective port State measures leads to deterrence or at best elimination of destructive activities like IUU fishing.

In Article 4 of the PSM, as is the case with Article 2 Subsection 3 of the UNCLOS, States' sovereignty is unambiguously recognised and the responsibility that is part of it. Although more emphasis is on ports in their respective territories, including the right to deny or grant entry to them, States are also encouraged to exercise these rights following international law. Furthermore, as coordination and collaboration are at the centre of implementing any cooperative effort, Article 6.1 of the PSM, similarly to Article 61.2 of UNCLOS, Article 6 of the Code of Conduct and Article 8 of UNFSA, the cooperation of States through regional

[29] www.fao.org/fileadmin/user_upload/legal/docs/2_037t-e.pdf. Accessed 8 February 2016

[30] http://www.fao.org/port-state-measures/background/parties-psma/en/. Agreement on Port State Measures (PSMA). Accessed 24 January 2021

fisheries management organisations is highly encouraged. Article 6.3. states it clearly that all parties at sub-regional, regional, and global levels shall cooperate, thus ensuring effective PSM implementation. Where appropriate, they may do so through the FAO.

Inspections as a function of MCS are dealt with in Article 13, Section 2(a-i). In this Article, Parties are encouraged to ensure that inspections are conducted by appropriately qualified inspectors in a manner that is not detrimental to the business activity that the vessels are undertaking. Furthermore, and as expressely stated in Article 13 Section 2(h), the PSM does not condone inspections that are deemed discriminatory and those that are viewed as an act of harassment of any vessel. Hence, conformity with international law in its implementation is held in high esteem. It is envisaged that effective implementation of all the provisions of the PSM will, among other things, contribute to harmonised port State measures that are an enabler to a more concrete regional and international cooperation. That will inevitably lead to the more central desired outcome of the PSM, which is to block all entry points, transhipments, and shipments of the bulk of illegally caught fish into national and international markets. Its impact on the broader objective of conservation and sustainable utilisation of the aquatic living resources working in tandem with the rest of the other tools, as explained in the preceding text.

2.6. Implementation of the Monitoring, Control, and Surveillance (MCS) framework

Dynamics in the management and subsequent MCS programs of fisheries can be viewed from both the international or global perspective and the regional perspective. An indisputable fact about fish and fish products is the vital role they play in food security and nutrition in most developing nations and at the regional and global levels. It is the same space it occupies in poverty reduction, which is realised through employment opportunities that it creates and the economic development and growth (OECD, 2017). However, whilst utilising a similar perspective, but in the African context, and elaborating more on the importance of fish in economic growth and development, Heck *et al.* (2007) state that fish in Africa has in the recent past become a leading export commodity, where the export value of fish stood in 2007 at USD 3.27 billion. In safeguarding this critical resource, MCS becomes a central component of the entire suite of fisheries governance strategies employed by the respective countries, individually or as a group.

According to Cochrane and Garcia (2009), there is no particular MCS approach supporting the above assertions that can be thought of as an immediate solution for all challenges inherent with fisheries management. Alternatively, various methods that are deemed essential components of a comprehensive MCS effort in fisheries management strategies of different countries can never be viewed as right or wrong. According to Branch and Clark (2006), such fisheries management approaches can include the Total Allowable Catch (TAC), which is about setting limits to the tonnage that can be caught annually, divided proportionally among right holders. Secondly, there is a Total Allowable Effort (TAE), which in essence is about limiting the number of people, boats, or traps that can be utilised by a permit or license holder in the exploitation of a particular species in a fishing season. Both of these fisheries management approaches, their implementation plans, and the evaluation of their effectiveness will contribute as the mast of any National MCS program.

All of the above-mentioned fisheries governance approaches are utilised in commercial fisheries. However, regarding artisanal fisheries, the notion of a bag limit is often used, and it is about restricting individual fishers to a fixed maximum number of fish each individual may catch at any given time (Branch & Clark, 2006). In their arguments, Branch and Clark (2006), also include what they refer to as the indirect fisheries management measures, which include, but are not limited to, gear restrictions, closed areas, and seasons. Gear restrictions mainly focus on, for example, mesh sizes and hook sizes; blade sizes; or where traps are used, it could be escape hatches; all that serves to put a limit on the sizes of fish or any other targeted species that may be caught. Another approach that is utilised to reduce fishing effort is seasonal closures. According to Branch and Clark (2006), seasonal closures are predominantly invoked during the breeding season to prevent harvesting, which may have far-reaching consequences in the breeding stock and allows reproduction. All of these measures, coupled with others that may be explored in this study, form the basis on which the South African MCS strategies and plans are developed and implemented.

2.7. Technology as an integral part of MCS operations

In UNCLOS (1982), responsibilities of coastal States within their respective Exclusive Economic Zones (EEZ) are explicitly defined, i.e., with regards to both the economic development and effective control in the utilisation of marine living resources (Girard & Du

Payrat, 2017). These responsibilities are premised on sustainable utilisation of marine living resources, which is anchored in sound management and conservation practices, for example, the reduction of Illegal, Unreported, and Unregulated (IUU) fishing, ecosystem-based approaches and Marine Protected Areas (MPAs), (Girard & Du Payrat, 2017). These sentiments are also expressed under the Duties of a Flag State in Article 18 (3) (g)(i) of the UNFSA. These responsibilities are said to include Monitoring, Control, and Surveillance of its fishing fleet, or fishing vessels flying its flag to ensure that national inspection schemes and regional enforcement schemes are observed. It is further proposed in Article 18 (3)(g)(iii) that this achievable through the development and implementation of a Vessel Monitoring System (VMS), which must conform to a set of universally accepted standards as agreed upon in the region or sub-region. According to Lobach (2010), the pronouncements of the UNFSA were the first recorded appeal for the use of VMS in a global instrument directed to flag States. The intention was to develop and implement VMS as an integral part of an MCS system that should be utilised to monitor their respective fishing fleets' fishing activities. Muench et al. (2017) define the VMS as *"satellite-based surveillance systems that send vessel identification and location, the VMS poll, information at prescribed time intervals, often for fishery enforcement."*

The indication given by Selbe (2014), is that Portugal is the first country that can be accredited for the development of the present-day architecture of the VMS, which was precipitated by concerns of the prevalent wasting of time whilst searching for vessels that were in difficult situations at sea. At the time, satellites were the only available communication means for ships that were beyond the horizon. An example of such satellites is the International Mobile Satellite Organization, later renamed Inmarsat, which was launched in 1978 by the International Maritime Organization (IMO) to improve satellite telecommunication and safety at sea (Girard & Du Payrat, 2017; Selbe, 2014). Inmarsat launched the first constellation of VMS satellites in the 1990s, which was immediately followed by the Argos constellation. While the Inmarsat constellation was specifically for VMS, initially, Argos was mainly launched for environmental monitoring, but at some later stage, also it was upgraded to cater to VMS needs (Girard & Du Payrat, 2017). Iridium, which is another important global player in VMS technology, entered the fray in 2000.

FAO (1998) defined VMS's role in an MCS system to be a central part of an MCS regime that leads to its effectiveness. Furthermore, VMS is considered to be a viable management tool in the broader MCS strategy. Longépé *et al.* (2018) emphatically describe a VMS system's role

as the cornerstone of any national MCS program in the world. Due to VMS's universal acceptance as an integral part of an MCS program, there has been an increase in its utilisation over the past twenty (20) years. In explaining further, the reasons behind the global rise in the utilisation of VMS, Flewwelling *et al*. (2002) argue that, the reasons for the escalation in the utilisation of technology in all MCS efforts and strategies globally are driven by the decreasing fish stocks and the degradation of the marine environment. In some quarters, this may be interpreted as a negative way of understanding its increase in global utilisation. Alternatively, and what can be deemed a positive outlook on the increase in VMS use may be attributed to recent advancements in the satellite-based VMS systems. The advent of satellite-based VMS systems has inevitably led to the propagation of a now widely held belief that these technological developments are likely to result in a more efficient and effective MCS program globally (Flewwelling *et al*., 2002).

This assertion, most probably, emanates from the fact that data generated through the VMS system is at a reasonably low cost if compared with more traditional methods, for example, at-sea-boarding of fishing vessels Flewwelling *et al.* (2002). Also, advancements in technology, particularly about satellite-based VMS, have a potential to improve the effectiveness of MCS systems by generating a more comprehensive range of useful data at a substantially lower cost than exclusive reliance on more traditional MCS measures, such as at sea enforcement Flewwelling *et al*. (2002). Another dimension of this debate is that compared to the conventional methods mentioned above, VMS provides more information than any of them, not to mention a more expansive coverage and of better quality (Katara & Silva, 2017). The other important aspect of satellite-based VMS is that it provides real-time or next to real-time position, course, and speed data through a communication link directly into a base station (Cochrane & Garcia, 2009). Such capabilities enable VMS operators to track all vessels' activities in all areas under surveillance in real-time within the system. That is further expounded by Chang, (2011); Davies *et al.*, (2007); Detsis *et al.*, (2012) when they state that VMS in areas where fisheries are closed can be used as part of a fisheries management strategy. Furthermore, a VMS can also allow transmission of information that is not position information and is not necessarily entered by the vessel's operator. Such information could be derived from various automatic sensors FAO (1998), which are explored further in the following discussion.

Apart from the demonstrated direct relevance to MCS intervention strategies in the preceding text, there are indications that utilisation of VMS in the broader fisheries governance has the

potential of yielding even better results and improvement of fisheries governance in general. A typical example of that is the extraction and utilisation of information from sourcebooks like the logbook, catch and effort data from the fishing vessels, which can be loaded directly into the VMS system (Cochrane & Garcia, 2009). Information loaded in this manner assists in quota management and stock assessment, which is always appreciated by at-sea boarding parties. It should be noted that VMS's versatility and additional capabilities that can be explored need both the technical support to maintain its functionality and skilled operators. Currently, prominent views are that the VMS is at the centre of all technologies regarded as immensely important to effective and cost-efficient MCS strategies.

Noteworthy is that there have been significant developments on the new technologies front used in fisheries governance and other related maritime activities over the years. Most notable in these technological developments was demonstrating what could be achieved by combining VMS technology with Synthetic Aperture Radar (SAR) technology, which is a high-resolution radar satellite data, and this study was conducted in the European waters by (Kourti *et al.*, 2001). These technological developments made it possible to detect fishing vessels without any cooperation arrangement between the vessels and the relevant Fisheries Governance Authority (FGA). That is contrary to the VMS functioning, where an Automatic Locating Unit (ALU) must first be installed and switched on in order for the vessel to be identified and tracked. Outside of Europe, this pioneering technological combination has been used consistently by France in their Southern Ocean sub-Antarctic Island territory of Kerguelen Islands since 2004 (Longépé *et al*., 2018). Indonesia followed suit, and they started by creating Infrastructure Development of Space Oceanography (INDESO) in 2012, which was launched and came online in October of 2014.

The primary purpose of INDESO is to fight IUU fishing, relying on receiving and analysing high-resolution satellite imagery data through a Vessel Detection System (VDS), a system that targets non-cooperative fishing vessels (Longépé *et al.*, 2018). The mechanics of fisheries monitoring, utilising a combination of VDS as reliant to SAR imagery and VMS, are made possible by SAR sensors that would be covering a specified monitored area, and these sensors are not affected by weather or day and night conditions (Detsis *et al*., 2012). In this combination, the SAR image generated through the SAR sensors is taken and used for the analysis of a vessel itself. Still, sometimes an image of a vessel's wake is taken and used for a similar analysis. In those instances, i.e., where the SAR image that was taken is the wake of

the vessel, a rigorous analysis of the wake image would be performed where specific physical characteristics are the main focus of the analysis. Positive identification of a non-cooperative vessel will be attained after the resulting data from the analysis, as explained above, has been cross-correlated with VMS or AIS data (Detsis *et al*., 2012).

As part of the suite of the latest technological developments is the Automatic Identification System (AIS), a system characterised by ease of access to the public (Shepperson *et al*., 2018). Predominantly the data generated through AIS is utilised to track vessels, and it is therefore very helpful in investigating fishing activity (McCauley *et al.*, 2016; Natale *et al*., 2015). Although it may look like AIS is a viable alternative source of information with regards to tracking and scrutinising fishing activity, Shepperson *et al.* (2018) warn that it is too early to be too much reliant on AIS as there are still problems with regards to the quality and interpretation of data it provides. Perhaps the teething issues that are being expounded by Shepperson et al. (2018) can be better understood when the historical background of AIS is taken into consideration. Longépé *et al.* (2018) define the AIS system as a system developed for collision detection and avoidance among merchant ships. However, in both design and application, the system has since advanced to be where it is at the moment. Presently it can be described as a maritime system linked to a satellite system, and it uses Very High Frequency (VHF) band in the transmission and reception of information, commonly referred to as sat-AIS (Carson-Jackson, 2012; Longépé *et al*., 2018).

With specific reference to fisheries governance, the AIS utilisation, compared to that of VMS, where the determining factor for preference is capability, there are different views from experts in the field. For example, Hinz *et al*. (2013) argue that the two systems cannot be compared because AIS is freely available to the public if the comparison could be only on availability and ease of access. In contrast, access and use of VMS are under the strict regulatory control of FGAs. However, Hinz *et al*. (2013) are quick to point out that the original engineering design of AIS that of collision detection and avoidance makes it susceptible to unauthorised access. Of great concern, though, is that the signal can be lost when it is operated in an area with less density of vessels as it needs to be transmitted from one vessel to the next (Shepperson *et al*., 2018). Also, there is a high possibility and risk of information falsification where a particular fishing vessel's skipper can deliberately or accidentally enter into the system wrong information about the vessel, for example, the vessel identification (McCauley *et al.*, 2016). Given the difference in VMS and AIS's validation regimes by authorities, when falsification of

information occurs, this may defeat the vital tenacities of an MCS program. Although there are further arguments about the difference between the two systems, Shepperson *et al*., (2018) believe that there has been little scientific comparison between the two systems. Their argument is anchored on that an intensive study to generate accurate comparison data is needed for the two systems. Also, where they will be operated in the same vicinity; subjected to the same conditions, such that individual variations can be reasonably and equally analysed. Until that is conducted, for now, AIS cannot be adequately and precisely equated to VMS, nor can it even be considered an alternative to VMS in a fisheries governance setting (Shepperson et al., 2018). The only suggestion that Shepperson et al. (2018) are offering in getting around the problem in the meantime, and with particular focus on MCS applications, is that FGAs can get more reliable data on fishing activity through the increase of VMS poll frequency than using AIS.

Although this study's focus is on MCS and the role that technology plays in achieving MCS objectives as part of fisheries governance, the reality is that technology that has been explained above covers a wide range of subjects. In essence, the ability to extract and make available surveillance information from a wide range of vessels, especially non-cooperating, contributes to the notion of Marine Domain Awareness (MDA) (Detsis *et al*., 2012). MDA is defined as a security concept that infuses activities like military operations, piracy, illegal immigration, fishing activities, and other activities, where sources of data are various systems that are inclusive of VMS and SAR (Mills *et al.*, 2007). Undoubtedly this is beyond the scope of this study. Suffice to say that there are areas of common interest presented by technology that is currently in use and technology that is still under development. That may be an area of further research on the lengths that technology used for fisheries governance purposes can be used for other uses, such as safety and security. There are indications of such studies already as Miller *et al*., (2010) suggested that utilisation of bioluminescence in monitoring vessels and submarines at sea is a current military technology that may be pursued to strengthen MCS efforts against IUU fishing vessels in the future.

3. AN OVERVIEW OF THE SOUTH AFRICAN FISHING INDUSTRY

3.1. The South African fisheries sector and the implementation of MCS

3.1.1. General introduction and background

From the Orange river, the South African border with Namibia in the West to Ponta do Ouro in the east, the South African border with Mozambique, the South African coastline is approximately 3 100km (Branch & Clark, 2006; Wepener & Degger, 2019). That covers an Exclusive Economic Zone (EEZ) of about 1 million square kilometres, and this excludes Prince Edward and Marion Islands which are South African territories in the Southern Ocean. Combined, both add 100 000 km^2 of ocean requiring protection. Branch and Clark (2006) state that South Africa's coast is biogeographically divisible into three central Provinces extending from the Republic of Namibia to the Republic of Mozambique. The first of these Provinces is the Benguela province on the west coast, which is mainly characterised by its cold, nutrient-rich upwelled waters of the Benguela current. The Natal Province, characterised by warm nutrient-deficient waters of the Agulhas current occurs along the east coast. The third Province is the Agulhas province, which is the confluence of the Agulhas current that follows the continental, and moves to the offshore and creates an array of intermediate conditions. Branch and Clark, (2006) further state that these biogeographic differences are the underlying reason for the variety of marine life that South Africa experiences. Furthermore, following all other upwelling ecosystems globally, the South African western coastal shelf is a highly productive ecosystem (Cochrane, 1995). That contrasts considerably with the east coast, which is far less productive than the west coast, but with high species diversity that includes both Indo-Pacific and endemic species (Cochrane, 1995).

Study of middens, shows that the abundant marine living resources along the South African coastline have been exploited for many centuries, (Cochrane, 1995). Abalone is an example of that exploitation as available evidence suggests exploitation of 12 000 years. The sample applies to various other marine living resources exploited by Strandlopers (beach-walkers) approximately 6000 years ago (Cochrane, 1995). Some form of a regulated fishery in South Africa, according to Branch and Clark (2006), started in 1657/58 when Jan van Riebeeck passed fishing regulations that were allowing freemen to fish but, *"not for the sake of selling",* in order *"that agriculture may not suffer."* However, sizeable industrial fishing has started in South Africa close to the beginning of the last century. That process escalated rapidly, and by

the 1960s catches had exceeded the sustainable yield in many of the South African fisheries. According to Cochrane (1995), this alarming decline in several key fish stocks led to a strong drive to institute a scientific basis on the management of significant fisheries.

In the 1990s, immediately after the new political order was ushered in in South Africa, a period of wide-ranging political and administrative reforms started. Such reforms targeted national challenges that included a depressing legacy of hunger, indiscriminate poverty, unemployment, poor education system, and a biased distribution of resources system (Hersoug, 1998). Regarding the fishing sector, the combination of the 40 years of apartheid coupled with 300 years of colonial domination and discrimination left a significantly uneven distribution of resources between black and white communities, (Hersoug, 1998). During this epoch, the gap between the small scale and the commercial fisheries sectors widened, and that attributed to both the general government policies of the time and the uneven regional distribution of catching and processing possibilities, (Hersoug, 1998). Furthermore, the fisheries administration was dominated by white politicians and white administrators with total disregard of active participation and involvement of coastal populations which were predominantly black, (Hersoug, 1998).

The transition to democracy in South Africa in 1994 provided an opportunity to include this neglected sector in the post-apartheid fisheries policy. One of the promises from which the African National Congress (ANC) moved, as the sitting government, was to redress the past's imbalances and push back the frontiers of poverty (Hersoug, 1998; Sowman, 2006). That included a more focused approach on the government's part to change the impoverished coastal communities' status quo through improved access to marine resources (Sowman, 2006). This commitment was reiterated through the policy development process between 1995 and 1997. Statements promoting a new approach of equitable access to marine resources, addressing past imbalances, and managing resources for the benefit of the country's entire citizenry were clearly articulated in the White Paper for a Marine Fisheries Policy for South Africa (Sowman, 2006). The new national fisheries policy was published in 1997, after enacting the South African Constitution, 1996. This new policy, as influenced by the values of the Constitution, its underlying principles took cognisance of the vulnerability of coastal resources, thus aligning it with the latest global trends in fisheries management whose mantra is the promotion of sustainable fishing (Witbooi, 2006). A significant paradigm shift because fisheries worldwide have always found it challenging to adequately balance the protection of marine living resources with sustainable and equitable economic access (Hauck & Kroese, 2006). The

balance could be achieved if the process involves developing rules and regulations by the National government, whereby the critical function of the Fisheries Governance Authority (FGA) is spelt out to ensure compliance. That was in consideration of the prevalence of various forms of non-compliance in fisheries worldwide that was identified as one of the leading causes of dwindling global fish stocks, thus a significant threat to sustainable fisheries management regimes (Hauck & Kroese, 2006). South Africa as a member State to the Southern Africa Development Community (SADC), and in recognition of the widespread challenge of non-compliance in fisheries, took a decisive action of being actively involved with fellow SADC States in strengthening compliance strategies in the region, focussing on Monitoring, Control and Surveillance (MCS) (Hauck & Kroese, 2006). Actions that South Africa took to ensure cooperation with the other SADC States and built on its MCS capacity whilst contributing to developing a consolidated Regional MCS are explored further in this chapter's following sections.

3.1.2. Fisheries governance: Legislative and policy framework in South Africa

In 1994 there was a significant shift in regulations, resources exploitation, the disparity in resource access and distribution as a clear shift of guard from one system of government to the other. The total South African quota was 512 437 tons in 1994, i.e., the eight species regulated by total allowable catch (TAC). Hersoug, (1998) points out that from this quota, only 0.75% was awarded to blacks, and from 2 700 registered commercial fishing boats in South Africa, only 7% were black-owned. Besides, there were 4000 fishing licences issued and approximately 6% were issued to blacks (Hersoug, 1998). The same imbalance applied to the allocation between the big business and the small business sectors. Out of the 512 437 tons, i.e. the total quota, only 7% was awarded to the small business sector while the rest was allocated to big business. However, there were some variations from one species to another. For example, big business accounted for 88% of the hake quota, 85% of the sole and 99% of the anchovy, 80% of horse mackerel and pilchards; 70% of West Coast rock lobster and 84% of the abalone (Hersoug, 1998). Hersoug (1998) further points out that in the lucrative hake sector, only three companies controlled 72% of the allocated TAC in 1994. In the commercial small pelagic fishery sector, three companies controlled 79% of the anchovy TAC and 30% of the pilchard TAC, while five companies effectively controlled 90% of abalone fishery.

Similarly, three companies controlled 82% of the South Coast rock lobster (White Paper - Marine Fisheries Policy for South Africa, 1997; Hersoug, 1998). Also, worth mentioning is that during the same period fishing rights allocations were guided and implemented utilising the Sea Fishery Act of 1988. Such state of affairs could not be ignored, and the new government had to act if its primary objectives of redistribution of wealth; redress of imbalances of the past and proper control and administration of the fisheries sector were to be realised. The three focus areas of government as stated above are provided for in the objectives and principles of the Marine Living Resources Act (MLRA) under Chapter 1, Section 2 (b; d; h and j) (RSA, 1998a, 2014).

Therefore, after enacting the South African Constitution, 1996, the new South African government undertook a comprehensive review process of all sectors' legislative framework. An area of particular interest for this study is the legal framework review of the South African fishing sector. Up to 1994 South Africa's industrial fisheries, as per the prevalent institutional arrangements at the time, were dominated by a few large companies whose growth and development has been to a large extent supported favoured by policies of the apartheid regime (Nielsen & Hara, 2006). That is further emphasised by (van Sittert *et al*., 2006) when they state that, the norms and standards of the segregationist government-driven policies resulted in imbalanced ownership of marine access rights and the means of their utilisation. Therefore, it becomes apparent that the main underlying reason for fisheries legislative framework review in the post-apartheid South Africa was not environmental nor economic considerations, but rather socio-political concerns which were deemed as necessary to redress the imbalances of the past (van Sittert *et al*., 2006).

The South African White Paper on Marine Fisheries Policy (WPMFP) was published in May of 1997. Central to the white paper was the long-term vision for a democratic South Africa, as stated in the Macro-Economic Strategy (MES) as was driven by the Department of Finance. The MES was about a competitive, fast-growing economy which sought to create sufficient jobs for all job-seekers. It was also in favour of redistribution of income and opportunities favouring the poor (RSA, 1997). In addition to that underlying vision of the White Paper, its objective was to improve the fishing industry's overall contribution to the long term vision of economic development and wealth distribution (RSA, 1997). That is further put into perspective by Witbooi (2006) in her assertion that equity, sustainability and stability are three fundamental aspects of a cogent structured fisheries policy. It is important to note that the development of the WPMFP precipitated the writing of the MLRA and the fundamental

principles as expressed in the white paper were translated into the Act. That is elaborated further in part 1 Section 2 (a) to (j) of the MLRA wherein the objectives and the underlying principles of the MLRA are articulated. Section 2(j) for example, emphasises the desired impact of the restructuring process of fisheries as to attend to the historical imbalances of the past and achieve equality and equity in the process (RSA , 1998a; Witbooi, 2006). The importance of the MLRA's objectives and principles is that they give policy and strategic direction to any future policy framework on fishery matters that would be formulated in South Africa. Of equal importance is that the objectives and principles of the MLRA do recognise the importance of striking a balance between economic benefits through improved access to the resource, conservation and ecological sustainability which are matters that have taken centre stage in the global discussions on the need to promote sustainable fishing (Witbooi: 2006). The progressive amendment of the MLRA in 2014 paved the way for implementing the small-scale fisheries policy.

When the White Paper on Marine Fisheries Policy and the MLRA was published, the government Department mandated with fisheries management was the Department of Environmental Affairs and Tourism (DEAT). The specific and implementing branch under DEAT was Marine and Coastal Management (MCM) branch. Hence in the WPMFP is was emphasised that the Department of Environmental Affairs and Tourism was mandated under the primary policy principles, to endeavour to implement the policy through its marine fisheries management institutions to achieve this overall policy objective (RSA, 1998a). Inevitably the same approach and expectations were for DEAT to do the same for the MLRA, albeit with a renewed interest on transformation. Hence the enactment of the MLRA ushered in a period of escalating transformation efforts within the fishing industry. However, the lack of transformation in the sector remained as the roadmap provided by the MLRA was not clearly defined (Witbooi, 2006). This situation is enunciated in the judgement of Justice Schutz of the South African Court of Appeal (SCA) in a matter to appeal the hake allocation processes and transformation considerations amongst others, or failure thereof, by DEAT in case number 32/ 2003 and case number 40/2003 (Supreme Court of Appeal, 2003)[31]. In his judgement, Justice Schutz intimated that although there may be some areas that the MLRA is not clear on, it becomes incumbent upon the Minister or his or her delegated representative's discretion to take

[31] Minister of Environmental Affairs and Tourism and Others v Phambili Fisheries (Pty) Ltd and Another (32/2003, 40/2003) [2003] ZASCA 46; [2003] 2 All SA 616 (SCA) (16 May 2003)(Supreme Court of Appeal, 2003)

administrative decisions. He further stated that it is not the function of the court to sit on appeals on decisions to grant fishing allocations in fulfilling legislated transformation expectations or to constitute itself as an authority as to how to make such allocations as that is the duty of the government functionaries, not courts (Supreme Court of Appeal, 2003).

According to Nielsen and Hara (2006), the nondescript definition and transformation goals as reflected in the MLRA may have had unintended strategic advantages for MCM as the statutory responsible fisheries management authority. Therefore, the dismissal of both cases by the SCA, with DEAT exonerated from any suggested failures on carrying out its legislative mandate, maybe a case in hand. It provided MCM with the necessary platform and the requisite administrative flexibility to carry out the susceptible and complicated reform task. Nielsen and Hara (2006) succinctly sum up this argument by asserting that from an administrative perspective, the nebulous definition of transformation benefitted government departments in avoiding lawsuits that were a real threat to reform efforts in the 1990s when the government instituted its first efforts to redistribute the access rights of existing rights holders. Taking the matter further on equity as encapsulated in the MLRA in Part 1 Section 2 (j) read in conjunction with part 3 Section 18 (5), Part 5 Section 30 (2) and Section 32 (a-e) it becomes apparent that some of the intentions of the MLRA are to encourage equity and growth in the fishing sector through co-operative strategies, especially from the previously disadvantaged communities. Additional arguments were on the reallocation of fishing rights, with a view that they were instead dealt with as a resource management issue rather than a socio-economic challenge (Nielsen & Hara, 2006).

In 1994, another crucial dimension central to the policy development discussion was that South Africa is not a standalone country, but an integral part of the global village and more so the SADC region. Regarding this matter, Witbooi (2006) argues that fisheries policy reforms that have occurred in South Africa should not be viewed in isolation, but rather as an integral part of the changes that have been experienced in regional and international fisheries regulation. The basis for this argument is that whilst South Africa was in isolation from the rest of the world due to its repressive laws there was no pressure exerted upon the country to conform into many of the pieces of international law (Hersoug, 1998; Nielsen & Hara, 2006; Witbooi, 2006). However, due to the advent of democracy and subsequent acceptance of South Africa as part of the global community, international law formalised by the Constitution, exerted a significant influence on the domestic legislative framework. Currently, South Africa is a Contracting Party or a Non-Contracting but Cooperating Party to many of the Regional Fisheries Management

Organisations (RFMOs) and international organisations worldwide. The agreements that the country has with these organisations are based on international law, which tends to inform or influence the domestic fisheries legislation (Witbooi, 2006). This argument is brought closer to the South African interests, as encapsulated in the Constitution, by van Sittert *et al*. (2006) when they state that an array of these policy agreements have as their essential elements, environmental protection, optimal utilisation of resources; sustainability and maintenance of ecosystems as well as the rights of indigenous peoples and their cultures. The South African Constitution (1998) is even more decisive in the protection of environment as it elevates it to be one of the rights under Chapter 2, Section 24. Wherein it is stated that everyone has a right to a protected environment that is not harmful to them, which should be of benefit to both present and future generations. However, of particular relevance to this study, captured under Section 24 (b) (iii) of the Constitution of South Africa (1998), is the right of everyone to a, *"secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development."*

Therefore, it is essential to note that the United Nations Convention on the Law of the Sea (UNCLOS) discussed extensively in Chapter 2, Section 2.2 of this study, is the key international agreement that significantly influences domestic marine fisheries policy. It establishes the legal regime for the ocean and all marine living resources therein. Provisions of UNCLOS that are particularly relevant to domestic fisheries management include those providing for the establishment of maritime zones and those regulating the use of marine living resources within these zones. South Africa has been Party to UNCLOS since 1997 and has incorporated almost all provisions of UNCLOS into its domestic legislative framework through the Maritime Zones Act (MZA) and the MLRA (Witbooi, 2006). UNCLOS entitles all coastal States to claim various maritime zones. These, according to Part II Article 2 read in conjunction with article 17 of UNCLOS, include a 12 nautical mile territorial sea within which coastal States enjoy complete sovereignty subject only to the right of innocent passage by foreign vessels (United Nations, 1982). According to Part IV, Article 55 and Article 56 (a-c), both read in conjunction with Article 57; there is a 200 nautical miles Exclusive Economic Zone (EEZ) as well in which coastal States may exercise rights over marine resources therein (United Nations, 1982). The Coastal States may subject domestic and foreign fishers within these zones to their national fisheries law. Under UNCLOS, the Maritime Zones Act claims, among other things, territorial waters and an EEZ for South Africa (Adangor & Arugu, 2018; Conradie, 2019; Witbooi, 2006). Besides, within their respective EEZs, States incur various conservation

and sustainable use obligations regarding marine living resources. In line with the provisions of UNCLOS coastal States are compelled to determine the Total Allowable Catch (TAC) of living marine resources within their EEZs, and to ensure proper conservation and management of these resources with the sole purpose of avoiding over-exploitation, for example, Articles 61, 62 and 63 (Conradie, 2019; Witbooi, 2006) . As required by UNCLOS, a key component of domestic fisheries management is the determination by the Minister of Environment Forestry, Fisheries and Environment (DEFF) a TAC and the allocation of portions thereof to various fishing sectors.

Furthermore, under Article 62, paragraph 2 of UNCLOS, South Africa can harvest its annual TAC fully, it is not bound to implement UNCLOS's provisions concerning the sharing of surplus stock. As it exercises sovereign rights over the marine living resources within its EEZ, the government may nevertheless elect to permit foreign fleets to harvest within this zone. In the South African legislation, i.e. the MLRA, this is stated in Part 6 Section 38 (1 and 2), and Section 39 (1-5), where it is confirmed that South Africa may enter into international fishing access agreement (Witbooi, 2006). Another international law dimension that the South African fisheries management legislative and policy framework has taken into its fold is the United Nations Food and Agricultural Organisation's (FAO) Code of Conduct for Responsible Fisheries (Coll *et al*., 2013; Hosch, 2009; Witbooi, 2006). As the Code is voluntary (see Chapter 2), South Africa is not obliged to comply with its provisions, but South Africa as a member of FAO adopted the Code in 1995 and it is nevertheless an influential policy document (Witbooi, 2006)[32].

Furthermore, the FAO Code's goals together with certain specific obligations imposed by the Code is identifiable in the core principles, and objectives of the MLRA reflected in different provisions of the MLRA and its regulations, (Witbooi, 2006). From the regional point of view, the South African fisheries management legislative and policy framework also can be looked at per the SADC Protocol on Fisheries, which was also discussed comprehensively under Section 2.8 of Chapter 2. Most importantly is that South Africa is Party to the SADC Protocol on Fisheries, a Protocol that was signed in 2001 and came into force in 2003 (Witbooi, 2006). Recognising goals of the Protocol, and drawing parallels with the MLRA, Witbooi (2006) argues that, even though the MLRA has given effect to numerous provisions of the Protocol, the MLRA falls short to adequately reflect the comprehensive suite of the obligations imposed

[32] https://sapfia.org.za/wp-content/uploads/2018/04/SAPFIA-Code-of-Responsible-Fishing-FINAL.pdf. Code of Conduct for Responsible Fishing. Accessed on the 01 July 2021

by the Protocol. However, part of the reason is probably that the MLRA was concluded before the Protocol was finalised. To clarify and substantiate these assertions, and drawing from the Protocol's Article 8, which is about harmonisation of legislation, Section 4 (b) may be an example. Section 4 (b) of Article 8 is about State Parties cooperation on establishing region-wide comparable levels of penalties that should be instituted for illegal fishing. The MLRA has no such provision, and if it had, that would have been construed as addressing Regional integration issues.

Furthermore, Article 9, sections 1 (a-e) and 2 of the Protocol, is another area of interest that could be utilised in supporting the views as expressed by Witbooi (2006) in the identified gaps of the MLRA as explained. Article 9 articulates the responsibilities of State Parties in the regional fisheries law enforcement framework. For example, in Article 9 Section 1 (b) it is stated that *"State Parties shall co-operate in the use of surveillance resources to increase the cost-effectiveness of surveillance activities and reduce the costs of surveillance to the Region and two or more State Parties may conclude an arrangement to co-operate in the provision of personnel and the use of vessels, aircraft, communications, databases and information or other assets for fisheries surveillance and law enforcement."* In the MLRA, there are no provisions that are explicitly addressing the contents of the two Articles of the SADC Protocol on Fisheries. As provided for in Part 6, law enforcement (51 to 56) of the MLRA are the areas where Article 9 of the Protocol should have been incorporated to achieve the regional outlook of the MLRA. Some provisions of Article 8 of the Protocol are addressed by Part 7 Section 42 (1 to 3) of the MLRA, but it is not explicit. It is rather too general and not as specific as obligations that are pithily captured in the Protocol. Therefore, given the two examples as explained, this gives credence to Witbooi's (2006) assertion, that there is still a bit to do towards bringing the MLRA to an accepted level of Regional integration through a properly aligned and fully integrated legislative framework.

An approach mostly focussing on balancing economic efficiency, social equity, and ecological sustainability is often stated as the overriding objective of most fisheries management systems worldwide, (Cochrane, 2000). South Africa has adopted these broad objectives, but due to its political past, it has also prioritised social equity issues as stated in Chapter 1 Section 2(j) of the MLRA. However, in the fisheries sectors where this intervention matters most, i.e. the small-scale and subsistence fisheries, Sowman (2006) argues that the extent to which a positive impact has been realised is questionable. Sowman (2006) further states that the individual rights-based approach in the rights allocation process further compounds an already complex

rights allocation system. That is problematic because of historical use patterns and socio-cultural practises. Sowman (2006) points out that, lack of clarity regarding policy priorities across an array of legislation relevant to natural resource management, food security and poverty alleviation has resulted in an inconsistency in their implementation.

In the final analysis, it can be stated that to a large extent fundamental global fisheries governance principles that are generally endorsed by international law are amply reflected in the South African legislative framework, (Witbooi, 2006). However, there are still a few grey areas in the South African legislative framework where the inexplicit processes to be followed and adhered to with regards to specific obligatory duties following international law's particular instruments, exposes South Africa to a risk of non-compliance with international law and mismanagement of domestic fishing industry (Witbooi, 2006). A typical example of this matter is how Article 111 of the UNCLOS is reflected in Chapter 6, Section 52 of the MLRA. In the MLRA, except stating that hot pursuit will be done following Article 111, it does not reflect what is in Article 111, Section 3 of the UNCLOS, which says that *"the right of hot pursuit ceases as soon as the ship pursued enters the territorial sea of its State or of a third State."* That creates a severe interpretation problem, more especially among inspectors when they are conducting patrols at sea. Inspectors only refer to the MLRA as their primary source of information and a central guiding document for actions to be taken when at sea and patrolling, and they do not cross-reference with the UNCLOS to get a better view of the entire process as to the grounds for and how coastal States should carry out hot pursuits. In 2010 this led to the South African patrol vessel, the Sarah Baartman OPV, chasing Mozambican vessels fishing illegally in the Kosi Bay area[33]. The two vessels were later apprehended three nautical miles inside Mozambican waters, and they were escorted back to South Africa to be detained in the Richard's Bay harbour. That was nearly a diplomatic incident and that could have been avoided if all the hot pursuit conditions were explained clearly in the MLRA.

3.1.3. South African fisheries: Structure and their economic contribution

Fisheries are major contributors to the socio-economic development of any fishing nation, particularly developing countries, even though there tends to be inaccuracies in their overall

[33] At the time, the Researcher was a Director responsible for the South African Fisheries Patrol Vessels (Directorate: Environment Protection Vessels).

contribution to the country's GDP (Sarpong *et al.*, 2005; Zeller *et al*., 2006). In this regard South Africa has not fared any better, hence there were studies conducted to critically understand the socio-economic contribution of the fisheries sector to the country's GDP (Hara *et al*., 2008). Findings of Hara *et al* (2008) were that a greater understanding of the socio-economic contribution of fisheries creates a better understanding of dynamics and interdependencies of the legislative framework, policy and management. In addition, that a better understanding of the South African fisheries structure and economic contribution, particularly fisheries that were prioritised by the FGA, is central in developing their respective management strategies. The development of an effective MCS program should also benefit from this approach through informed FGA policy positions.

Therefore, in the 2012 status of the South African Marine Fishery Resources report published by the Department of Agriculture, Forestry and Fisheries (DAFF) a total of 17 fishery sectors are covered, wherein the most up-to-date information and analyses of their status is presented. The report ranged from Abalone (*Haliotis midae*) to white mussels and small invertebrates, however for this study focus will only be on five fisheries, as examples, which are as follows: (a) Abalone (*Haliotis midae*); (b) both Cape hake species, i.e. *Merluccius capensis* and *Merluccius paradoxus*; (c) Small pelagics, i.e. anchovy (*Engraulis encrasicolus*), round herring (*Etrumeus whiteheadii*), sardine (*Sardinops sagax*); (d) Squid (*Loligo reynaudii);* and (e) West Coast rock lobster (*Jasus lalandii*). The underlying reason for the selection of these fisheries as the primary area of focus for this study is partly due to their economic value and the fact that in the DAFF 2012/2013 to 2016/2017 strategic plan as well as in DAFF's Integrated Fisheries Security Strategy (IFSS) they are prioritised as the five key fisheries sectors.

3.1.3.1. The Abalone Fishery (*Haliotis midae*)

According to Anderson *et al*.,(2012), abalone (*Haliotis midae*), commonly known as the *perlemoen*, is a large marine mollusc that is a highly sought after seafood delicacy in the Far East. Along the South African coastline, abalone is widely distributed, extending from St Helena Bay in the West Coast to just north of Port St Johns in the East Coast (DAFF, 2012). They further states that the resource was most abundant in the region between Cape Columbine and Quoin Point, supporting a commercial fishery for almost 60 years. Map 3.1 below shows

the distribution of abalone in general, but it also illustrates areas from which the abalone is harvested for commercial purposes.

Map 3. 1: Map of South Africa showing the biogeographical range of abalone and areas where it is commercially exploited Source:(Department of Agriculture Forestry and Fisheries (DAFF), 2016

Along the East Coast abalone is not commercially exploited as current scientific evidence suggests that abalone population densities along that coastline are sparsely distributed and discontinuous, (DAFF, 2012). However, even though there were no commercially exploited abalone fisheries in the East Coast, experimental allocations were awarded between 2012 and 2015 (DAFF, 2016). The historical background of the abalone fishery in the DAFF Report (2016), gives the late 1940s as the period from which the fishery started. The report further states that only five large processing establishments dominated it during the fishery's infancy stage. Furthermore, there was no regulation in the early stages of development for this fishery except for size limits (Raemaekers *et al*., 2011).

As the fishery was not regulated in 1965, catches peaked at 2800 tons, harvesting levels which were not sustainable (DAFF, 2012; Raemaekers *et al*., 2011). Catches plummeted immediately in the following years, resulting in the first catch regulations imposed in 1968 (Raemaekers *et al*., 2011). The industry remained profitable even though there was a further rapid decline of catches in 1970. Throughout the 70s, catches were between 600 and 700 tons per annum until the 90s when an improvement in catches was again experienced (DAFF, 2012). The early 1990s came with a new set of challenges for the fishery. A booming recreational abalone

fishery inevitably led to a window of opportunity for a significant increase in illegal fishing activities in the sector (DAFF, 2012; Raemaekers *et al*., 2011). Illegal fishing in the industry was precipitated by high accessibility of abalone, coupled with the fact that abalone is easily harvested, lucrative, and a target of international poaching syndicates (Branch & Clark, 2006; Cochrane *et al.*, 2020).

A combination of sustained high levels of illegal fishing in the sector and the downward trend in the abalone stocks compelled Marine and Coastal Management (MCM) to close the recreational fishery in 2003/2004 (DAFF, 2012). On the other hand, the fishery's transformation in post-apartheid years sought to increase participation in the fishery, particularly by individuals and communities that were on the receiving end of economic exclusion by the repressive regime. Therefore, in 1998/1999, subsistence rights were introduced, but two-year medium-term rights subsequently replaced them. That process was to be followed by the allocation of ten year long term rights in 2003/2004, aiming at broadening participation in the abalone fishery (DAFF, 2012). In February 2008 the commercial abalone fishery, once revered as a lucrative commercial fishery where at the turn of the century it was having annual earnings of about R100 million was closed entirely to allow natural recovery of the resource.

This total closure's fundamental reasons were the decline in density and distribution of abalone stocks within the resource's designated commercial harvesting zones due to illegal harvesting (DAFF, 2012). In July 2010 the fishery was re-opened on the premise that conditional total allowable catch (TAC) allocations will be based on appropriate reduction in illegal harvesting of the resource. This approach could be attributed to the erstwhile prevailing DAFF management objectives, prioritising sustainable utilisation of natural resources. Closely aligned to this is the active monitoring and prevention of abalone spawning biomass in each zone from dropping below 20% of an estimated pre-exploitation level, and to see to it that it recovers to 40% of that level within 15 years, i.e. by 2024/2025 season (DAFF, 2012). During this period, Betty's Bay MPA, situated within Zone D, also experienced severe declines in the abalone due to poaching and ecological changes (DAFF, 2016). That resulted in the closure of Dyer Island to commercial abalone fishing, i.e. with effect from the 2003/2004 season, and it has since functioned as a refuge for abalone to assist in stock recovery (DAFF, 2016). Furthermore, in 2014 long-term rights allocated in 2003/2004 expired, and the Department opted to grant exemptions to all rights holders until 2016 (DAFF, 2016).

3.1.3.2. The South African hake fishery (*Merluccius capensis; Merluccius paradoxus)*

There are two hake species in the South African waters: the shallow water Cape hake *Merluccius capensis* and the deep-water Cape hake *Merluccius paradoxus*. The most abundant of the two species is the *Merluccius paradoxus* as it makes up 90% of the total hake catches, and the remaining 10 % is the *Merluccius capensis* (Nielsen & Hara, 2006). Closely linked to the hake catches are the by-catch species such as monkfish (*Lophius vomerinus*) and the kingklip (*Genypterus capensis*), which are also of economic importance as aligned to the species (Nielsen & Hara, 2006). The range distribution of the deep-water hake extends from Northern Namibia to just east of East London in the Eastern Cape of South Africa. On the other hand, the shallow water hake has a distribution range that extends from southern Angola to the northern KwaZulu-Natal. In their predefined fields, both hakes can be found on the continental shelf and upper slope around Southern Africa. The hake fishery was started in the period before the end of the First World War until 1931 (DAFF, 2016). Catches are reported to have been averaging 1000 tons per annum, and after 1931 it showed some steady increase. However, during and after the Second World War, the fishery began to show some marked increase in catch rates, which was averaging 170 000 tons per annum in the early 1960s (DAFF, 2016).

An unprecedented significant upswing of hake catches in the South African waters was first realised in 1962, and it eventually peaked at almost 300 000 tons in 1972. Two contributing factors to that event were the incursion of foreign fleets in the South African waters, which increased the local fishing effort and catches. The other was the fact that fishing effort had extended farther offshore where the Namibian waters were also part of the fishing area as Namibia was part of South Africa as the then South West Africa (DAFF, 2012). The results of devastation were evident as in 1972 a total of 1.1 million tons of hake were reported to have been caught in the South-East Atlantic area, which incidentally is the geographical location of both Namibia and the West Coast of South Africa (DAFF, 2016; DAFF, 2012). Still in 1972, and due to concerns over increasing catches and decreasing catch rates, a decision was taken

to establish the International Commission for the South-East Atlantic Fisheries (ICSEAF). This action's main reason was to exercise some control and introduce some fisheries management framework in what had become an international fishery (DAFF, 2012). A wide range of fisheries management measures was introduced in the region through ICSEAF, which included measures such as minimum mesh size, international inspections and quota allocations to member countries (DAFF, 2016).

The establishment of ICSEAF and the introduction and implementation of fisheries management measures did nothing much to improve the dire situation as catch rates continued to decline. However, there was a turn of events in November 1977 when South Africa declared a 200 nautical mile EEZ. That marked a new epoch for fisheries management in the region. This new era was characterised by the direct management of the hake resource by the South African authorities and the exclusion of foreign vessels, except a few ships operating under bilateral agreements and subject to South African regulations (DAFF, 2012). There are four sub-sectors within the broader Cape hakes' fisheries sector: deep-sea demersal trawl; inshore demersal trawl; hake longline and hake handline. Nielsen and Hara (2006) state that the pelagic hake trawl fishery is the most valuable in South Africa and accounts for 40 to 50% of all landings' total value. That is further supported by the DAFF (2016) whereby in their report, the hake fishery accounts for an annual landed value that is more than R5.2 billion and providing employment to more than 30 000 people. A significant step forward considering that Nielsen and Hara published their research in 2006 the hake deep-sea trawling, which is considered to be a highly capital and labour intensive industry, employed approximately 8 600 full-time employees of which 2 850 were sea-going.

The deep-sea hake sector is characterised by a wide range of business models that straddle from catch and sell operations to highly sophisticated, internationally competitive, vertically integrated food companies (Crosoer *et al*., 2006). The deep-sea fleet consists of about 25 wet fish stern trawlers, where fish are laid on ice and 36 factory stern trawlers with onboard processing equipment. Two-thirds of the deep-sea hake fleet consists of vessels between 40 and 50 meters in length. Irvin and Johnson (I&J) and Sea Harvest are the two leading producers of deep-sea hake, and they held 55% of nearly equal shares in the quota in 2002, and that over the past decade caught volumes ranged between 140 000 and 155 000 tons annually (Nielsen & Hara, 2006). This statement is further supported by DAFF's data, which also shows a steady decline between 2005 and 2009, wherein catch volumes ranged between 100 000 and 140 000 tons. In the 2012 fishing season, DAFF set the TAC at 144 671 tons, a total increase of 9.78%

from the 2011 fishing season, set at 131 780 tons (DAFF: 2012). In the 2015 and 2016 fishing season, DAFF set the TAC at 147 500 tons per annum which also catered for the time the industry needed to scale down on the industry's infrastructure in the preceding seasons as a response to an increasing TAC (Department of Agriculture Forestry and Fisheries (DAFF), 2016). A significant development in the hake deep-sea and inshore trawl fisheries is certification by the Marine Stewardship Council (MSC). That has provided great socio-economic benefits to the fishery, especially to international markets which are increasingly prioritising MSC certified fish products (DAFF, 2016). Furthermore, MSC certification should be a reliable measure for compliance, as it is an indication that MSC is satisfied that monitoring control and surveillance is effective in this fishery[34].

3.1.3.3. The Small Pelagic (*Engraulis encrasicolus; Sardinops sagax; Etrumeus whiteheadii*) fishery in South Africa

Anchovy, *Engraulis encrasicolus*; sardine, *Sardinops sagax* and round herring (*Etrumeus whiteheadii)* all fall within the group of fish referred to as small pelagic fish. Small pelagic fish are small foraging fish species found in surface and near-surface waters over the continental shelf of South Africa's coast (DAFF, 2012). Anchovy and round herring are mostly processed into fishmeal and fish oil, whereas sardines are canned or frozen for human consumption; pet food and bait. Mostly, processing the small pelagic fish is done in factories on the West Coast of South Africa (DAFF, 2012). Erratic fluctuations in small pelagic fish population sizes tend to be a common occurrence throughout the world, and a highly variable recruitment process mainly precipitates it. In the recent past decades, both the anchovy and sardines in the South African waters exhibited this variability (DAFF, 2012). For example, anchovy rebounded from a low 160 000 tons in 1996 to about seven million tons in 2001.

On the other hand, sardine exhibited a dramatic decline from over four million tons in 2002 to just over ¼ million tons in 2007. Another common occurrence or behavioural pattern among small pelagic fish populations is changing in distribution patterns, often associated with changes in population sizes (DAFF, 2012). An example of this behavioural pattern in the South

[34] https://fisheries.msc.org/en/fisheries/south-africa-hake-trawl/about/. Fishing for a future: How a sustainable hake fishery in South Africa is supporting livelihoods and communities. Marine Stewardship Council February 2016. Accessed 23 January 2021

African waters happened between the mid-to-late 1990s and early 2000s. In the 1990s the sardine population, which most of its biomass was located west of the Cape Agulhas in the West Coast, grew steadily and then showed a shift in relative distribution towards the farther east off the South Coast during the 2000s. The distribution of species under the small pelagic fishery sector is the continental shelf waters extending from the Hondeklip Bay, in the West Coast of South Africa, to Durban (DAFF, 2016).

Purse-seine netting is predominantly utilised in this fishery. It started in the West Coast during the 1930s, but a significant drive to push it to the levels we are experiencing today started in the late 1940s. The impetus to take it to these levels was driven by the global demand of canned fish, which was at unprecedented levels after the Second World War (Anderson *et al.*, 2012). Adult horse mackerel was initially the target of many fishing vessels in this sector and sardines off the West Coast, but due to the steady decline in catches of the horse mackerel sardine soon dominated (DAFF, 2012). In 1962 sardine landing peaked at 410 000 tons before a dramatic decrease. These developments compelled purse-seiners to target anchovy using smaller meshed nets, and the downside of that action was juvenile recruits of the anchovy making up the bulk of landings. They were caught as they moved from the West Coast nursery grounds to the spawning grounds off the South Coast, and for the next three-and-a-half-decade anchovy dominated catches with annual landings varying between 40 000 and 596 000 tons (DAFF, 2012).

The pelagic fishery is viewed as South Africa's largest fishery in terms of landed catch and direct and indirect employment, and as the second most prestigious after the demersal fishery (Crosoer *et al.*, 2006; DAFF, 2012). In 2014 the total combined catch of anchovy, sardine and round herring landed by the pelagic fishery was 372 000 tons, anchovy (240 000 t); sardine-directed (89 000 tons); sardine by-catch (8 000 tons), and round herring (35 000 tons) (DAFF, 2016). However, it is also pointed out that the niche within which the pelagic fishery industry operates in is exceptionally volatile, characterised by large fluctuations in the annual TAC, a situation that is further compounded by high volume or low-profit margins which are inherent traits of the sector (Nielsen & Hara, 2006). The downside of this situation tends to be instability in the industry and a significant negative impact on profitability and investment behaviour (Nielsen & Hara, 2006). The fishery was recently comprised of 100 purse-seine vessels; eight fishmeal plants; six canning factories and 40 bait packing facilities. The pelagic fleet was composed of vessels that were mostly between 20 – 24 meters long. Smaller vessels, i.e. those less than 22meters, are wooden and use ice to preserve their catches (Nielsen & Hara, 2006).

However, newer and larger steel vessels are equipped with refrigerated seawater tanks for this purpose. The commercial fishery sector, of which the small pelagic fishery is part of, is estimated to directly employ 27 000 people and 100 000 indirectly employed individuals (Cochrane *et al*., 2020).

3.1.3.4. The South African Squid (*Loligo reynaudii*) fishery

Loligo reynaudii, which is locally known as "*chokka",* is an abundant loliginid squid which has a range that extends from Namibia to the Wild Coast in the Eastern Cape Province of South Africa (DAFF, 2012). Their growth rate is relatively fast as they tend to reach a productive size in about a year or less, and they have a reasonably short total life span, which mostly is less than two years. The only recorded heavy exploitation of the fishery in the South African waters, which can be attributed to foreign fishing fleets predominantly from the Far East, was in the 1960s and 1970s (DAFF, 2016). The heavy exploitation of the squid resource subsided in the late 1970s and early 1980s due to South Africa declaring an EEZ, and subsequent phasing out of the foreign fishing activity. Catches in the 1990s ranged between 2000 tons 7000 tons, which continued to the early 2000s with hauls that ran between 3000 and 13 000 tons. The fishery remained relatively stable and robust in the early 2000s, and in 2016 it provided employment to 3000 individuals and generated revenue that was more than R480million (DAFF, 2016).

Squid is caught by demersal trawl, and the annual catches fluctuate between 200 and 800 tons (DAFF), 2016). The predominant method is a commercial jigging method that was first introduced in South Africa in 1984. That is a labour-intensive fishery as the jigs that are used to catch squid are handheld. In 2004 the jig fishery registered its highest catch of over 12 000 tons, as shown in Figure 4.1 (DAFF: 2012).

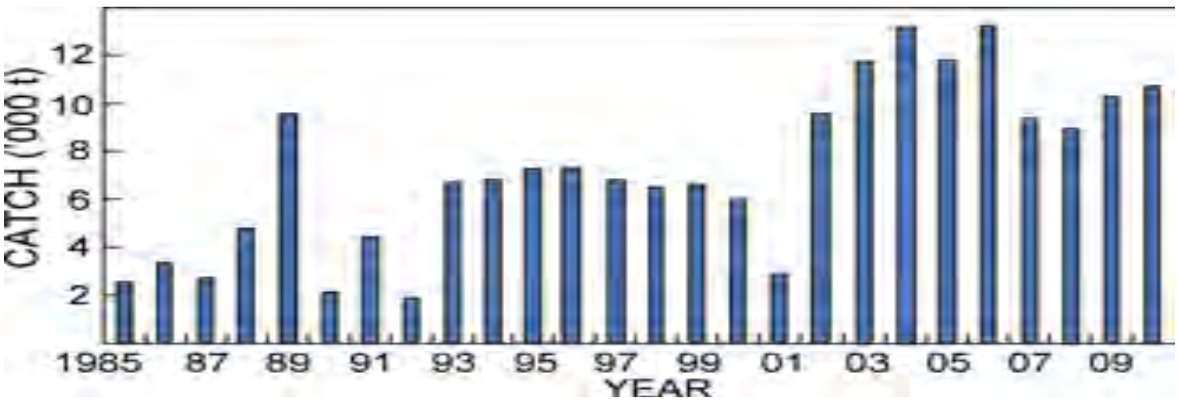


Figure 3.1: Annual catches of jig-caught squid off South Africa, 1985–2010. Data are from the South African Bureau of Standards (provided by the industry for the period 1985–2007) and NRCS (2008–2010)

As a standard practise, squid are placed into plastic crates as they are caught, and fishers are paid per kilogram of squid caught (Sauer et al., 2003). After that, and at regular intervals, all the caught squid is sorted by size and packed into 10 kg trays placed into a blast freezer on board the vessel (Sauer *et al.*, 2003). Furthermore, a control measure in the form of a licencing system, with the sole purpose of limiting the number of vessels taking part in the fishery, was introduced between 1986 and 1988 (DAFF, 2016; DAFF, 2012).

The squid fishery is effort controlled, and current fishing effort is capped at a maximum of 2 422 crew and a commensurate number of fishing vessels. Besides, a five-week closed season between October and November each year has been implemented since 1988. The underlying reason for instituting a closed season period in the fishery is to protect spawning squid and improve recruitment for the following year (DAFF, 2016; DAFF, 2012). The key management objective for the squid fishery is to cap effort at a level that secures the most significant catch, on average, in the longer term without exposing the resource to the threat of reduction levels at which future recruitment success might be impaired or catch rates drop below economically viable levels (DAFF, 2016; DAFF, 2012).

3.1.3.5. The South African West Coast Rock Lobster (*Jasus lalandii*) fishery

The West Coast rock lobster is a cold-water, temperate, spiny lobster species found from Walvis Bay in Namibia to East London in South Africa. In South Africa, the commercial fishery operates between the Orange river mouth and Danger Point in waters of up to 100m in depth (DAFF, 2012). All the West Coast rock lobster fishing zones within this range are depicted in Map 3.2 below.

Map 3. 2: West Coast rock lobster fishing zones and areas. The five super-areas are A1–2 corresponding to Zone A, A3–4 to Zone B, A5–6 to Zone C, A7 being the northernmost Area within Zone D, and A8+ comprising Area 8 of Zone D in conjunction with Zone F. (Source: DAFF 2016 Report)

In the late 1800s, the commercial harvesting of the West Coast rock lobster began in earnest in South Africa. However, peak yields were only realised in the 1950s during which period an annual catch of 18 000 tons was landed. Before the 1960s the predominant method of catching lobsters was the utilisation of hoop nets, but from 1965, all changed with the introduction of more efficient traps and motorised deck boats. During the 1960s catches declined by almost half to 10 000 tons, and the downward spiral continued to the recent past where the biomass of males greater than 75mm carapace length had fallen to 1.9% of unexplained biomass and the total spawning females is at 2% of unexplained biomass (Cochrane *et al*., 2020; DAFF, 2016; DAFF, 2012). The reason behind this dramatic decline in catches is thought to be due to a combination of fishing methods and efficiency changes in management measures, overexploitation, environmental changes and reduced growth rates (DAFF, 2012). The historical data on this resource's catches dating back from 1890 to 2010 is illustrated in Figure 5 below. Periods of interest in figure 4.2, which are a cause for concern, are the mid-50s and the drastic decline of the resource in the 80s, 90s up to 2010.

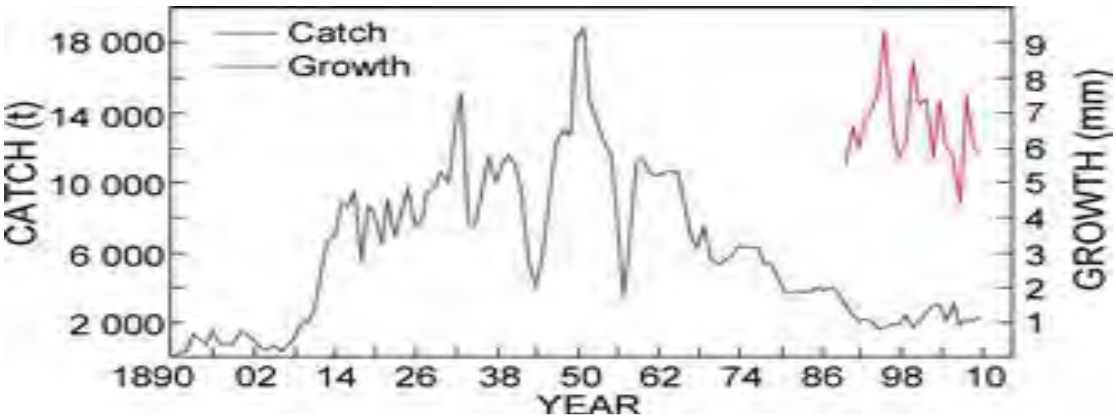


Figure 3. 2: Historical catches of West Coast rock lobster 1890-2010, with the associated trend in growth indicated for the period post-1990 (Source: Anderson *et al*., 2012)

The eastward shift in the West Coast rock lobster distribution was first noted by the species' invasion in the eastern part of Cape Hangklip area which is part of the traditional abalone fishing zones. Due to this invasion, three new rock lobster fishing zones were opened as it was determined that there were commercially viable quantities of rock lobster in this area (DAFF, 2012).

Of all the rock lobster fisheries in South Africa, the WCRL is the most valuable on the premise of its high market value. To put this statement into perspective, in early 2000 the WCRL fishery had approximately 19 factories which employed over 2 800 people, even though they were operating below their optimum capacity due to the TAC reduction (Sauer *et al*., 2003). There is an indication that a TAC of 4 000 tons could be processed without any further capital investment at full capacity. However, it is worth noting that much as the WCRL is viewed as the most prestigious of the rock lobster fisheries in South Africa, in global terms South Africa only supplies less than 2% of the world's total lobster market demand, and this translates into about R200 million per annum in monetary terms (Sauer *et al*., 2003).

3.2. The South African Monitoring, Control and Surveillance (MCS) system

3.2.1. Historical background of MCS in South Africa

According to an unpublished report by Goosen (2010), a retired MCS expert in the employ of Fisheries Management for more than 40 years, MCS in South Africa was established early in 1952 with only two inspectors. At the time it was called the Sea Fisheries Inspectorate. One of the inspectors was stationed at Donkergat on the West Coast, and the other in Durban in the present-day KZN, to ensure that the landing and processing of whales were in line with the rules of the International Whaling Commission (IWC). In the early 1960s, the Sea Fisheries Act was promulgated, and the number of employees in the inspectorate grew to 21 inspectors (Goosen, 2010). At the time, the inspectorate was managed by the Administrative Component of the South African Sea Fisheries and was stationed at most fishing harbours on the West and South Coast and Port Elizabeth, Port St Johns East London. The Sea Fisheries Control Officers (FCOs) ' primary responsibility was to monitor fish landings, predominantly rock lobster and small pelagic fish on the West Coast and South Western Cape.

In those days South West Africa (Namibia) was governed by South Africa hence the placement of FCOs at Walvis Bay and Lüderitz to perform land-based monitoring and sea-based monitoring as observers on pelagic factory vessels. Between the 1960s and 1980s, six near-shore Fisheries Patrol Vessels and several small crafts were commissioned and they were deployed along the coast from Port Nolloth to Port Elizabeth. FCOs were deployed on the patrol vessels to carry out sea patrols, and at the coastal stations, they used small crafts to conduct inshore patrols (Goosen, 2010). The number of FCOs grew as new fisheries such as South Coast rock lobster were opened, and by the mid-1980s about 200 FCOs were employed. During this period, there were no major changes in the organisational structure other than creating a management structure and movement of posts between stations to compensate for fisheries movements (Goosen, 2010). During this period the proclaimed fishing harbours were a separate entity and did not form part of the Fisheries Inspectorate component.

The only connection between the harbours and the fisheries inspectorate was the sharing of operational resources. Further changes in the governance system directly impacted the functioning of those early MCS forms in South Africa. To put that into perspective, Hauck and Kroese (2006) argued that the devolution of fisheries compliance function to the Provinces of

the Cape Provincial Administration (CPA) in 1987 had a severe negative impact on the ability and capacity of government with regards to the effective enforcement of fisheries regulations. The establishment of Marine and Coastal Management (MCM) in 1994, which was a branch of the erstwhile Department of Environmental Affairs and Tourism (DEAT), could be viewed as a positive step towards the right direction as fisheries compliance was again elevated to a national competency status residing in this branch (Hauck & Kroese, 2006). That created a myriad of other problems, of which the most conspicuous was the marked reduction in the total number of Fishery Compliance Officers (FCOs) over a decade, where between 1986 and 1995 numbers decreased from 420 to 126 (Hauck & Kroese, 2006). To further compound an already untenable situation were budgetary constraints, where the inspectorate had no operational budget as it had been relegated to be a sub-directorate of the Directorate: Administration within Sea Fisheries. Their operation area was primarily the Western Cape with three offices in Mossel Bay, Port Elizabeth and East London. During this period, an investigation was undertaken to determine if the Coast Guard for compliance was a viable option or not. After careful considerations, it was decided not to go the Coast Guard route, but rather to remain with the existing compliance model (Goosen, 2010).

3.2.2. The institutional arrangements of MCS in South Africa

In 1998 the Marine Living Resources Act (18 of 1998) was promulgated (see Section 3.1.2). After its promulgation, fishing rights were awarded to ensure a more equitable and fair distribution of fish. The fishing industry grew from a few large and medium-sized fishing companies' right holders to about 3 000 right-holders, most of them in the near-shore abalone, rock lobster and line fish sectors that required intensive monitoring (Goosen, 2010). At the time, the organisational structure could not address the many challenges that the new fisheries posed, and MCS restructuring was urgently needed. The first restructuring process was instituted in 1999 which led to an Offshore Division residing under the Research Directorate; an Inshore Division residing under the Compliance Directorate and the Patrol Vessels Division which remained under the Directorate Administration (Goosen, 2010). That was to be followed by a further restructuring process of the Compliance Directorate in 2003. The Compliance Directorate was promoted to be a Chief Directorate with two Directorates under it, the Directorate of Compliance responsible for coastal compliance and the Monitoring and

Surveillance Directorate (Goosen, 2010). During this period, tender bids were awarded for a new fleet of Fisheries Patrol Vessels (FPVs). The other restructuring process was in 2005 where the Chief Directorate Monitoring Control and Surveillance, within the branch, was further restructured to have three Directorates: Compliance, Special Investigations Unit or Monitoring and Surveillance, and the Environmental Protection Vessels (Goosen, 2010).

After the 2009 South African National General elections, there was further restructuring for MCM and its Chief Directorates. In June of 2009 new government departments were announced to the nation, with their respective Ministers, by the State President, and among them was a new Department of Agriculture, Forestry and Fisheries (DAFF). That was followed by a Presidential Proclamation (Proclamation No.44 of 2009), which was signed on the 1 July 2009 to transfer functions entrusted by the MLRA, and its regulations, to the Minister of DAFF from the Minister of DEAT[35]. The transfer of administration, powers and functions delegated by the Sea Fisheries Act (Act 12 of 1988) and MLRA was through Proclamation No.1 of 2010, signed on 10 February 2010. The Fisheries function was finally transferred to DAFF as Program 6 of the Department with effect from the 1 April 2010[36].

After the 2019 National General Elections, Fisheries Management was transferred from DAFF, and it was incorporated in June 2019 as a branch of the Department of Environmental Affairs together with Forestry, to form a new Department of Environment, Forestry and Fisheries (DEFF)[37]. According to DEFF[38] there are ten branches, but the focus will only be the Fisheries Management Branch for this study. The Fisheries Management Branch, as can be seen in Figure 3.3 below, is led by a Deputy Director General (DDG) and it has five Chief Directorates which are: Aquaculture and Economic Development; Marine Resources Management; Fisheries Research and Development; Fisheries Operations Support; and Monitoring, Control and Surveillance which is the subject of this study.

[35] https://pmg.org.za/committee-meeting/14850/. Proclamation for the transfer of the administration and the powers and functions to the Minister of DAFF from Minister of DEA (28 August 2012). Accessed on the 09 August 2020.
[36] https://pmg.org.za/committee-meeting/14850/. Portfolio Committee Presentation on the Integration of the Branch: Fisheries Management into the DAFF (28 August 2012). Accessed on the 09 August 2020.
[37] https://nationalgovernment.co.za/units/view/15/department-of-environment-forestry-and-fisheries-deff. Accessed 09 August 2020.
[38] https://www.environment.gov.za/. Branches of the Department. Accessed 08 July 2021

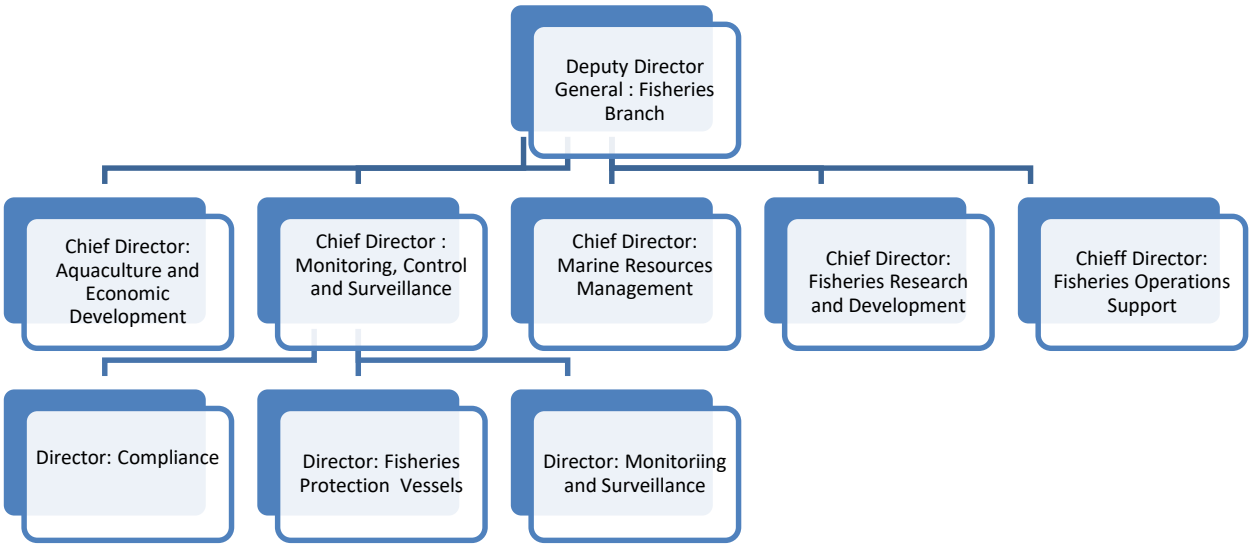


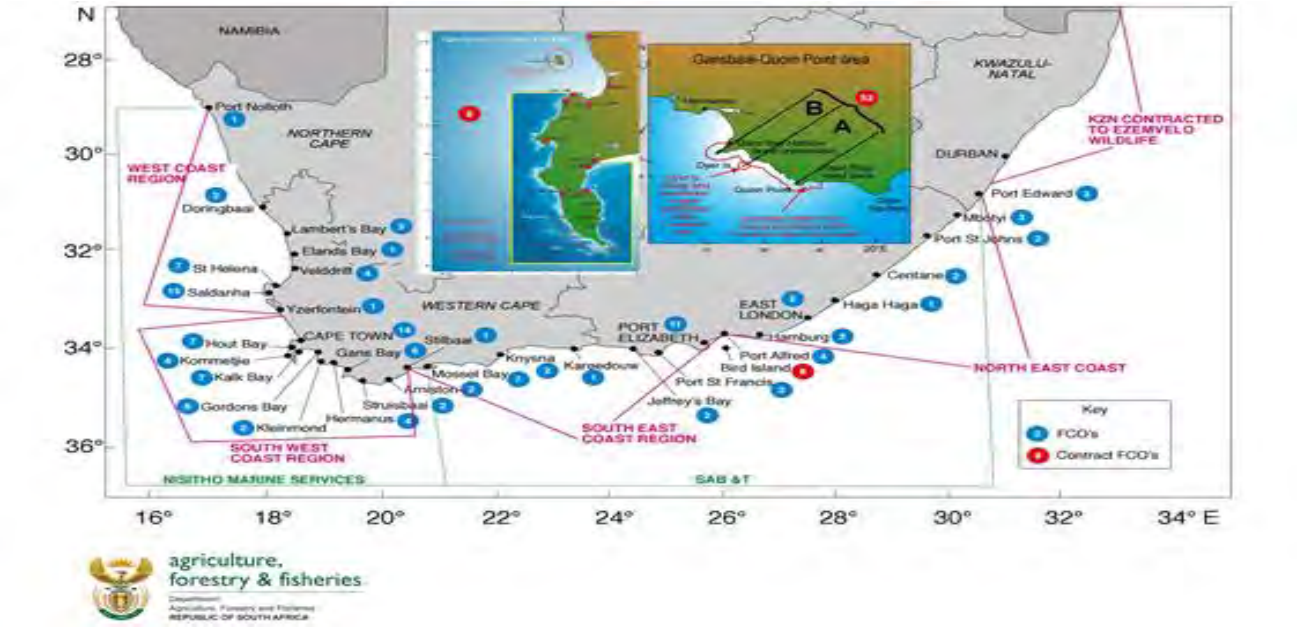
Figure 3.3: Top management structure of the fisheries branch and the management structure of Monitoring, Control and Surveillance

According to Flewwelling *et al.* (2002), the major determining factor on the effectiveness of any MCS program is possible when all its respective responsibilities are consolidated within one Ministry as its core mandate. They further state that such an arrangement serves to ensure that the bureaucratic processes are not a hindrance to the MCS strategy in place, but rather to catalyse a more conducive environment that renders the MCS activities more responsive to fisheries governance needs (Flewwelling *et al*., 2002). South Africa faced similar challenges during the initial phase of policy reforms and transformation, which followed the 1994 elections. During this phase, fisheries managers had to contend with a plethora of compliance challenges which to a certain extent could be attributed to the process and associated legal and policy reforms (Hauck & Kroese, 2006).

Coupled with that, South Africa terminated agreements with foreign governments for preferential access to the South African EEZ, which led to a need to escalate MCS efforts to curb illegal fishing in the high seas. As illustrated in Figure 4.3, the current MCS structure is a product of the 2003 restructuring process to attend to MCS objectives as outlined above. It is important to note that there was hope among many South Africans in the fisheries management fraternity when the current MCS organisational structure was formulated. Therefore, it becomes critically important to better understand the impact of that organisational restructuring process by analysing the structure, resources, and mandate of each of the three Directorates of the MCS Chief Directorate as this study partly sought to determine.

3.2.2.1. The Compliance Directorate

According to Goosen (2010), the Compliance Directorate's mandate is to monitor compliance with the MLRA and Regulations promulgated thereunder by conducting land-based patrols and inspections along the entire South African coastline. The period following 1994 was marked by major changes in the South African fishing industry, and the South African MCS had to be restructured accordingly and adjust its strategies to address numerous fisheries compliance challenges. Therefore, between 1994 and 2009 the Directorate Compliance opened 33 compliance stations covering the Western Cape; South Western Cape; Southern Eastern Cape and the Northern Eastern Cape. That was to ensure that there is an adequate distribution of Fisheries compliance stations along the South African coastline, monitor compliance of the then-new subsistence and line fish rights or exemption holders, and attend to the poaching of marine resources. Additionally, a total of 280 FCO and 50 Honorary Fisheries Control Officers (HFCOs) were also employed during this period (Goosen, 2010). Map 3.3 illustrates the number of coastal stations, the number of personnel per station in the 2010/2011 financial year, and the geographical distribution of stations along the entire South African coastline.



Map 3. 3: Compliance Directorate office and personnel distribution along the South African coastline (Source - DAFF: 2010/11)

Moreover, FCO's monitoring of landings became nearly impossible, given the few numbers of FCOs relative to the amount of landed fish. Even though the Department restricted the fishing industry only to land their catch during working hours, the MCS management determined that monitoring catches took up more than 80% of the FCOs working time. The downside of that was that less time was spent on their core function of ensuring compliance along the coastline (Goosen, 2010). In consideration of these limitations, in 2005, a management decision was taken to monitor landings in almost all the TAC controlled fisheries to be outsourced to two private companies. Nosipho and SAB &T were the two companies contracted by the government following an open tendering process, and their brief was the monitoring of all landings in the TAC controlled fisheries as FCOs was relieved of those duties. These two companies employed 127 monitors to perform this function under the Directorate Compliance. Distribution of landing monitors covered only the Northern Cape, the Western Cape and the Eastern Cape as MCS did not have any presence in KZN after 1994. Hence a decision was taken in the early 2000s to outsource the complete compliance functions to the Ezemvelo KwaZulu-Natal Wildlife (Goosen, 2010). The contractual arrangement between Ezemvelo KwaZulu Natal Wildlife and the DEFF has since been discontinued.

3.2.2.2. The South African Fisheries Protection Vessels Directorate

A Director heads the Fisheries Protection Vessels (FPV) Directorate under the MCS Chief Directorate. It has two distinctively different sub-units, the Vessels and the Vessel Monitoring System (VMS) Operations Centre, both managed by the same Director. All vessels are purpose-built, and therefore the reason behind their procurement, the principles that informed their structural design serve as a reasonable basis in understanding their utilisation and performance. Rohan (2003) argues that the utilisation of patrol vessels in executing MCS strategies for any country is irreplaceable as they are among a few platforms that can be used to collect legally acceptable evidence of transgressions. He further states that *"in most cases, they combine monitoring and control in such a way that any attempt to separate monitoring from their combined activity is almost irrelevant"* (Rohan, 2003). He concludes, on the subject, by further emphasising the crucial role vessels play in any MCS strategy even though they are costly to procure and operate. Hence they must be integrated into a global system, and efforts are made to optimise their expensive use.

A decision to procure state-owned and operated fisheries patrol vessels was taken initially in 1991, but it was in the late 90s that the South African central government made inroads towards that. The main reason to procure the Environmental Protection Vessels (EPVs) was the State's limitations in monitoring all fishing activities in the entire South African EEZ. Such a decision is supported by Flewwelling *et al.* (2002) where they state that for any well-conceived MCS strategy about offshore fisheries monitoring, larger and more expensive sea-going platforms should be its cornerstone. To further validate the decision to procure these vessels by the South Africa government, at the time the fishing industry was having a free on board (FOB) landed value of approximately R2 billion per annum which provided direct employment to nearly 30 000 people. Therefore, it was, as it still is, an essential aspect of the macro-economic landscape of South Africa and justifies serious attention to MCS (Hauck & Kroese, 2006). Illegal, Unreported and Unregulated (IUU) fishing added another dimension in the debate to procure a fleet of new vessels as a lucrative Patagonian Toothfish (*Dissostichus eleginoides*) fishery was under pressure in the South African Southern Ocean territories.

This urgent need for the South African government to act on the escalating scourge at the time is put into perspective by Hauck and Kroese (2006). They explain the pressure exerted by IUU fishing in the deep sea with the South African EEZ, the high seas, and around the Prince Edward Islands as a significant contributing factor in compelling the South African government to terminate agreements with foreign governments' access to the South African EEZ. Furthermore, there were also growing concerns of the country's predisposition to the escalating marine oil pollution due to the increasing volume of maritime traffic around the Cape Horn shipping lane. Likelihood of incidents collectively classified as hazardous to our coastline due to strong currents and rough seas, irresponsible cleaning of tanks or even vessels colliding with each other were in the precarious situation the fragile South African coastline had to contend with. Several legislation pieces were considered in deciding on procuring EPV's, and they included the MLRA and the South African Maritime Safety Authority Act (SAMSA Act) Number 5 of 1998.

According to the MLRA, responsibility for the protection of South Africa's marine living resources rests with the Department of Environmental and Tourism (DEAT) Executive Manager: Marine and Coastal Management (MCM), now DEFF (Deputy Director-General: Ocean and Coasts). Matters relating to the combating of pollution, as stated in the Marine Notice Number 2 of 1996 issued by the Department of Transport on 24 January 1996 as amended from time to time, are assigned by the SAMSA Act (Section 52 (1) to DEFF (RSA,

1998b). However, the practicality of some responsibilities tended to be more complicated because of the mandates that were not appropriately revised after the re-engineering and re-alignment of the National Government Departments, i.e. immediately after the South African 2009 national elections. Before the 2009 national elections, MCM as a DEAT branch was the owning and operating Department of both the Fisheries Research Vessels (FRVs) fleet and the EPVs fleet. After the 2009 national elections MCM was dissolved, and the new Fisheries Branch was established as part of DAFF. About 80% of MCM staff was moved to the Fisheries branch of DAFF, whilst the other 20% was moved to form a new branch of Oceans and Coasts in the new Department of Environmental Affairs. Almost all vessels, except one Fisheries Research Vessel (FRV), the Algoa, and the SA Agulhas I, a supply and research vessel for the South African National Antarctic Program (SANAP), remained with the Fisheries Management Branch. A difficult proposition for DEA when it comes into fulfilling its legislated mandate of environmental protection.

To circumvent this challenge, DEA and DAFF negotiated a Memorandum of Understanding (MoU), where the terms of reference were about getting access to and utilising the DAFF vessels by DEA in all matters are about the Department's legislated mandate when the need arises. That may now be resolved by the current structure of the National Government Departments which came into effect on the 1 April 2020, as Fisheries Management and the Ocean and Coasts Branches are under DEFF. The Fisheries Management Branch has the vessels equipped with oil pollution abatement equipment, whereas the Ocean and Coast Branch is mandated to implement oil pollution combating activities. According to an unpublished report by Alan Roberts (2001), the Department decided to replace its then existing fleet of three vessels with four multipurpose fishery and environmental protection vessels and instructed its personnel to carry out a preliminary investigation. This initial investigation had two objectives: identifying potential suppliers or shipbuilders and understanding the process to be followed in acquiring these vessels (Roberts, 2001).

Through this process, drafting of tender specifications and the entire tender process was followed with the worldwide invitation of tenders. A tender for the construction of the smaller vessels, i.e. the Inshore Patrol Vessels (IPVs) was awarded to Farocean Marine – Cape Town, which is a local company, to build the three IPVs. The bigger vessel or the Offshore Patrol Vessel (OPV), illustrated in Figure 3.4, the tender was awarded to Damen Shipyards of Gorinchem in the Netherlands (Roberts, 2001).

Figure 3.4: The Sarah Baartman OPV – Flagship of the South African MCS program (Source: Andile Moshani[39], Directorate: FPVs - 2017)

The primary specifications for the IPV's were that the overall length (LOA) be between 40 – 45 metres, and be capable of operating between the Orange River, a border between South Africa and Namibia, and Ponta do Ouro which is a border between South Africa and Mozambique. Hull specifications were such that it must be narrow, for speed given the possibility of hot pursuits during operations, and a shallow draft to ensure that they can be brought closer to the shore when patrolling. These vessels were also fitted with bow-thrusters for extra manoeuvrability which is essential when patrolling close to the rocky shore. Thermal night vision cameras and infra-red surveillance equipment completed the order for the fisheries patrol needs. Core functions included fisheries patrols of up to 80 nautical miles from the coast, and that they can do oil spill surveillance and mapping. Furthermore, they perform first strike action of oil pollution abatement through either skimmers or oil dispersant as the other request was for them to be fitted with spray booms and a carrying capacity of 10 000 litres of dispersant concentrate (Roberts, 2001). Other capabilities included search and rescue, general information gathering for the South African Navy, limited towing and limited fire-fighting. Their utilisation would have to be 200 days per vessel per year, i.e. 15 – 18 days per month, with endurance or voyage duration of 10 – 14 days a time. The pre-determined range as per

[39] Andile Moshani (Mr) is the Deputy Director in the Fisheries Protection Vessels (FPVs) Directorate. He has been with the Directorate with effect from 2008 at first as an Assistant Director and was later promoted to be the Deputy Director responsible for the management of the Ship contract between DEFF and the service provider. He is also responsible for deploying vessels both in South Africa and in the SADC region for joint MCS patrols and the management of FPVs inspectors.

requirement was 3 500 nautical miles at a cruising speed of 12 – 15 knots, of which the maximum speed should be between 23 – 25 knots and a loitering speed of 6 – 8 knots (Roberts, 2001).

Specifications for the Sarah Baartman OPV, pictured in Figure 4.4 above with one of the IPVs in the background, were that it should have an LOA of a least 75 meters and not more than 85 meters. That in addition to operating between the Orange River and *Ponta do Ouro*; it must be capable of conducting patrols throughout the entire South African EEZ and beyond, including Prince Edward and Marion Islands. Specifications were similar to those of IPVs as they were built for speed, i.e. a narrow hull with a shallow draft for more manoeuvrability when the vessel is operating close to shore. Surveillance equipment for the OPV was specified to be similar to that of the IPVs, i.e. thermal night vision cameras and infra-red surveillance equipment. However, a slight difference was the inclusion of long-range or over the horizon radar for surveillance purposes. Another difference was that there was a mission control room for the OPV where planning; debriefing sessions, and presentations on daily patrol activities would be done. In addition to that, is a small hospital with the capability to conduct minor surgical procedures that may be needed for the crew during operation or any other person they may take on board during patrols who may need urgent medical attention.

The OPV vessel was built to conduct oil spill surveillance and containment of oil spills through the utilisation of spray booms, sweeps, oil fenders and skimmers, and a 50 000 litres oil dispersant carrying capacity was a requirement. Utilisation projection was 220 to 250 sea days a year with an endurance or voyage duration of 30 days. Range specifications were that it be capable of doing 6 000 nautical miles at cruising speed of 12 – 15 knots, with a maximum speed of 20 knots. It was also specified that it must carry a 7 metre Rigid Hull Inflatable Boat (RHIB) to serve as a workboat, which would be launched from the quarter deck via a dedicated davit for boarding parties. Additional to the RHIB the OPV would be fitted with an 8-ton tugboat to deploy oil spill abatement equipment. The Directorate Fisheries Protection Vessels (FPV) was established on the 14 December 2005, i.e. after all the vessels on order were delivered to the erstwhile Department of Environmental Affairs and Tourism. Additional to the fleet of both the IPVs and OPV, the Fisheries Protection Vessels Directorate also operates a fleet of small crafts that are at stations along the South African coastline, and it is also responsible for the management and operation of the Vessel Monitoring System (VMS) Operations room which is in Cape Town. The VMS is critically important in the operations of MCS as Flewwelling *et al*. (2002) points out that, the declining status of many fish stocks and

the marine environment has also created a strong incentive for States to adopt VMS as a component of an overall MCS strategy. Considering the extent to which the South African VMS is utilised in the overall South African MCS strategy, detailed technical aspects of VMS and its utilisation in fisheries governance are covered extensively in Chapter 2, Section 2.10 of this study.

The FPV Directorate has six coastal stations along the coastline extending over three Provinces, the Eastern, Western Cape and the Northern Cape. Their existence is driven by the need to conduct daily near-shore inspections, weather permitting, and the utilisation of small crafts provided to each coastal station. These coastal stations are:

1. Jacob's Bay halfway between Vredenburg and Saldanha Bay, and it covers the area between the Dassen Island and the Orange River. According to the DEFF website, this office is ideally situated for combating WCRL poaching activities that are incredibly high during the WCRL season.

2. Cape Town station which is located at DEFF Fisheries office in Cape Town. This station is responsible for the area between Yzerfontein and False Bay, and that includes Robben Island. At this station, there are eight FCOs of whom two are Chief Fisheries Control Officers (CFCOs) who are serving as junior managers in the day-to-day planning of MCS activities for the station. All of FCOs in this station, as with other stations are qualified skippers with Category B-day and night skippers' tickets, and three of them are divers with Class IV divers' ticket. Their operational equipment includes 4x4 pick-up trucks to tow and launch small crafts, a high-speed RHIB with military specifications and jet-skis. Figure 3.5 illustrates part of the chase boat fleet that the FPV Directorate has as part of its resources towards achieving its MCS objectives.

Figure 3. 5: Three of the fleet of 8 FPV Directorate Gemini Chase Boats

3. The third and fourth stations are in Hermanus and Gans Bay to cover the abalone fishery which has been identified as one of the most challenging fisheries to manage (Cochrane *et al*., 2020; Hauck & Kroese, 2006; van Sittert *et al*., 2006). Reasons that have been most cited for this observation include ease of access to the resource, the relative ease of its harvesting and the fact that it is a lucrative fishery (Branch & Clark, 2006). Inevitably a combination of the above factors predisposed the resource to international poaching syndicates, a situation that led to the resource stocks levels being severely depleted to the point of commercial extinction (Branch & Clark, 2006). As a direct response to this DEAT (now DEFF) established stations both in Hermanus and Gans Baai. Hermanus is situated in the Overberg region between Gans Baai, which lies east of Hermanus, and Kleinmond, West of Hermanus (Map 3.3).

4. The other two stations are in Port Elizabeth and East London, covering Mossel Bay and the Umtamvuna river. The Port Elizabeth station's area of jurisdiction extends from Mossel Bay to Port Alfred and the East London station covers from Port Alfred to Umtamvuna river. The establishment of the Port Elizabeth station, which is operated by two CFCOs, and five FCOs was to combat abalone poaching reported to be rife in Sardinia Bay, Cape Recife and in and around the Bird Island.

Drawing on the information and practical experience, the author has with the deployment strategy of the sea-going vessels of the EPV fleet; each vessel was deployed a maximum of 15 sea days per vessel per month. That gives a total of 180 sea days per vessel per annum, and a total of 185 days alongside, which unfortunately does not happen anymore given severe budget cuts and that is discussed further in the following sections of this chapter. Figure 3.6 gives an overview of where each of the sea-going vessels is deployed. In no order of priority, any of the IPVs, i.e. the Victoria Mxenge, Lillian Ngoyi or the Ruth First could be deployed at any given moment, and a moments' notice, to any of the pre-determined fishing grounds. That would either be for a scheduled patrol or an emergency patrol whenever there is a reported MLRA contravention. That would be driven by the overall fisheries management strategy of the Department or the MCS strategy of the Chief Directorate in support of the Departmental overall fisheries management plan.

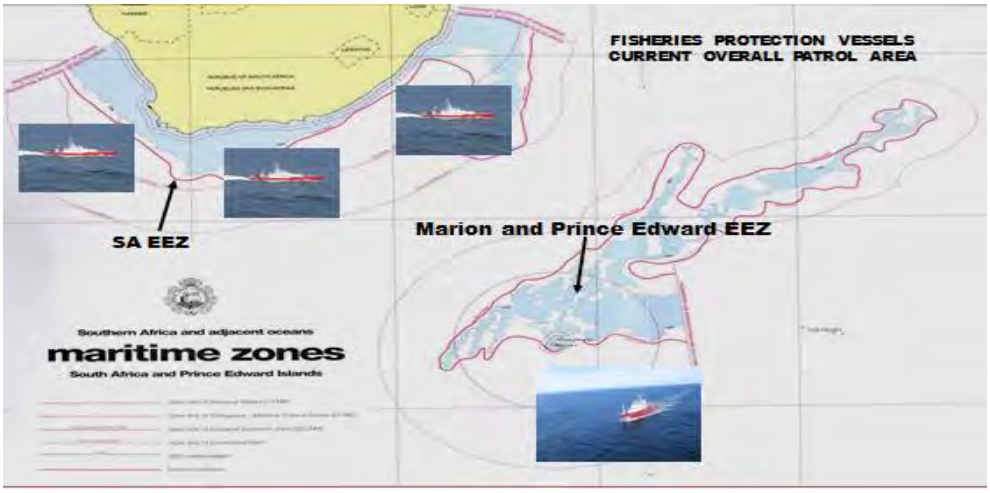


Figure 3.6: An illustration of the area of operation for the South African Patrol Vessels (Source: SA Navy and MCM, 2008)

At any given moment there would be a vessel stationed either in Cape Town or Lamberts Bay fishing harbour to patrol between the Orange River and the Cape Point going up to 120 nautical miles from the coastline, as to when there is a need. Another vessel would be at the Simon's Town naval base patrolling the Overberg area and Mossel Bay. The last of the IPVs operates from Port Elizabeth covering the area between Humansdorp and the waters adjacent to the Province of KwaZulu-Natal. Each of these vessels will have a patrol party of four inspectors, i.e. three FCOs and a team leader who is a CFCO. The Sarah Baartman OPV is responsible for patrolling the entire South African EEZ from the border with Namibia to the border with Mozambique including Prince Edward and Marion Islands EEZ. Although its sailing schedule is slightly different from that of the IPVs, it has the same number of sea days, 180 sea days unless there is a need for more, which would require permission for doing up to a maximum of 225 sea days per annum from the Director-General of the Department. Currently, the deployment rates are significantly reduced due to the Department's financial constraints to a maximum of 120 sea days per vessel per annum, which is also not guaranteed. Sea days for the Sarah Baartman OPV are also severely cut to be about 120 per annum, and the SADC joint patrols that the vessel is occasionally deployed to do has not happened since 2013. Conditions, objectives and the regulatory framework for such a regional deployment will be discussed later on in the study. For the Sarah Baartman OPV, the patrol party can be a minimum of six and a maximum of eight inspectors, at most with two CFCOs and six FCOs.

The CFCO on board must develop a daily activities patrol and at sea boarding program, which is informed by both the sailing order handed to him when they set sail for that particular patrol,

and a daily report of targeted vessels for that particular patrol. On board, each of the IPVs is an 8.5 meter RHIB fitted with two 225 horsepower engines, capable of over 50 knots. On board, the Sarah Baartman OPV are two 7.3 meters RHIBs each fitted with two 150 horsepower engines, and each RHIB is capable of speeds between 45 and 52 knots depending on the sea state as monitored and decided upon by the Captain of the vessel, all for safe navigation. These RHIBS are for both quick and easy launches in response to abalone poaching activities, and the CFCO also acts as the leading skipper and safety officer on board each of these small crafts. This approach by the South African fisheries patrol vessels at sea is succinctly captured by Flewwelling *et al.* (2002) when they state that, the safety of the crew and the patrol party is the sole responsibility of the master of the patrol vessel where he or she needs to take into consideration weather conditions and whether the sea state allows safe boarding evolutions. He further states that, although the Captain is responsible for safety all other patrol technical details, implementation and evaluation at sea are the sole responsibility of the Senior Fisheries Officer.

Guidance on where to go and patrol and do both visible policing and at-sea boarding would be coordinated by Assistant Director EPV utilising the VMS Operations centre to communicate with the patrol vessel. The VMS system is a critical component of all the at-sea patrols in South Africa. As stated in the FAO's Fishing Operations (1998) document, the advent of VMS brought certainty to numerous aspects of monitoring as through it positions of vessels at sea can be confirmed without any marginal error, and that includes certainty on the exact time a vessel is to enter any port. Furthermore, VMS helps to ensure that all MCS operations are done cost-effectively and efficiently as through its accuracy in reporting positions of vessels the time it takes to ferry fisheries officers is reduced, and that includes vessels and aircraft to specific areas at sea if an investigation is needed (FAO, 1998). That is the same principle that informs vessels' deployment strategy by the EPV Directorate in South Africa. Congregation of vessels of a particular fishery, which will be colour coded in the system, informs the full at-sea boarding and inspection approach. On the other hand, the speed and direction of a vessel within a Marine Protected Area (MPA) informs an interrogation approach with various stages and finally the pursuit of the suspect vessel, if deemed necessary, by any of the vessels near the transgressing vessel.

(i) The South African Vessels Monitoring System (VMS)

The South African VMS system plays a significant role in the country's MCS strategy. The South African VMS has been in operation since March 2000, and it is a Sapphire program supplied by *Bluefinger*, a United Kingdom-based company. In the 2019 VMS data that the author sourced from the VMS Operations centre, it reflected that there were 1 171 fishing vessels in the database from the 17 commercially exploited fisheries (Table 3.1). As shown in Table 3.1, the inclusion of the fishing gear in the VMS database enables the inspectors during boarding at sea to quickly identify any discrepancies in the fishing gear and expeditiously act accordingly within a short space of time.

Table 3. 1: The number of vessels in some fisheries chosen for this study that are monitored through the VMS

SECTOR	NUMBER OF VESSELS ON VMS DATABASE	NUMBER OF VESSELS THAT HAD PERMITS IN 2019	GEAR TYPE
Abalone	121	63	Diving
Hake Inshore Trawl	23	28	Trawling Nets
Hake Offshore Trawl	57	56	Trawling Nets
Horse Mackerel (Mid-water Trawl)	3	19	Trawling Nets
Hake Longline	71	62	Longlines
Hake Handline	52	30	Handline
Traditional Linefish	439	313	Handline
Squid	160	122	Squid Jigging
WCRL	245	259	WCRL Ringnets
Total	**1171**	**896**	

According to information solicited from the VMS Ops centre the diversity in the fisheries to be monitored has led to the utilisation of four different types of VMS units which provide coverage ranging from global coverage to coastal waters. All the four different types of VMS units utilise different communications protocols routed to the central VMS database. There are two approved VMS units for use by the offshore fisheries sectors, the International Maritime Satellite-C (Inmarsat-C) VMS units used by vessels operating offshore and other countries EEZs. VMS data is exchanged for these units via a data line between DEFF and the satellite service provider (SSP), also known as a Land Earth Station (LES) in the Netherlands. The

Inmarsat C network consists of geostationary satellites that cover the globe divided into four satellite ocean regions, whose coverage areas overlap as follows:

- Coverage for Atlantic Ocean Region – West (AOR-W) 130° West to 020° East longitude.
- Coverage for Atlantic Ocean Region – East (AOR-E) 090° West to 060° East longitude.
- Coverage for Indian Ocean Region (IOR) 010° West to 140° East longitude.
- Coverage for Pacific Ocean Region (POR) 110° East to 100° West longitude.

The unit has to be logged in to one of the above satellite ocean regions, depending on where they are operating. The units have to be allocated a unique Inmarsat Mobile Number (IMN) by Inmarsat in London. For the South African flagged vessels, the application form for the registration and activation of the Inmarsat network unit must be done through Telkom in Pretoria. The first four digits of these nine-digit numbers are country-specific, for an example, South African flagged or registered vessels' IMN's commence with 4601 and Namibia is 4659.

Communication is through Data Network Identifier (DNID), which are accounts set up by the LES, per vessel or fleet, or, shore-based monitoring centre as in our case. The DNID acts as a mailbox between the monitoring centre, i.e. the LES/ SSP and the transceivers onboard vessels. Once IMNs are allocated by Inmarsat, the South African VMS operators download the DNID to a specific unit through the VMS software, by allocating a sequential Member Number to the respective IMNs. Member Numbers are sub-addresses of the DNID numbers, and a total of 255 Member Numbers can be allocated to a DNID. For example, if the South African VMS Operations Centre has just received a new DNID, number 3456. Paperwork that will be received with it will include the IMN from the vessel owners authorising the VMS Operations Centre to track their vessel, and this will be followed by process of allocating Member Number 1 to the IMN on DNID 3456.

The VMS Data Communications includes the C-Sat Server as a centralised communications management server for all external communication. It includes dedicated interfaces to each SSP supported, and an interface to the VMS. A visual record of all requests and commands sent via the LES greatly assists with trouble-shooting when a unit does not respond to various

commands. A typical example of that would be when the VMS Operations Centre is trying to download a particular DNID to a satellite ocean region that the unit is not logged into. The footprint of this VMS system is the entire globe except for the polar regions. Besides, the standard reporting rate for this system's units is set at six-hour intervals, but it can be adjusted according to the need. However, it should be noted that the higher the logging frequency or reporting rate that dramatically increases the monthly satellite communications bill. Reporting rates are increased through the VMS software at the VMS Operations Centre and transmitted to the transceivers on board the vessels. Such an intervention is instituted only when a case of severe MLRA transgression or illegal activities are suspected. Furthermore, it is also possible to establish where a vessel is at any given time by polling, i.e. requesting a position from the unit.

The second VMS type unit that is also utilised in the offshore fisheries sector in South Africa is a Skygistics product, and it is operating within the Inmarsat footprint, but not as extensive as the Inmarsat C. This unit operates within the Inmarsat *"spot-beam"* coverage area, which is not as extensive as the Inmarsat C coverage. However, it also covers the South African offshore territories, i.e. Prince Edward and the Marion Islands. It is similar to the Inmarsat-C, except data from the units is routed from the SSP to the Skygistics database from where it is forwarded to the DEFF VMS Operations Centre. Vessel owners are responsible for purchasing the Skygistics VMS units and paying monthly airtime for the transmission of VMS data. Reporting frequency of the units depends on a particular fishery's management requirements; however, during installation, the units can be programmed to report at 10, 15 or 30-minute intervals.

For the inshore fisheries sector, there are two approved VMS units. The first of these units uses Global System for Mobile (GSM), i.e. the cellular network for transmitting data from the VMS units onboard the vessels to the DAFF VMS Operations Centre. In essence, the transmitted data is routed via a GSM service provider to the VMS unit and airtime provider, from where it is forwarded to the DAFF Operations Centre. Although the units' range is limited to the GSM coverage of the area concerned, the unit acts as a data logger whilst the vessel is out of cellular coverage. Upon returning to be within the GSM coverage area, the vessel's unit downloads all stored positions, and the logged VMS data is transmitted to the control centre every two hours. The nature of a transmitted message is that each transmission contains 10 VMS reports equal to 12-minute reporting intervals.

Similarly, to the Skygistics units, vessel owners are responsible for purchasing the VMS units and entering into a contract with the service provider for the airtime payable. This arrangement is similar to a cellular telephone contract that individuals would have with various service providers operating in South Africa. The second approved unit uses a radio trunking network for the transmission of data from the VMS units onboard the vessels to the DAFF VMS operations centre. The transmitted data is routed via the radio trunking network, to the VMS unit and airtime provider from the DAFF VMS Operations Centre. The range of these VMS units is approximately up to 40 nautical miles (nm) offshore, and depending on the requirements of the management regime of a particular fishery the reporting frequency of these units is at 30-minute intervals. As is the case with the GSM and Skygistics units, vessel owners are responsible for purchasing the VMS units and the payment of monthly airtime for the transmission of VMS data.

3.2.2.3. Special Investigations Unit / Monitoring and Surveillance Directorate

Access to and utilisation of marine resources needs to be meticulously managed and controlled so that the benefit of all South Africans is guaranteed (Cochrane, 1995). The success of the principles as stated in the preceding text is the introduction of democratic processes in the broader management of natural resources, and sustainable utilisation of the resources beyond gaining access (Cochrane, 1995). In present-day South Africa, especially the authorities charged with managing the country's natural resources, these principles have important, and far-reaching implications (Cochrane, 1995). Consequently, these principles are an inherent part of the new fisheries policy which in turn is in alignment with the country's Constitutional pronouncements where the emphasis is on equitable access to natural resources; sustainable utilisation of natural resources, and the quest for transparency in overall equity (Witbooi, 2006). However, that can also lead to increased illegal activities due to many people and coastal communities gaining access to the marine living resources without the corresponding levels of monitoring and enforcement measures. Some of those illegal activities are classified as severe, given the amount of money involved in the process, and their adverse impact on particular targeted species and the environment or the ecosystem as a whole. That was one of

the fundamental reasons for the erstwhile MCM to establish the Special Investigations Unit / Monitoring and Surveillance (SIU / M&S) Directorate.

Furthermore, the fundamental differences in the gravity of crimes committed in the fisheries sector precipitated the management to establish a special unit, a sub-directorate to focus on serious crimes (Hauck & Kroese, 2006). This decision informed the overall organisational restructuring process aimed at developing a more focused special investigations unit on serious marine offences and increasing the number of MCS stations along the entire South African coastline (Hauck & Kroese, 2006). This new strategic direction was also triggered by the realisation of an urgent need for addressing marine crimes broadly and chronic offenders in the fishing sector specifically, hence this dedicated investigative unit (Hauck & Kroese, 2006). In the main, the Special Investigations Unit (SIU) discharges its responsibilities either as a stand-alone unit or mostly in collaboration with other state law enforcement agencies, through well-coordinated surveillance missions and highly technical special operations (Hauck & Kroese, 2006).

Key to the successes that DEA realised was the collaboration that the Department had with the South African National Defence Force (SANDF) in particular the South African Navy (SAN) and the South African Air Force (SAAF); the South African Police Service (SAPS); the Department of Justice's Asset Forfeiture Unit (AFU), and the Scorpions within the Department of Special Operations (Hauck & Kroese, 2006). Figure 3.7 hereunder illustrates some of the high profile cases that the SIU successfully investigated in joint operations with the law enforcement agencies, as mentioned above. These partnerships were through the Prevention of Organised Crime Act (POCA). By using tools provided by POCA the Department and the SIU, in particular, could target, investigate and prosecute all syndicates in the organised crime arena who are implicated in money laundering offences, and transgressions of the MLRA.

Figure 3.7: Some of the Special Investigations Unit / Monitoring and Surveillance Directorate (SIU/M&S) Cases (Source: Thabiso Maratsane[40], D - SIU: 2016)

A system of procedure guided by the provisions of POCA further encourages an approach that investigates the origins of the proceeds of organised crime, and after forensic audits, all determined proceeds of crime such as vehicles, boats and property should be confiscated (Hauck & Kroese, 2006).

The Hout Bay fishing company investigation, covered in detail under Section 3.2.5.2. of this study, and the subsequent successful prosecution of the perpetrators is a clear example of the impact that the SIU Directorate has had since its inception. Collaboration between the public and the SIU Directorate in the investigation of this case started with an anonymous tip-off about illegal harvesting of rock lobster and other fish in May of 2001 (Hauck & Kroese, 2006). Although from certain quarters this may be viewed as a significant victory on the MCS efforts about fighting illegal fishing, in essence, it brought to the fore the severity and sophistication of illegal fishing operations that were taking place within the South African EEZ. Furthermore, this case highlighted the urgent necessity of consolidating all law enforcement agencies' collaboration as a strategy for improving the requisite capacity to effectively investigate corporate syndicates (Hauck & Kroese, 2006). That further emphasised the critical importance of joint efforts among government departments and scientists to identify and investigate incongruities in catch data (Hauck & Kroese, 2006). Currently, and under DEFF, the SIU/M&S Directorate is led by a Director who is based in Cape Town and there are other two offices outside of Cape Town, one is in Port Elizabeth and the other in East London.

[40] Thabiso Maratsane (Mr) is an Assistant Director in Special Investigations Unit / Monitoring Directorate, i.e. within the Chief Directorate MCS. He has been with the Chief Directorate MCS for more than 15 years, of which ten were in a junior management position. He is experienced in all MCS operations, particularly Special Investigations and MCS related forensic work and special operations.

3.2.3. The CCAMLR Convention Area and the South African Territories in the Southern Ocean – Another Dimension in the South African MCS program

On 4 January 1948, the National flag of the Union of South Africa was hoisted on Prince Edward Island (Hutson: 2003). Prince Edward Island is one of the two Islands annexed by South Africa. The other is Marion Island. The Prince Edward Island lies about 1 900km south-east of Cape Town and 19km north-east of Marion Island covering 47 square kilometres. The two Islands are in the sub- Antarctic waters, and they are considered to be in the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) waters. That is an area often referred to as the Convention Area. The CCAMLR Convention came into force in 1982 as part of the Antarctic Treaty Systems (ATS) with the sole purpose of managing natural resources, excluding mammals, in the Southern Ocean (Österblom & Sumaila, 2011).

The information provided in the CCAMLR website further states that the Convention applies to all Antarctic populations of finfish, molluscs, crustaceans and sea birds found south of the Antarctic Convergence, i.e. the Convention Area. The marine resources managed by CCAMLR specifically exclude whales and seals which are the subject of other conventions: The International Convention for the Regulation of Whaling (IWC) and the Convention for the Conservation of Antarctic Seals (CCAS). The CCAMLR Convention organisational structure (Figure 3.8), depicts the Commission as the decision making body in CCAMLR, supported by three advisory committees. The three advisory committees are the Standing Committee for Implementation and Compliance (SCIC); the Scientific Committee (SC) with its two Working Groups (WGs) and the Standing Committee in Administration and Finance (SCAF) which is currently Chaired by South Africa.

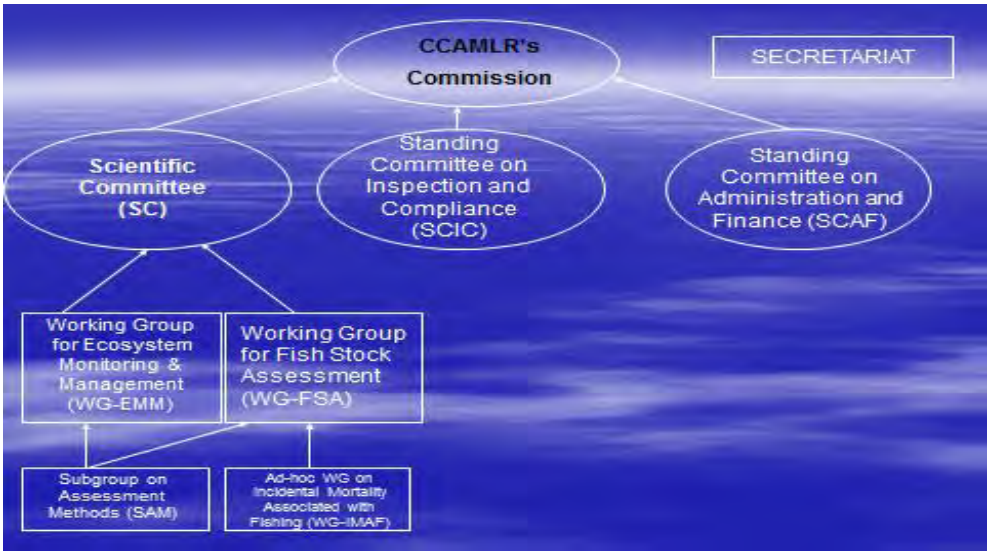


Figure 3.8: Diagrammatic representation of the organisational structure of CCAMLR

According to the CCAMLR System of Procedure (SOP), the organisation and running of CCAMLR meetings are the Commission's responsibility as the decision making body, and it has an independent secretariat responsible for collecting and disseminating information on non-compliance (Österblom & Sumaila, 2011). The Standing Committee on Implementation and Compliance (SCIC) is solely responsible for compliance-related information provided by the secretariat and member states and provide recommendations to the Commission on the revision of existing Conservation Measures (CMs) or drafting of new CMs (Österblom & Sumaila, 2011). On the other hand, the Scientific Committee (SC) provides scientific advice emphasising the precautionary approach to harvesting and exploiting marine living resources within the area designated as the CCAMLR waters (Constable *et al.*, 2000; Österblom & Sumaila, 2011). It is worth noting that the SC takes the level of Illegal, Unregulated and Unreported (IUU) fishing into account when providing recommendations for quotas, and a higher level of IUU fishing translates into lower quotas for licensed fishing companies (Österblom & Sumaila, 2011). Equally important, is the management of both the Patagonian toothfish (*Dissostichus eleginoides*) and the Antarctic toothfish (*Dissostichus mawsoni*), which are in part managed by the Commission, but several States including South Africa also exercise jurisdiction over their sovereign Sub-Antarctic islands and adjacent fishing grounds within the CCAMLR Area (Miller *et al*., 2010; Österblom & Sumaila, 2011). That is an illustration that CAMLR does not necessarily have exclusive competence in all areas that fall within the Convention Area, as some most productive fishing grounds fall within national jurisdiction areas (Österblom & Sumaila, 2011).

Chile was the first country to institute research on the prospects of the Patagonian toothfish, which in 1955 was to be followed by the exploratory fishing activity of the resource (Agnew, 2000). The subsequent development of longline gear paved the way for establishing a commercial fishery within the Chilean EEZ, and its major success was notable from the 1980s as between 5000 and 10 000 tons of the Patagonian toothfish were landed per annum (Agnew, 2000). The longline gear configuration, which can operate to depths exceeding 1000 meters, made it all possible. The 1990s saw the Patagonian toothfish fishery's commencement in Argentina and the Falkland Islands, where trawlers and longliners were utilised as they still are today (Agnew, 2000). In the Southern Ocean, particularly around the Kerguelen Islands, all toothfish species have been the subject of a directed trawl fishery since the mid-1990s. Besides, around South Georgia, the toothfish has also been caught through general trawl fishery from the late 1970s (Agnew, 2000). However, all these fishing activities did not have that much adverse impact on the resource, which only became more evident after the introduction of extensive commercial harvesting of the resource (Agnew, 2000).

Extensive scale commercial harvesting of the resource in the Sub-Antarctic waters started around the South Georgia Islands by the Soviet Union in 1988/1989 by introducing the longline fishery, and Chile followed that in 1991/1992 (Agnew, 2000). South Africa came into the Patagonian toothfish fishery picture early in 1996 when three operators filed their applications through the South African Sea Fisheries Research Institute, expressing their interest in initiating toothfish fishery in the South African EEZ the Prince Edward Islands (Brandão *et al*., 2002). However, in anticipation of these applications, notification of the imminent fishery had already been forwarded by South Africa to CCAMLR in November 1995, thus following due processes as part of the Prince Edward Island falls within the CCAMLR Convention Area," (Brandão *et al*., 2002). Subsequently, five experimental permits were awarded in October 1996 to harvest toothfish in the Prince Edward Island EEZ. For the 1996/1997 season, the experimental catch level was set at a maximum of 2 500 tons, which meant 500 tons per operator, limited for the period extending from 30 October 1996 to 31 October 1997 (Brandão et al., 2002).

3.2.3.1. IUU Fishing in the Southern Ocean including the Prince Edward Island's Exclusive Economic Zone

In CCAMLR's Scientific Committee work, levels of IUU fishing are taken and utilised as a basis on which to advise the Commission on the determination of fishing quotas in the Convention Area. According to Agnew (2009), the term IUU fishing can cover a wide range of issues, but he moved on to suggest that for the study that they undertook, and for the sake of proper analysis in their study they confined it to unreported catches, namely those taken within an EEZ which are both illegal and retained and which are usually unreported. Furthermore, all unreported catches taken from the high seas waters were subject to a Regional Fisheries Management Organisation (RFMO) jurisdiction (Agnew *et al.*, 2009). Accordingly, the 1993 Commission meeting dealt with the first signs of illegal or unreported fishing of the toothfish in the Convention Area when numerous transgressions of the CCAMLR Conservation Measures (CMs) were first reported by CCAMLR inspectors (Agnew, 2000). Within two years after that, i.e. in 1995, a report was sent to CCAMLR about an enormous number of fishing vessels around South Georgia in Sub-area 48.3 long after the CCAMLR season.

This development enabled CCAMLR to compile details of unreported catches of the early 1990s, but unfortunately in the report, no information was provided on IUU fishing for the year 1996 (Agnew, 2000). In late 1996, Prince Edward and Marion Islands became the new target of IUU fishing as it was reported during that period that a large scale IUU fishing was taking place within and outside of the South African EEZ with an increasing and alarming rate (Agnew, 2000). During the following year, i.e.1997, IUU fishing vessels were observed and apprehended in the EEZs around South African's Prince Edward Island, French Kerguelen and the Crozet Islands, and Australian Heard and McDonald Islands (Österblom & Sumaila, 2011). In 1997 it was further suggested that landings of almost all of the suspected IUU toothfish catches were in the Namibian ports and Mauritius port, with an estimation that between September 1996 and March 1997 74 000 to 82 000 tons were landed (Agnew, 2000). The considerable increase in IUU catch was linked to the reductions of toothfish catches rates around South America in 1995 and 1996, thus increasing the fishing cost and compelling many fishing vessels to search for new fishing grounds. This phase in the toothfish fishery development coincided with when the Northern Hemisphere fishing companies were beginning to take notice and interest in the toothfish fishery.

Upon the discovery of the Prince Edward Island Patagonian toothfish fishery, for legally fishing vessels the Catch Per Unit Effort (CPUE) was set at 10 tons a day, compared to the 3 tons a day around South Georgia which unlike the Prince Edward Island had a more robust law enforcement regime (Agnew, 2000). Therefore, from a purely economic perspective of more fish landed in less time, to a criminal perspective of more returns through illegally caught fish and a less chance of getting caught served to attract more IUU vessels around the Prince Edward Island. During the same period, an estimated 130 000 tons of toothfish, acquired through illegal means, was available on the world market. Furthermore, in 1997, 90 vessels were cited in IUU activities, and half of those vessels were flagged with CCAMLR members, mainly from South America (Agnew, 2000). The adverse effect of IUU fishing in Prince Edward, Marion and Crozet Areas in 1996/1997 was an almost total collapse of the stocks due to the mining of stocks, i.e. catches that far exceeded sustainable levels where most of the biomass was removed in an unsustainable way.

Unregulated catches declined tremendously from the peak in 1996/1997 and continued to move towards Kerguelen and Head and Macdonald Islands. One of the reasons for abandoning Prince Edward Island area was the significant reduction in catch rates due to IUU fishing, from 1.4 kg per hook in 1996 to 0.5 per hook in 1997 equivalent to 0.8 tons per day (Agnew, 2000). Inadequate resources are the main limiting factor in how developing countries can achieve effective enforcement measures in curbing IUU fishing (Erceg, 2006). Developing countries should strive to curtail the use of their flags as the Flags of Convenience (FOC). Reflagging vessels to the licensing State in these cases is used to avoid stringent conservation and management and controls, illegal fishing on the margins of other States' Exclusive Economic Zones and the high seas, and misreporting catches (Erceg, 2006). South Africa's failure in MCS capability, and the ability to respond timeously and effectively during the peak of IUU fishing in and around its islands in the Southern Ocean is a case in hand, and it is further put into perspective by Brandaõ *et al*. (2002) where they state that to that date only two aerial and one sea reconnaissance trip had been undertaken by South Africa. Needless to say, that evidence of the high levels of IUU fishing activity in the targeted area was there for everyone to see during the patrols as Brandaõ *et al.* (2002) further state that, on the first aerial survey in September 1996, illegal operators were photographed in the Prince Edward Island EEZ.

To this day it remains a problem for South Africa to effectively implement any meaningful MCS plans for its territories in the Southern Ocean. The distance from the mainland to get to Prince Edward and Marion Islands, the total area of patrol in that statistical area, the endurance

ceiling of the patrol vessel, and the exorbitant amount of money needed to complete such a patrol are all some of the limiting factors for a developing country like South Africa. DEA explored alternative solutions, with the researcher as part of the negotiating team between 2006 and 2012. One was a Treaty with Australia and the other an MCS and Research Agreement with France given the proximity of their territories in the Southern Ocean to those of South Africa. That process yielded some positives for South Africa, for example, an exchange program of inspectors with Australia in 2011, but the treaty was never finalised as was the agreement with France.

3.2.4. Operation Phakisa and the South African MCS Program

Operation Phakisa is a National government strategy of unlocking the economic potential of South Africa's oceans that was launched in October of 2015[41]. In motivating for this new approach in economic development, the South African Government inferred that South Africa is surrounded by three oceans, the Indian, Atlantic and the Southern Ocean, and it was not taking full advantage of in utilising the living and non-living resources that are in these oceans. The estimation that was presented by the government was that the oceans have the potential to contribute up to 177 billion rand to the gross domestic product (GDP) and create just over one million jobs by 2033. Various experts from government, the private sector; labour; academia and foreign experts from the United Kingdom and Malaysia identified four areas that must be prioritised for the South African Blue Economy effort. Those were the, (a) Marine Transport and Manufacturing, (b) Aquaculture; (c) Offshore Oil and Gas Exploration, and the Marine Protection Services and Ocean Governance (MPG). It is the MPG, under Operation Phakisa, that is designed to support all South African MCS efforts through its initiative 5, the Enhanced and Coordinated Compliance and Enforcement.

The Enhanced and Coordinated Compliance and Enforcement was meant to establish an integrated and coordinated approach to identifying non-compliance to the South African Maritime Legislative and Regulatory frameworks and the exploitation of resources within all

41 https://www.operationphakisa.gov.za/operations/oel/pages/default.aspx?RootFolder=%2Foperations%2Foel%2FOcean%20Economy%20Lab%20Documents%2FLab%20Documents&FolderCTID=0x012000741D6D119AF82C4B9C73BC1F93D3923E&View=%7B3F778B1E%2D4E15%2D4A55%2D9FD1%2D79D0F1909E40%7D. Department of Planning, Monitoring and Evaluation (Operation Phakisa) webpage. Accessed 19 July 2020

the South African maritime zones. This integrated approach and coordination are about compliance and enforcement activities relating to a wide range of issues that are inclusive of piracy, armed robbery at sea, human trafficking and smuggling, the introduction of alien and invasive species through the ballast systems and all customs and excise requirements; whale watching, shark cage diving; illegal structural developments within the terrestrial, coastal zone; Unregulated and Unreported (IUU) fishing activities and illegal activities within Marine Protected Areas (MPAs). According to Operation Phakisa (MPG) annual reports of 2017/2018 and 2019/2020, some of the objectives of the Enhanced and Coordination of Enforcement are:

a. *"Coordination of enforcement and policing of coasts and oceans,"*
b. *"Improvement of monitoring, control and surveillance";*
c. *"Protection of sensitive and unique marine habitats and species;"*
d. *"Integration and combining of the limited human and financial resources to successfully protect and police ocean resources and environment;"*
e. *"Mitigation of the high levels of IUU fishing and other illegal activities;"*
f. *"Inspections at harbours, launching pads, slipways, yacht basins and smaller fishing harbours;"*
g. *"Enforcement of marine and coastal legislation;"*
h. *"Rummaging (inspection) of vessels in ports and Boarding of vessels at sea for documentation and cargo inspections;"*
i. *"Inspection of vessels for compliance with maritime safety regulations;"*
j. *"Inspection of fishing vessels for catch verification and methods of catching (longline and seine);"*
k. *"Illegal marine resource mining hot spots;"*
l. *"Oil pollution and illegal bilge rinsing,"*

The implementation of all these objectives, which are in various plans for the coastal Provinces is the responsibility of a Governance Structure, comprised of different stakeholders, and collectively referred to as the Phakisa Command and Oversight structure (Figure 3.9).

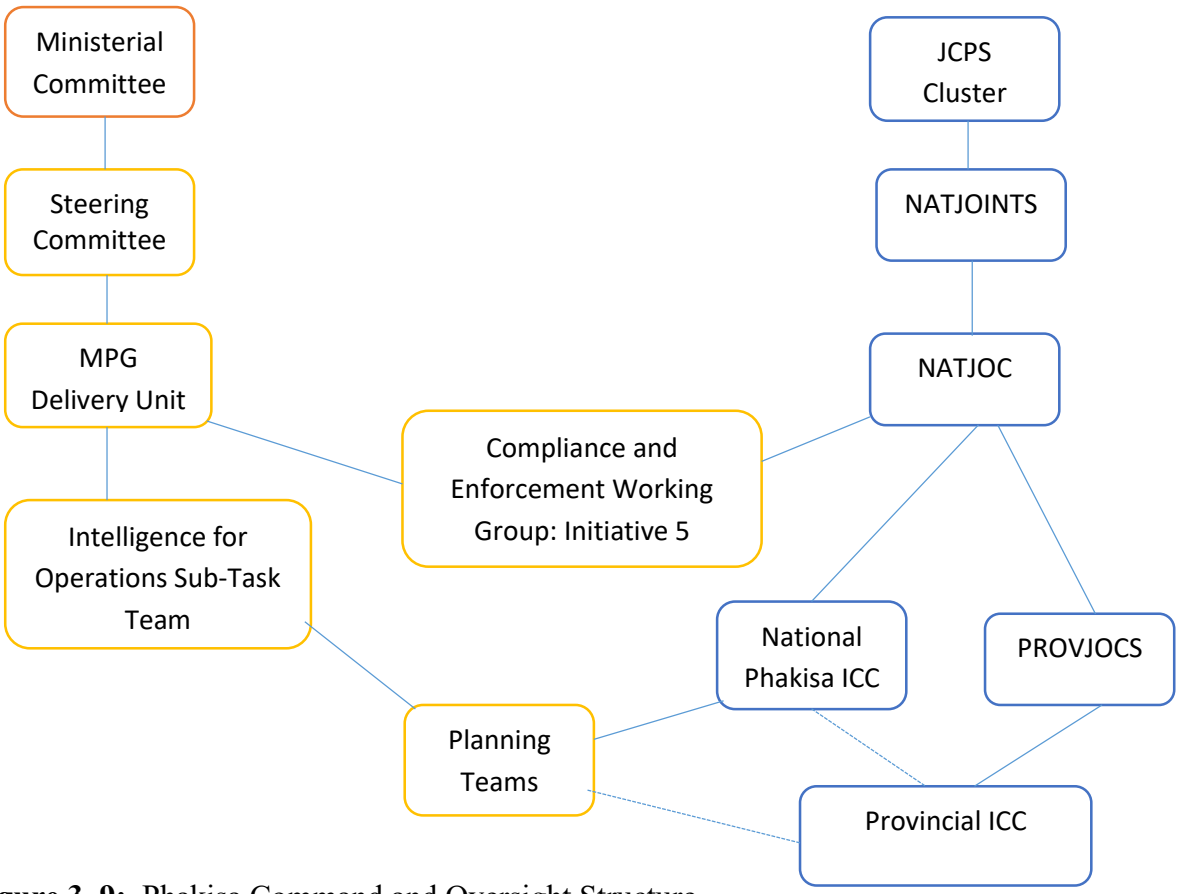


Figure 3. 9: Phakisa Command and Oversight Structure
(Source: DEFF Blue Economy Chief Directorate)

The Department of Environment, Forestry and Fisheries (DEFF), previously DEA, chairs the Phakisa Command and Oversight through a Compliance and Enforcement Working Group for Initiative 5 from its inception in March of 2016 till the 31 March 2020. During this period, DAFF supported DEFF, the Fisheries Management Branch, and that branch has since become part of DEFF. Also supporting DEFF is the National Joint Operational Intelligence Structure (NATJOINTS), a platform for coordinating all security and law enforcement operations throughout the country. It is made up of all Government Departments that are part of the Justice, Crime Prevention and Security (JCPS) Cluster. The JCPS Cluster is Departments that includes the South African Police Service (SAPS), the South African National Defence Force (SANDF), Department of Home Affairs (DHA), the National Prosecuting Authority (NPA); South African Revenue Service (SARS); Department of Social Department (DSD), and the Department of Justice and Constitutional Development (DOJCD).

The Enhanced and Coordinated Compliance and Enforcement (Initiative 5), is about joint operations where the primary responsibility is the maritime environment utilising multiple role players. The operational approach for joint operations focusses on compliance monitoring, taking appropriate enforcement actions against offenders confirmed to be contravening any of the pieces of legislation on oceans and coastal environment governance. That is frequently coupled with undercover or surveillance operations, proactive operations to prevent illegal activities and a reactive approach, often responding to complaints that are followed up and perpetrators apprehended if necessary. That is achieved through searches (inspections), visits (observations / visible policing or patrols) and other operational activities, for example, roadblocks. A comparison of Operation Phakisa national compliance and law enforcement activities for three financial years, i.e. 2016/2017; 2017/2018 and 2018/2019 are reflected in Table 3.2.

Table 3. 2: Summary of Operation Phakisa compliance and enforcement activities

	2016/17	**2017/18**	**2018/19**	**Total Activity National – 3 year period**
Searches	6 865	7 842	5 597	20 034
Visits	913	1 072	1 029	3 014
Operational Activity	4 702	5 337	5 282	15 321
Total Activity Per Year	12 480	14 251	11 908	38 639

Source: Marine Protection Services and Governance (MPSG) Annual Report – 2018/2019

Through this marine environment, compliance and law enforcement operation in all four coastal Provinces, observations made by NATJOINTS were that illegal harvesting of marine resources along the entire South African coastline was continuing at an alarming rate. NATJOINTS further stated that poaching of abalone is not only confined to the Western Cape, but to all coastal Provinces where poachers target ranched abalone (*Haliotis midae*); the East Coast rock lobster (*Panulirus homarus*), and West Coast rock lobster (*Jasus lalandii*) as well as wild abalone (Marine Protection Services and Governance, 2019). Moreover, along the Eastern Cape Province coastline, the red/copper steenbras (*Petrus rupestris*) is mainly targeted by recreational fishermen and then transported by road to Durban. Also, reports about the red/copper steenbras transgressions in the Port St Johns area became more frequent when the blanket ban on red/copper Steenbras for recreational fishers was lifted (Marine Protection

Services and Governance, 2019). The collaborative effort of Operation Phakisa's Initiative 5 also unearthed another problem, especially in the deep-sea or offshore fisheries sector both inside and outside the South African EEZ, gillnetting, as illustrated in Figure 3.10. In South Africa, gillnetting is generally outlawed, but through Operation Phakisa's Initiative 5 discarded gillnets have been frequently found along the KZN coastline, especially at the Blue Lagoon area of Durban (Marine Protection Services and Governance, 2019)

Figure 3. 10: Ocean and Coasts Information Management System (OCIMS) snapshot where the red dots show areas with a possible gill netting activity (MPSG Report: 2019/2020).

Despite the myriad of surfacing challenges resulting from the implementation of Operation Phakisa's Initiative 5, there were also notable successes. For example, permanent deployment in the Overberg resulted in poaching activity moving to the Cape Peninsular, particularly the Robben Island and the Northern and Eastern Cape. To that end, approximately 400 Overberg poachers were intercepted in Jeffrey's Bay en-route to Port Elizabeth (Marine Protection Services and Governance, 2020). The launch of an almost fully functional OCIMS brought about a significant improvement in South Africa's ability to detect and monitor transgressors in the ocean space (Marine Protection Services and Governance, 2020). That provides an early warning platform on possible risks and threats in the coastal waters and the high seas around South Africa and beyond, as its footprint extends to the marine environments of our immediate neighbouring States.

3.2.5. Review of the South African MCS Program

3.2.5.1. General review

Over the years, especially after 1994, different aspects of the South African MCS program have been discussed in numerous academic publications and public platforms. For example, the insufficient and ineffective control in the South African Marine Protected Areas (MPAs) that have designated no-take zones, was viewed as the underlying reason for a massive scale poaching of marine living resources (Pramod *et al*., 2008; Sjöstedt & Sundström, 2013). This observation was first made by Pramod *et al.* (2008) four years after Japp (2004) noted the improvements of MCS in South Africa. Japp (2004) had argued that there was a relatively high number of convictions regarding marine living resources transgressions, which could be attributed to an effective MCS system. These views were supported by MRAG (2005) as they stated that during this period, IUU fishing levels were low in South Africa, and that was an indication of a robust MCS system. The multiplicity of views on the status, capabilities and impacts of the South African MCS system, led to different views about improvements that MRAG (2005) and Japp (2004) advanced in their arguments.

Brill and Raemaekers, (2013), further elaborate on the matter that substantial improvements in the South African MCS system were made with the commissioning of South African National Parks (SANParks), notably the Table Mountain National Park (TNMP). The Department of Environmental Affairs and Tourism (DEAT) decided in 2004 to implement and manage fisheries law enforcement focusing more on abalone (*Haliotis midae*) and the West Coast rock lobster (*Jasus lalandii*) fisheries compliance operations within the jurisdiction of the park. This necessary arrangement between DEAT and SANParks inevitably increased the number of confiscations and convictions, as Brill and Raemaekers (2013) observed. Similar institutional arrangements were entered into by DEAT with the Overberg Municipality and the Ezemvelo-KwaZulu-Natal Wildlife, which were innovative law enforcement arrangements seeking not only to expand the footprint of the South African MCS system to all coastal Provinces but also to serve as a force multiplier strategy and to tackle illegal fishing activities head-on (Hauck & Kroese, 2006).

Besides, during this period, the environmental courts, the anti-corruption efforts; the establishment of the anti-poaching unit, and the strengthening of international cooperation that resulted in high profile arrests were at its zenith (Hauck & Kroese, 2006; Sjöstedt & Sundström, 2013). Another dimension on the discussions about the effectiveness of the South African MCS

system was advanced by Pramod *et al*. (2008), where they argued that the South African MCS system's ineffectiveness and inefficiency was a direct result of inadequate funding and maladministration. Inadequate funding continued in the latter years to weigh heavily on the demise of the abalone fishery as DAFF pointed out in the status of the South African Marine Fishery Resources report (2016), that the best MCS efforts to curtail abalone poaching failed to yield the expected 15% reduction in poaching due to insufficient funding and other related resources. Moolla (2010) had also commented on inadequate funding and how the South African government was addressing it.

Moolla (2010) emphasised that MCS funding was inadequate, reporting that most MCS operations were funded through the sale by DEAT of confiscated abalone and the West Coast rock lobster. Noteworthy is that for both species, the sales that were funding MCS operations resulted from poaching activities, which would then be confiscated by MCS officials to be sold by the Department at some later stage. Despite all these challenges and controversy, the South African fisheries management image did not suffer that much as it was ranked 6th out of 33 countries in two studies about determining progress in the implementation of ecosystem-based management of fisheries, as well as the comparative evaluation of fisheries management performance utilising a framework of 13 attributes (Cochrane *et al*., 2020). However, excessive poaching in the abalone and West Coast rock lobster fisheries and the capacity reduction of management and enforcement in DAFF over the last decade has led to a position that renders DAFF unable to adequately address those serious shortcomings (Bergh & Davies, 2009; Cochrane *et al*., 2020).

Corruption of FCOs has also been noted as another continuing blemish in the South African MCS system (Cochrane *et al*., 2020; Sundström, 2013). Treisman (2000) defines corruption as *"the misuse of public office for private gain."* Agnew et al. (2009) and Österblom *et al.* (2011) further argue that the occurrence of corruption correlates positively with levels of illegal fishing. An important example of corruption was the South African Mossel Bay 2005 case, where an FCO and numerous Fisheries Monitors were involved in corrupt activities together with three companies that included ProFish Mossel Bay, and fishing boat skippers [42] That was engaging in the processing of non-declared sardine catches as bait; under-reporting of catches; offloading of fishing vessels in the absence of FCOs or Monitors, and a wide range of other

[42] https://www.iol.co.za/travel/south-africa/mossel-bay-fishing-boss-gets-5-years-in-jail-251675. Mossel Bay fishing boss gets five years in jail. Accessed 06 August 2020.

MLRA contraventions (Attwood, 2016). Scorpions collaborated with MCM for a six-month undercover operation, resulting in the arrest of ProFish Mossel Bay Director who was subsequently sentenced to a five-year jail term whilst the company was fined R350 000.00. According to this article, the FCO took the initiative of approaching ProFish Mossel Bay for a small pelagic scam which went on for years. In the process, hundreds of tons of fish valued at millions of rand were effectively pillaged in the Southern Cape region. Using this case, Attwood (2016) succinctly illustrated the far-reaching adverse impacts of corruption as engrained in illegal fishing activities to fisheries governance broadly by quoting Cochrane giving an expert opinion during the court proceedings of the Mossel Bay case or the "lotto fisheries" case as commonly referred to that, "…even small illegal catches could interfere with a science-based management system − like the operational management procedure (OMP) that is used to manage catches in the small pelagic fishery." Although it was 14 years ago that Hauck and Kroese (2006) pointed out that effective law enforcement interventions to combat corruption within MCM were desperately needed where FCOs were in the middle, and such views hold even today.

3.2.5.2. Inshore fisheries

Several species are categorised as inshore fisheries in South Africa, for example, squid (*Loligo reynaudi*i); oysters (*Saccostrea margaritacea*); the shallow water tiger prawns (*Penaeus monodon*) and others (Department of Agriculture Forestry and Fisheries (DAFF), 2016). However, for this study, the focus is only on abalone (*Haliotis midae*) and the West Coast rock lobster (*Jasus lalandii*), which are subject to high levels of illegal fishing as described in the previous section. At the turn of the century, the abalone fishery was among the most profitable commercial fisheries in South Africa, with earnings estimated at R100 million annually (Department of Agriculture Forestry and Fisheries (DAFF), 2016; Minnaar *et al*., 2018). Poaching of abalone in South Africa has been steadily escalating since the early 1990s (Brick *et al*., 2009; Cochrane *et al*., 2020; Minnaar *et al*., 2018). A direct response to the escalation of abalone poaching by DEAT was intensive development of the South African MCS effort to curtailing the poaching activity (Brick *et al*., 2009; Hauck & Kroese, 2006). Despite all the law enforcement intensification efforts by DEAT, abalone poaching continued persistently to a point where the fishery was eventually closed in 2008 (Raemaekers & Britz, 2009). Leading

to the closure of the abalone fishery were some incidents that tested the South African MCS system's resolve. An example is the 1994 "abalone war" characterised by ferocious conflagration between the coastal communities, poachers and the FCOs working with police (Hauck & Kroese, 2006).

Currently, the West Coast rock lobster is regarded as the most lucrative inshore fishery in South Africa as it is valued at more than R260 million per annum and provides employment to more than 4 200 people from the West Coast coastal communities (Cochrane *et al.*, 2020; Cockcroft *et al*., 2008; Department of Agriculture, 2016). However, as the West Coast, rock lobster is a high-value species coupled with its proximity to the shore, renders it highly susceptible to poaching as hoop nets which are used for fishing for the West Coast rock lobster are easy to acquire(Cochrane *et al.*, 2020; Department of Agriculture, 2016). The set of environmental characteristics that predisposes the West Coast rock lobster to poach, i.e. proximity to shore and easy access by all coastal communities, are similar to those that beset abalone.

The combination of a wide range of factors that are inclusive of natural conditions of the fishery and the development of intricate organised criminal syndicates locally and internationally with extensive abalone poaching activities in the Western Cape of South Africa, make the abalone fishery particularly difficult to manage (Brick *et al*., 2009; Hauck & Sweijd, 1999; Lambrechts & Goga, 2016; Raemaekers & Britz, 2009). The difficulty can be illustrated, for example, by the circumstances that led to the closure of the commercial fishery. The fishery was subsequently reopened in 2010 because there would be a 15% poaching reduction per annum (Department of Agriculture Forestry and Fisheries (DAFF), 2016). However, six years after the abalone fishery was reopened, available confiscations and inspection data from the Compliance Directorate indicated that instead of reducing poaching, it had increased five-fold (Department of Agriculture Forestry and Fisheries (DAFF), 2016). The observed increase in poaching occurred despite the intense MCS efforts of the South African Fisheries Governance Authority (FGA) working in collaboration with all other law enforcement agencies and relevant stakeholders. The failure to control illegal fishing is linked to inadequate resources allocated to curb poaching (Cochrane *et al*., 2020; Department of Agriculture, 2016).

The dominant academic view is that abalone poaching has continued relentlessly for over two decades (de Greef, 2016; Minnaar *et al*., 2018). That may be attributed to several factors in addition to the limited enforcement capacity. One of those is easy access to abalone *(Haliotis midae*) as it commonly occurs in shallow inshore waters, and in depths that are not exceeding

100 meters, it is thus an easy target for poachers (Cochrane *et al.*, 2020; Minnaar *et al.*, 2018). Other reasons are an elaborate link between the history and marginalised communities of South Africa, and the devastating consequences of apartheid. The new political dispensation may have led to various unintended consequences in managing the marine living resources that continued marginalising traditional, small scale fishers. Hauck & Sweijd (1999) proposed that criminalisation of trade in abalone fishery started when it became a scarce resource due to overfishing in the 1970s, and Lambrechts and Goga (2016) argue that it also took root in the breakdown of relations between Coloured fishing communities and the State. That breakdown goes back to the apartheid laws era when they were dispossessed of land and excluded from property ownership and utilisation of marine living resources from the ocean as a source of income (Lambrechts and Goga: 2016; De Greef: 2013). The introduction of the small scale fisheries sector policy in 2014 was intended to reverse the marginalisation of small scale fishers in the country, but so far has not been fully implemented (RSA (Republic of South Africa), 2012). Regarding difficulties with full implementation of the small scale fisheries sector policy Isaacs and Witbooi (2019) argue that the problem may be with how it is formulated, where the human rights concept is awkwardly merged with a neo-liberal agenda of segregating between winners and losers creating an affluent social class alongside impoverished people utilising marine resources.

These interrelated issues about the relationship and interactions between the State, in consideration of its respective fundamental responsibilities, and its citizenry in consideration of its basic rights and a quest to gain access to natural resources (Lambrechts & Goga, 2016; de Greef, 2013) are, further elaborated by Pinnock (2016). Pinnock (2016) argues that the mass socio-economic marginalisation of the majority of this country permeates our society to this day. Furthermore, he states that "the historical legacy of the apartheid system can, in turn, be linked to the growing break down of state legitimacy and state-society relations which continues to haunt current authorities as they struggle to transform and remedy the injustices of the past." That is evident in the fisheries governance sector as on one end the government officials are the enforcers of the country's legislative framework, whilst coastal communities are more focussed on exercising what they consider to be their right of gaining access to the living marine resources.

This conflict highlights that government has a dual responsibility of protecting marine living resources, whilst taking care of food security processes through regulated access to the natural

resources[43]. In this regard, Isaacs and Witbooi (2019) argue that protecting the rights of traditional fishing communities is the responsibility of State and ensuring that other parties from outside these communities are barred entry to fish waters that these communities depend on. Law enforcement is the expected response but on consolidating conservation measures and management rules (Isaacs & Witbooi, 2019). Success is not always guaranteed with this approach as it is m based on international fisheries law enforcement, which is designed to deal with highly sophisticated organised crime (de Coning & Witbooi, 2015; Isaacs & Witbooi, 2019), and it may not be appropriate for addressing illegal fishing by frustrated legitimate fishers.

The MLRA provides the legislative frameworks for guiding the MCS structure's functions in ensuring that South Africa upholds the national macro and sectorial fisheries responsibilities following global fisheries governance best practices (Cochrane *et al.,* 2020; van Sittert *et al.*, 2006; Witbooi, 2006). Notably, the MLRA regards all fisheries' transgressions as criminal activities and guides FCOs in applying the appropriate sanctions even though that may not be an ideal approach to transgressions in the small scale fisheries sector due to the humanitarian considerations (Isaacs & Witbooi, 2019). The MLRA was not the originator of this approach, and it is essential to note that fisheries transgressions in South Africa predated the MLRA, for example, abalone and WCRL poaching, and the State responded by instituting law enforcement interventions of which the intentions were to curb illegal activities in the fisheries sector as if they were criminal activities, failing to take into account humanitarian considerations.

The South African FGA has committed to utilising different approaches in responding to fisheries crimes committed under organised crime and those that would ordinarily be conducted in the small-scale fisheries (Isaacs & Witbooi, 2019). Small scale fisheries, which are different from commercial fisheries which are capital intensive, tend to be a low technology and labour-intensive fishing exercise that encompasses various subsistence fishing forms; traditional fishing operations and formal small fishing enterprises (Sowman, 2006; Witbooi, 2006). Although DEFF committed on utilising different approaches, there seems to be a preference of utilising fisheries crimes approach to fisheries law enforcement; hence a further argument on the matter as advanced by Isaacs and Witbooi (2019) is whether that approach would be able

[43]http://www.srfood.org/images/stories/pdf/officialreports/20121030_fish_en.pdf. United Nations General Assembly (UNGA) 'Promotion and protection of human rights: human rights questions, including alternative approaches for improving the effective enjoyment of human rights and fundamental freedoms: The right to food' Interim Report of the Special Rapporteur on the Right to Food, A 67/268. Accessed 09 September 2020

to take into consideration the human rights driven management. They further point out that the notion of law enforcement as a panacea for fisheries crimes cannot be sustained; hence alternatives like government social and economic focusing programs and policies should be explored (Isaacs & Witbooi, 2019).

A similar escalating trend in illegal fishing has occurred in the West Coast rock lobster (*Jasus lalandii*) fishery. The challenges in the WCRL sector are clearly articulated by Cochrane *et al.* (2020) when they point out that illicit fishing activities in the West Coast rock lobster fishery have also become a cause for concern. WCRL is a species that is viewed as being highly susceptible to collapse due to overfishing as it is both slow-growing and popular among poachers and crime syndicates[44]. Besides, its proximity to the shore makes it easily accessible to all criminal elements; hence it is susceptible to poaching and overfishing (Cochrane *et al.,* 2020; Hauck and Kroese, 2006). Organised crime, mostly led by foreign nationals, is mostly argued to be the ultimate cause of marine living resources pillaging in the form of poaching of WCRL, as is the case for abalone (Hauck & Kroese, 2006; Minnaar *et al.*, 2018; van Sittert *et al.*, 2006). However, it is not only foreign nationals involved in organised crime that is illicitly targeting marine living resources but also South Africans, with devastating effects.

A case in hand is that of Arnold Bengis and his Houtbay Fishing company about whom Nombembe and Hyman (2017) remarked that he is a man who inflicted the most debilitating blow to the WCRL fishery. The case of Arnold Bengis and his Houtbay Fishing Company was brought to the fore by a combination of a tip-off and a 10-month joint investigation between Marine and Coastal Management (MCM) officials and SAPS (Hauck & Kroese, 2006; Minnaar *et al.*, 2018; Nombembe & Hyman, 2017). That led to his arrest and subsequently charged with extensive illegal harvesting of rock lobster that extended from 1987 to 2001. It is argued that his illegal harvesting of the WCRL was caused by heavy punitive sanctions that were imposed in 1986 by the US government on the apartheid government, as well as the subsequent stringent fishing industry regulations that were imposed in the 1990s that included severe quota reductions for his company and other rights holders (Minnaar *et al.,* 2018). Those criminal activities were at the core of the MLRA transgressions at that time.

As a direct response to collective environmental crimes, which included marine poaching, the South African Police Service (SAPS) activities decided categorising them in 1997 as priority

[44] https://fishforce.mandela.ac.za/fishforce/media/Store/documents/Articles/Servamus_marine-organised-crime.pdf. The link between marine living resources. Accessed 19 August 2020

crimes (Hauck & Sweijd, 1999; SAPS, 1997/1998[45]). Furthermore, in 1998 SAPS established a Marine Investigation Unit of which the main focus was organised crime syndicates that were dealing with marine products (Hauck & Sweijd: 1999). These strategic decisions provided a foundation for cooperative marine environment governance, especially on the law enforcement front. That included the involvement of the Directorate of Special Operations (DSO) under the National Prosecuting Authority (NPA), commonly referred to as Scorpions, charged with the responsibility of investigating, arresting and prosecuting all abalone related organised crime activities (Minnaar *et al*., 2018; Redpath, 2002[46]). That was followed in 2002 by the launch of Operation Neptune II, which was a joint anti-poaching initiative comprised of MCM (FCOs); the South African National Defence Force (SANDF) and SAPS (Minnaar *et al*., 2018). When Operation Neptune II was launched, revenue lost to abalone poaching was estimated at R400million per year. Hence the operation was sustained for a year with approximately 70 personnel and specialised physical resources for high-level impact against marine living resources poaching activities (Redpath, 2002; Steinberg, 2005). The impact can be seen in the information as provided by the South African Navy (2015) that in the first three months of Operation Neptune 286 poachers were arrested; with 15 432 confiscations of abalone units, coupled with the seizure of 15 vehicles; boats and trailers and 440 diving equipment units.

Operation Neptune II was drawn to a close in 2004, and Operation Trident was developed and implemented in its place. The main objective of Operation Trident was to uproot syndicates that were behind abalone poaching through a specific intelligence-gathering exercise (Minnaar *et al*., 2018). What also came through Operation Trident were the first proposals that there should be 'green' courts, and a 24-hour call centre operated by a full-time Conservation Officer in the Overberg area (Van Dalen, 2013[47]). The purpose of the 'green' courts was to guarantee that the South African justice system can process all abalone poaching cases with high prosecution levels, and more stringent gaol terms for all perpetrators. The demobilisation of Operation Trident was in 2008, and it was partly due to SAPS internal institutional arrangements as they were refocussing general prevention of crime, investigating crime, and

[45] https://static.pmg.org.za/SAPS_Annual_Report_20182019.pdf. Annual report of the South African Police Service, 1997/8. Accessed 21 August 2020.
[46] https://hsf.org.za/publications/focus/issue-25-first-quarter-2002/poached-close-to-extinction. An article by Jean Redpath: Poached Close to Extinction. Accessed 21 August 2020
[47] https://www.da.org.za/archive/why-should-the-state-profit-from-abalonepoaching/. Why should the state profit from abalone poaching? Democratic Party. Accessed: 22 August 2020

apprehending suspected criminal under the South African criminal justice system[48].That approach was to the detriment of marine environment responsibility, which included patrolling of the coastline and the EEZ and fisheries protection as it was all handed back to DEFF for the FCOs to implement and monitor as mandated by the MLRA (Van Dalen, 2013). On the practical side of law enforcement implications of this demobilisation was the need for MCS officials to call upon SAPS for assistance in effecting arrest if poaching activities are reported, as well as in the setting up of roadblocks as they lacked the requisite skills and special equipment (Minnaar *et al.*, 2018).

The other negative result of Operation Trident's dissolution was the discontinuation of investigations by the Scorpions, or Hawks that replaced Scorpions when they were incorporated into SAPS in 2008. That meant that the well-established approach at the time, of using intelligence to target abalone poaching syndicates came to a halt as all operations reverted to reactive policing instead of the intelligence-driven policing or proactive policing which characterised Operation Trident (Minnaar *et al.*: 2018; Change Organisation, 2016[49]; SAPS, 2008). The other notable downside of the disbandment of Operation Trident, as was the case with Operation Neptune II, was the withdrawal of specialist personnel and equipment used for all operations especially boats for waterborne patrols and inspections, leaving meagre resources to local SAPS officers to continue with their policing (Change organisation, 2016).

Although Operation Neptune II came to a close in 2004, the South African Navy (SAN) is still fully committed to, *"enforcing maritime security and combating poaching in the Overstrand[50]."* To this end, in the SAN website, it is stated that in August 2018 and June /July 2019 as part of the SANDF Operation Corona they deployed the SAS Makhanda an Offshore Patrol Vessel, as well as the SAS Protea in the Overstrand region which was manned by the Maritime Reaction Squadron supported by SAPS and DEFF. Statistics of the operations are in their website, and they include confiscation of 182 units of shucked and two units of shelled abalone to the value of R585 000.00 and confiscation of diving and electronic communication equipment worth R127 700.00. Although the SAN deployments and operations may be viewed as overlapping or competing with similar efforts to Operation Phakisa's Initiative 5 (Section

[48] https://www.gov.za/faq/justice-and-crime-prevention/how-does-criminal-justice-system-work. How does the criminal justice system work? Accessed 03 October 2020.

[49] https://www.change.org/p/ stop-abalone-perlemoen-poaching. STOP Abalone/Perlemoen poaching petition to the Director-General of the Department of Agriculture, Forestry and Fisheries. Accessed: 22 August 2020

[50] https://www.defenceweb.co.za/featured/sandf-enforcing-maritime-security-combating-poaching-in-the-overstrand/. Enforcing maritime security, combating poaching in the Overstrand. Accessed 24 August 2020

4.2.4), they share a common objective that benefits the South African MCS collective effort. On the other hand, Operation Phakisa's Initiative 5 is expected to run for five years, after which it will be reviewed and a decision taken on whether to continue with it or disband it. This period aligns with the 5-year government strategic plan and the 5-year term of office of a new government administration after every national or general election.

3.2.5.3. Offshore fisheries

The South African offshore fisheries are mostly within our mainland EEZ apart from some exceptions, for example, the Patagonian toothfish (*Dissostichus eleginoides*) which is fished in the Southern Ocean. The main South African offshore fisheries comprised of deep-water hake trawl *(Merluccius paradoxus*); mid-water trawl – Cape horse mackerel (*Trachurus capensis*); hake longline and inshore trawl fisheries – shallow-water hake (*Merluccius capensis*), small pelagic – for example, sardine (*Sardinops sagax*), (Department of Agriculture Forestry and Fisheries (DAFF), 2016; Norman *et al*., 2018). The small pelagic fishery targeted species include the sardine, redeye round herring (*Etrumeus whiteheadi*i), anchovy (*Engraulis encrasicolus*) with its associated bycatch Cape horse mackerel, is managed using operational management procedures (OMPs) (Cochrane *et al*., 2020; Hara, 2013). In the small pelagic sector, which is controlled by a total allowable catch (TAC), 15-year rights were issued to 115 small scale fishery holders in 2005, of which that number has since been reduced to 109 (Cochrane *et al*.: 2020; Hara: 2013).

Although the small pelagic fisheries had been relatively well managed the sudden change in the distribution of sardine from the West Coast to the South Coast led to an unprecedented host of challenges in managing the resources between 2001 and 2005 (Attwood, 2016). One incident of severe transgressions of the MLRA that included under-reporting of catches was made possible by offloading at night in the absence of fisheries monitors, and that led to illegal processing of fish and a host of other related fraudulent activities (Attwood, 2016). The Mossel Bay "Manny's Fisheries" fraud case revealed significant weaknesses in the South African MCS system which Professor Cochrane as quoted by Attwood (2016) remarked that the laissez-faire approach to MCS requirements by all responsible officials in the MCS chain of command predisposes the offshore small pelagic fishery to an array of IUU fishing activities. He further stated that the direct negative impact of officials' actions and the resultant IUU fishing, led to

difficulties in carrying out a precise fish stock assessment process, of which the downside of that is on accurate allocations to the fishing community (Attwood, 2016). While this was one particular incident, there are also reports of other transgressions in the small pelagic fishery, for example, high grading or dumping of fish at sea (Cochrane *et al.*, 2020; Hara, 2013). High grading of fish in the small pelagic fisheries, especially in the sardine fishery, is an illegal activity attributed to various economic driven pressures, for example, where canning factories have set the acceptable minimum length of fish at 14cm (Hara, 2013). These minimum length standards, coupled with the volume of fish that each factory must receive per day, contribute to high grading per catch volume and reported illegal landings in the small pelagic fishery (Cochrane *et al*., 2020; Hara, 2013). Furthermore, skippers of vessels in the sardine fishery were observed to prefer casual labour instead of employing permanent crews, and that is a Labour Relations Act (Act 66 of 1995) transgression (Hara, 2013). A significant impact of this practise on the sardine fishery is high grading, and that somehow improves future opportunities of casual employment to the crew members, not to mention benefits of sharing the proceeds of revenue generated through sales of fish caught through illegal means (Cochrane *et al.*, 2020; Hara, 2013).

Other South African offshore commercial fisheries include the fisheries for tuna and tuna-like species, both in the Atlantic and Indian Oceans, divided into tuna pole-line and large pelagic longline fisheries (Department of Agriculture Forestry and Fisheries (DAFF), 2016). The targeted species include yellowfin tuna (*Thunnus albacares*) as an example of large pelagics, and in the tuna pole fishery, Albacore tuna (*Thunnus alalunga*) (Department of Agriculture Forestry and Fisheries (DAFF), 2016). In the Atlantic Ocean and the adjacent seas, the Regional Fisheries Management Organization (RFMO) responsible for managing and conserving tuna and tuna-like species is the International Commission for the Conservation of Atlantic Tunas (ICCAT), of which South Africa is one of the 53 Contracting Parties[51]. ICCAT 2019 compliance reports did not reflect fisheries transgression on the part of South Africa. Instead, they reflected minor administrative errors, as they stated that South Africa has always committed to 100% compliance following ICCAT protocols. However, in 2019 they could not achieve that target due to administrative oversight when sending reports in a wrong format which were subsequently rectified but after the closing date[52].

[51] https://www.iccat.int/Documents/SCRS/Manual/CH1/CH1-ENG.pdf. ICCAT Manual – What is ICCAT? Accessed 11 September 2020

[52] https://www.iccat.int/Documents/BienRep/REP_EN_18-19_II-1.pdf.

In the Indian Ocean, the Indian Ocean Tuna Commission (IOTC) is the RFMO that manages and promotes conservation and utilisation of tuna and tuna-like fish stocks while also encouraging sustainable development of fisheries[53]. South Africa ratified IOTC in 2016, and the first IOTC Compliance assessment of the South African MCS performance was conducted in 2017. This report provides the only IOTC South African compliance assessment at this moment. The overall views of IOTC about South Africa are of absolute commitment of the country to complying with all the IOTC Conservation Measures in force[54]. An example given in the report is South Africa's registration of all fishing vessels following the IMO regulations and installing functional and reporting VMS. In the fight against IUU fishing, the IOTC report appreciated that South Africa has three dedicated ports for foreign fishing vessels, i.e. Cape Town; Port Elizabeth and Durban. Furthermore, the process of application by foreign vessels before entry to the South African EEZ by foreign vessel, and inspections conducted following the FAO Agreement on Port State Measures and the applicable domestic laws and regulations are viewed positively by IOTC as effective measures to curb IUU fishing.

3.2.5.4. Marine Protected Areas

The notion of utilising MPAs as a tool for environmental management; biodiversity conservation and fisheries management gained traction in the early 2000s even though some scholars were raising concerns that their use as a conservation measure should be approached with caution as consideration should also be given to social aspects (Agardy *et al*., 2011; Christie, 2004). However, given threats of overexploitation together with general habitat destruction of oceans and coastal areas, a decision was taken to use the best available science at the time to develop and implement the MPA concept (Hoegh-Guldberg, 2015). In support of MPAs development and implementation, Halpern *et al.* (2008) argued that in the overall environmental degradation, the destructive human impact to the ocean environment could be estimated at 41%, hence MPAs were essential in arresting the downward spiral and improve the situation. That led into many management approaches on MPA. Many suggested that for

[53] https://www.iotc.org/node/1. Indian Ocean Tuna Commission: Objectives. Accessed 11 September 2020
[54] https://www.iotc.org/compliance/monitoring. South Africa – Compliance report of 2017. Accessed 11 September 2020.

MPAs to succeed, they needed to be structured to fulfil both the socio-ecological and governance objectives[55].

The escalating degradation of the marine ecosystems on the one hand and their value to human well-being on the other, the view of MPAs as a potential solution has been elevated in the recent past (Brander *et al.*, 2020). Lester *et al.* (2009) pointed out that on the global scale, there were notable trends of fish size increase coupled with density and species richness that was attributed to MPAs. This increase was not only limited to within the boundaries of MPAs but spilt over into adjacent areas to the MPAs, and it was observed throughout various development stages of fish, i.e. the adult breeding stock, juvenile fish and larvae, which signifies the effectiveness of MPAs (Harrison *et al*., 2012; Lester *et al*., 2009). MPAs are acknowledged globally as a fundamental environmental management tool with crucial objectives of conservation of biodiversity and, under specific circumstances, sustainable utilisation of fisheries, even though their distribution and effectiveness are not as yet adequate to curb fisheries and biodiversity decline (Kockel *et al*., 2020; Watson *et al*., 2014).

Benefits to fisheries as provided by MPAs do vary, and that is influenced by the design of the MPA where there are considerations of law enforcement capacity and effort, as well as fish species found within the MPA and their respective mobility rates, i.e. more conservation benefits for fish species with low and intermediate mobility rates[56]. Furthermore, for appropriately designed MPAs benefits for fishery resources are realised both inside of the MPA and the immediately adjacent areas outside of the MPA (FAO, 2011). However, advice against the exclusive use of MPAs as a fisheries management tool is also given as that approach may result in poor fish stock yields with an exorbitant fishing cost. Therefore, MPAs should form part of an integrated fisheries management plan, and not be utilised as a unitary fisheries management tool, unless there is compelling evidence that it is unavoidable due to lack of capacity in the implementing agency or inexistence of other forms of fisheries management (FAO, 2011).

In the past decade, there has been a remarkable global increase in number and dimensions of MPA, all as an attempt to meet international protected areas targets as set by the World Summit on Sustainable Development (WSSD) and the United Nations Convention on Biological

[55] http://ocean.panda.org/media/WWF_Marine_Protected_Areas_LR_SP.pdf. Marine Protected Areas: Smart Investments in Ocean Health. Accessed 20 September 2020.
[56] http://www.fao.org/3/i2090e/i2090e00.htm. FAO Technical Guidelines for Responsible Fisheries 4. Fisheries Management – Marine Protected Areas and Fisheries. Accessed 28 September 2020

Diversity (CBD) (Hoegh-guldberg, 2015). The target for the extent of global standards in MPAs coverage was taken during the meeting of the Convention on Biological Diversity (CDB) in 2010, for a 10% coverage of biodiversity and ecosystems services critical coastal and marine areas by 2020[57]. As explained above, the MPA targets are part of biodiversity targets generally referred to as the CBD Aichi biodiversity targets, which were formulated to ensure a systematic and practical management area of biodiversity importance and ecosystem services (Coad *et al.*, 2013). South Africa has not been left behind in these global environmental management developments, and as such, has also utilised MPAs as another dimension to enhance further the existing environmental protection and law enforcement collective effort.

Therefore, different approaches in utilising MPAs as environmental management tools have been employed in South Africa; some are closed areas or no-take Marine Protected Areas which are designed to protect the entire ecosystems and also used to evaluate all controlled efforts and the impact of the human interaction with the environment through research (Branch & Clark, 2006). With effect from 01 August 2019, 20 newly established MPAs related to Operation Phakisa became operational, leading to a total of 45 MPAs in South Africa. These 20 new MPAs are divided into two categories, i.e. offshore and inshore MPAs (Marine Protection Services and Governance, 2019). However, much as MPAs may be a welcomed development towards improving environmental management effectiveness, it also amplified the South African MCS system's existing limitations. The current challenges are inclusive of the distance of some offshore MPAs from the South African mainland like the Prince Edward Island MPA; limited capacity with regards to the Offshore Patrol Vessels (OPVs); limitations of the Automatic Identification System (AIS) footprint, and a host of other challenges as noted by NATJOINTS(Marine Protection Services and Governance, 2019).

3.2.5.5. Challenges of MCS within the existing long term MPA's and difficulties faced

For Marine Protect Areas, whilst MCS is purported to be suited to support the biodiversity management function, its primary focus is in combatting fisheries-related contraventions and bolster fisheries regulations (Miller *et al.*, 2013). Hence, in the governance of MPAs,

[57] https://sustainabledevelopment.un.org/content/documents/733FutureWeWant.pdf. RIO + 20 – The Future We Want. Accessed 29 September 2020

particularly on the law enforcement front, there is a multiplicity of problems. Putting that into perspective, Laffoley *et al.* (2008) point out that a major lingering challenge for effective implementation and management of MPAs is a reasonable and consistent law enforcement effort. That challenge could be attributed to lack of surveillance due to inaccessibility of the MPA, or no enforcement responsibility or lack of support for the MPA by adjacent communities which often results in a range of infractions (IUCN World Commission on Protected Areas (IUCN-WCPA), 2008). South Africa has in fact numerous MPAs bordering terrestrial parks or abutting coastal communities. The latter configuration leads to disagreements that are mostly driven by different interests, and mainly compromises the MPA's effectiveness due to lack of support for its mere existence or the fundamental principles of its existence at a more detailed level. Therefore, holistic support for the MPA by its stakeholders must be attained and sustained to achieve its effectiveness, particularly the adjacent communities and users (Agardy *et al.*, 2016). Unfortunately, the Tsitsikamma and the Dwesa-Cwebe MPAs are examples of MPAs that have experienced management challenges due to lack of support from their respective adjacent communities. The lack of support could be linked to the conflict of interest among the different stakeholders, a set of government priorities influenced by Government's different responsibilities and the interpretation and implementation of policies by Government (Lombard *et al.*, 2019; Muhl & Sowman, 2020).

The Tsitsikamma MPA is the oldest MPA in Africa, and it provides sanctuary to many fish species that are overexploited elsewhere, for example, red roman (*Chrysoblephus laticeps* and the dageraad (*Chrysoblephus cristiceps*)[58]. In 2016 the erstwhile Department of Environmental Affairs (DEA), now DEFF, decided to lift the shore-angling restriction in 20% of the MPA coastline which was vehemently opposed by a number of scientists and some parts of the community (Lombard *et al*., 2019). Notwithstanding the history of Tsitsikamma, which is non-consultation and dispossession of some adjacent communities as it was imposed on people through utilizing the National Parks Act of 1962 (Lombard *et al.*, 2019; Muhl & Sowman, 2020). Seemingly, non-consultation was the root of the problem. The prominent view was that the Government was not appropriately utilizing its policies, particularly the *"Research, Development and Evidence Framework"* which is primarily aligned with the South African Constitution (Muhl & Sowman, 2020). Noteworthy, this occurred during an era where there is sufficient research evidence that an MPAs' success depends not only on the biophysical, socio-

[58] https://www.marineprotectedareas.org.za/tsitsikamma-mpa. Established in 1964, Tsitsikamma is the oldest MPA in Africa and a treasure trove of marine life. Accessed 12 February 2021

economic and governance ambience but on the value system, beliefs and full support of its adjacent communities (Muhl & Sowman, 2020). Players in the Tsitsikamma MPA impasse were Government, the community where the fishers or anglers were at the forefront, the scientific community and other interested groups like the "Friends of Tsitsikamma" and the Afriforum.

A refocus on governance processes may seem a plausible remedy to avoid similar situations. Governance is a translation of group dynamics among stakeholders, processes and traditions of the different groups utilized to resolve environmental and societal problems, and its foundation is an extensive consultative process (Bennett & Dearden, 2014). On the other hand, the product of consultation is legitimacy, and in the MPAs context, it is when the Government's actions in the development and management of a particular MPA are viewed as appropriate and just by all parties involved, for example, adjacent communities, scientists and all other interested groups (Bennett & Dearden, 2014). Therefore, the consultation process in the determination and development of an MPA must be carefully constructed and meticulously implemented. Perceptions of stakeholders about the legitimacy of a particular MPA do have a bearing on their overall compliance with its regulations and management decisions, either detrimental or supportive of its objectives, and that translates to the level of that MPA's effectiveness (Bennett & Dearden, 2014). Seemingly, with Tsitsikamma and the Dwesa-Cwebe MPAs, there was no comprehensive socio-political research or appropriate consultative processes when established, and the current management difficulties may be a direct result of that oversight.

Another dimension to MPA management complications is the exclusion of certain groups of users which is often underlined by protecting marine living resources utilizing the rule of law, for example, fishing regulations (Agardy *et al.*, 2016). The fishing activity in numerous marine reserves, for example, Tsitsikamma and the Dwesa-Cwebe MPAs, in pre-1994 South Africa was regulated through the Sea Fisheries Act (1973), the primary focus of which was the protection of fish (Lombard *et al.*, 2019). Whilst democracy may have brought a change in legislation from the MLRA (1998) to the promulgation of the National Environmental Management: Protected Areas Act (NEMPAA – 2003), resulting in changing of Marine Reserves to Marine Protected Areas, challenges with regards to succinct policy, and administration pronouncements for fishing activities within MPAs remained (Lombard *et al*., 2019). Furthermore, with the different stakeholders that the MPA has, for example, local community; scientists and the Government with its various agencies, there is always a

multiplicity of views on the MPA's value (Muhl & Sowman, 2020). That brings about extreme difficulties in implementing the MPA, including its compliance and law enforcement programs, as articulated in the Dwesa-Cwebe communities versus the DAFF Minister case judgement.

Gongqose and Others v Minister of Agriculture, Forestry and Others[59], The Supreme Court of Appeal of South Africa (SCA) judgement for Case No: a matter between the Minister of Agriculture, Forestry and Fisheries (DAFF) and nine appellants from two villages adjoining the Dwesa-Cwebe MPA, brought in another dimension to the MPA and its law enforcement and access regimes. Historical facts presented for this case were 300 years before the 1885 annexation by the Cape Government that these communities lived within the Dwesa-Cwebe Nature Reserve which incorporates the MPA, and their subsequent systematic forceful removal from the nature reserve area between 1900 and 1950. The main argument was about the constitutionality of denying the adjacent community residents access to fish in the Dwesa-Cwebe MPA, which they claimed was within their traditional rights and practises. Considering that dissention of fishing communities over an MPA is argued to have an adverse impact on participatory planning which stifles sustained effective long term conservation program of the MPA (Agardy *et al.*, 2016), the unconstitutionality of the action further exacerbates the issue, and how such a decision goes against the United Nations Declaration on Indigenous People's Rights (UNDRIP) on indigenous people's rights to territories and resources that they have traditionally owned. A similar argument is advanced regarding Tsitsikamma MPA that, "*historically, local people relied on the surrounding natural resources to help supplement their diets, as well as to generate items to be traded with neighbours,*" (Muhl & Sowman, 2020).

Undertaking MCS within the context of protection and management of MPAs can therefore be incredibly complex. In certain instances, that is due to the implementation of a law enforcement and compliance regime in MPAs which continues to be a severe challenge, and that can be ascribed to inadequate staffing and an MPAs regulatory framework that is not clearly defined (Chadwick *et al.*, 2014). Another challenge is the limited awareness of the judiciary about MPAs ramifications which impacts negatively on the morale of law enforcement and compliance officers as there are perceptions that their efforts on the ground are not supported by commensurate court actions or penalties (Chadwick *et al.*, 2014). Furthermore, the rising pervasiveness of organized crime operations within and in areas adjacent to the MPAs puts an

[59] Gongqose and Others v Minister of Agriculture, Forestry and Others, Gongqose and S 2018 (2) SACR 3(1340/16, 287/17) [2018] ZASCA 87; [2018] 3 All SA 307 (SCA); 2018 (5) SA 104 (SCA); 67 (SCA) (1 June 2018),

extra strain on the MPAs law enforcement and limited compliance resources (Paterson, 2009). A favoured countermeasure is a collaboration by various conservation agencies, i.e. State law enforcement agencies and contracted management agencies, for implementing MPA management plans (Paterson, 2009).

However, that tends to bring up another challenge, funding. MPA cost is in two categories, the MPA establishment and operating cost which the implementing agency carries, and the compliance and opportunity costs, which are incurred by industries and coastal communities that work or are benefitting from the functioning of the MPA (Brander *et al.*, 2020). The main problem with this arrangement is when one or more of the parties cannot deliver on its commitments, which is more common with law enforcement and compliance commitments. Budgetary constraints for MCS related activities are mostly experienced by Government, as discussed further under Section 4. That is not unique to MPAs, in recent studies, similarities could be drawn in the governance of Areas Beyond National Jurisdiction (ABNJ), which is not the subject of this research work, in that for both effective MCS is viewed as very important if the success of conservation and management effort is to be guaranteed (Cremers *et al.*, 2020). The reason for expecting good success in applying the MCS concept in MPAs is that MCS consists of a set of interrelated actions that can be applied with relative ease in areal-based management of marine biodiversity (Miller *et al*., 2013).

3.2.5.6. Conclusion

In assessing the South African MCS system performance with regards to the UN Code of Conduct for Responsible Fishing, Pitcher *et al*. (2006)[60] observed mixed results that were dependent on different fisheries and the extent of needs for their respective management and protection. Furthermore, they pointed out that much as there were these disparities in a fisheries specific performance, overall the South African MCS system could not be effectively implemented, and the combination of administrative and financial problems aggravated the situation. Similar observations were later made by Pramod *et al*. (2008) and Moolla (2010),

60 https://www.researchgate.net/publication/274066887_An_Estimation_of_Compliance_of_the_Fisheries_of_South_Africa_with_Article_7_Fisheries_Management_of_the_UN_Code_of_Conduct_for_Responsible_Fishing. Accessed 20 September 2020

and in the recent past, DEFF confirmed that such challenges are still in existence and hampering all the South African MCS efforts (Status of the South African Marine Fishery Resources report: 2016). The negative impact of these shortcomings has been felt in inshore fisheries like abalone, and it has been a subject of numerous academic papers as a fishery that has suffered tremendous loses through poaching and an array of other IUU fishing activities (Brick *et al.*, 2009; Cochrane *et al.*, 2020; de Greef, 2016; Hauck & Kroese, 2006; Minnaar *et al.*, 2018; Pitcher *et al.,* 2006).

Over the years DEFF has tried a range of interventions to remedy the situation, and are inclusive of training and re-skilling of inspectors and technical assistance initially through a regional partnership between the European Union and SADC (Pitcher *et al.*, 2006), to strategic partnerships with other organs of State like the Table Mountain National Park (TMNP) to reduce or eradicate IUU fishing (Brill & Raemaekers, 2013). However, the weaknesses in the system remained, to a large extent, steadfast. Similar circumstance prevailed in the WCRL, and its proximity to the coastline and thus easy access did not make the situation any more comfortable for the South African Fisheries Governance Authority to uphold the rule of law (Cochrane *et al.*, 2020; de Greef, 2016; Minnaar *et al.*, 2018; Pinnock, 2016).

Collective MCS efforts were also introduced in South Africa where all government law enforcement agencies participated albeit playing different but specific complementary roles, for example, Operation Neptune and Operation Trident (Minnaar *et al*., 2018; Redpath, 2002; Steinberg, 2005). These highly specialised operations together with the introduction of green courts had a considerable impact in the fight against IUU fishing, and the strengthening of the South African MCS system during the few years they were in operation (Steinberg, 2005; Redpath, 2002; Hauck & Sweijd, 1999). When these operations were decommissioned that left a void that contributed to the reversal of some gains that were made (Change, 2016).

Effectiveness of MCS in the offshore fisheries does have mixed fortunes as observed by Pramod *et al*. (2006), with a positive review in the hake fisheries, but some challenges in the small pelagic fishery as illustrated by the Mossel Bay case where fisheries inspectors, monitors and skippers of a fishing company were involved in the organised pillaging of the marine living resources (Atwood, 2016). Lack of appropriate infrastructure, staff shortages in DEFF, and the general lack of effectiveness in the Department's ability to implement the MLRA and its related policies were blamed for the state of affairs in the small pelagic fisheries sector (Cochrane *et al*., 2020; Attwood, 2016). However, the South African MCS system seemed to be receiving

good reviews for its effectiveness in the management of highly migratory species like tuna and tuna-like species as indicated by IOTC and the ICCAT, except for minor administrative problems that occurred two years ago (ICCAT, 2019; IOTC, 2020). Another aspect of the South African MCS system is MPAs as they are regarded as an important tool in the conservation of biodiversity and sustainable utilisation of fisheries (Brander *et al*., 2020; Kockel *et al*., 2020; Watson *et al*., 2014). Currently, South Africa has 45 MPAs which are a combination of 25 old MPA, and recently 20 declared MPAs under Operation Phakisa, of which all are experiencing similar challenges of an ineffective MCS due to limited resources and distance from the mainland to those that are far offshore to mention but a few (Marine Protection Services and Governance, 2020).

3.3. Cost of Monitoring, Control and Surveillance in South Africa

The South African budgeting process is undertaken every year, and it involves the projection of expenditure, income and borrowing over three financial years following a process that is called the Mid Term Expenditure Framework (MTEF)[61]. MTEF is a "transparent planning and budget formulation process within which government establishes contracts for allocating public resources to their strategic priorities while ensuring overall fiscal discipline[62]." DEFF as a national government department follows the same principles, and that is reflected in many of its governance documents, for example, the DEFF strategic plan of 2015 to 2019. In this strategic plan document, DEFF has six programs of which Fisheries, which is the subject of this study is program 6. The purpose of Program 6, i.e. Fisheries, is stated as to promote the development and management of the South African fisheries sector, whilst ensuring that there is sufficient and adequate monitoring and sustainable use of the marine living resources[63]. Moreover, Program 6 has five subprograms which are, (a) Aquaculture and Economic Development; (b) Fisheries and Research Development; (c) Marine Resources Management; (d) Monitoring, Control and Surveillance, and (e) Fisheries Operations Support. Focusing on the MCS subprogram as it is the main subject of this study, its purpose is to intensify the compliance and enforcement effort to ensure protection and promotion of the sustainable use of marine living resources. Central to achieving such an objective is available funds, and in most instances that tend to be the major limiting factor.

As reported earlier, the MCS Chief Directorate comprises of three Directorates, which are the Compliance Directorate: Fisheries Protection Vessels Directorate (D: FPVs) and the Special Investigations Unit or Monitoring and Surveillance Directorate (D: SIU/M&S)[64]. Figure 3.11 hereunder outlines the budget allocation of MCS, i.e. for each of the three Directorates from 2006 to 2018[65]. It can be deduced from Figure 3.11 that there has not been that much change

[61] https://www.parliament.gov.za/storage/app/media/EducationPubs/16.02.15_Budget_pamphlet_eng.pdf - How the Budget Works for Us – Accessed on the 01 April 2020

[62] https://www.gov.za/faq/finance-business/where-do-i-get-copy-medium-term-expenditure-framework, Where do I find the Medium Term Expenditure Framework (MTEF)? – accessed on the 01 April 2020

[63] https://www.daff.gov.za/doaDev/topMenu/DAFF_SP_%20complete.pdf, Strategic Plan 2015/16 to 2019/20, accessed 01 April 2020

[64] DAFF Annual Performance Plan 2017/2018 (Programme and Sub-programme Plans – Programme 6: Fisheries). Accessed 19 July 2020.

[65] Information sourced from the Oracle annual financial reports archive of the Branch Fisheries, including the period that fisheries were administered by Marine and Coastal Management (MCM).

in the budget allocation for the year-to-year MCS operations from 2006/2007 to the 2017/2018 financial year. Naturally, such a situation does have a significant impact in the nature, scope and the overall objective of the respective MCS subprograms. The fact that MCS is a resources intensive and non-revenue generating State undertaking further complicates matters.

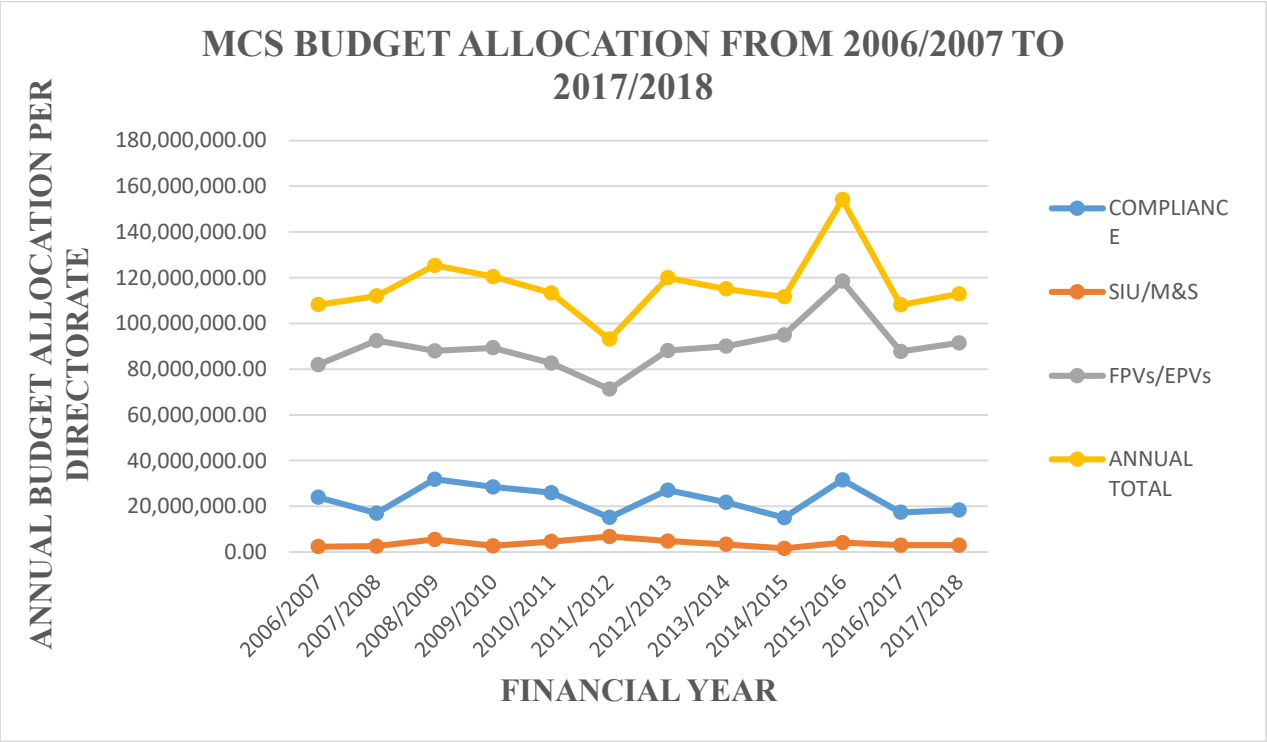


Figure 3. 11: MCS Annual Budget Allocation from 2006/2007 to 2017/2018 Financial Years

The difference between the budget allocation of the 2006/2007 financial year and that of 2017/2018 is R4 613 956.80 or (4.089%) all that in an 11year period. During the same period, the inflation rate averaged at 6.21%, where the lowest inflation rate was 4.26% (2010), and the highest was 10.99% (2008)[66]. That implies that the MCS budget's actual value in the latter years, as reflected in Figure 3.11 is only about 50% of the 2006 budget. Also important to note is the division of the total annual MCS budget among the three MCS components during the different financial years as depicted in Figure 3.11 above. For example, for the 2006/2007 financial year the D: FPVs got an allocation of R81 948 632.00, i.e. 75.71% of the total budget, compared to the Compliance Directorate which received R23 934 788.00 (22.11%) or the D: SIU/M&S which received the least allocation of R2 352 623.25, i.e. 2.17% of the total annual MCS budget. This trend of a partisan budget division in favour of the D: FPVs is visible

[66] https://www.statista.com/statistics/370515/inflation-rate-in-south-africa/ South Africa: Inflation rate from 1984 to 2024, Accessed 21 April 2020

throughout the years, as illustrated in Figure 3.4, as shown in the 2017/2018 financial year. Budget allocations for the 2017/2018 financial year were R91 507 320.00 (81.09%) for the D: FPVs, whereas for Compliance Directorate and D: SIU / M&S they were R18 377 680.00 (16.28%) and R3 000 000.00 (2.66%) respectively. This trend continued to the 2019/2020 financial year, of which a more elaborate analysis of the 2019/2020 budget allocation is addressed later in this section.

Worth mentioning is that the budget structure is similar for all MCS Directorates, but each Directorate has a unique cost centre number. In each Directorate the budget is divided into six budget subsections or subparts which are the, (a) Administrative Cost; (b) Inventory Cost; (c) Professional and Special Services; (d) Miscellaneous Cost; (e) Asset Related Expenses, and (f) Capital Expenditure. Subparts (a) to (e) of the budget are collectively referred to as the Operational Expenditure (OPEX), whereas (f) is stated as the Capital Expenditure (CAPEX). CAPEX, i.e. subpart (f), is defined as funds that entities utilise for the acquisition, upgrading or maintenance of the movable and immovable property, and that may be buildings, vessels or any other technological equipment and industrial plants[67].

The Compliance Directorate's core mandate is to monitor compliance with the MLRA and Regulations promulgated thereunder by conducting land-based patrols and inspections along the entire South African coastline. Its budget is divided into five geographically defined Cost Centres, all are the responsibility of the Director Compliance. Table 3.3 hereunder summarises the Compliance Directorate annual budget for the 2019/2020 financial year. The summary incorporates the Director Compliance Cost Centre (536) budget and the regional Compliance Directorate cost centres. The regional Compliance Directorates cost centres are the West Coast Compliance (541) covering all the stations in the South African West Coast which are Port Nolloth; Hondeklipbaai; Lamberts Bay; Laaiplek; St Helena Bay; Saldanha Bay; Yzerfontein; Cape Town; Hout Bay; Kommetjie; Kalk Bay; Gordon's Bay and the Overberg.

[67]https://www.investopedia.com/terms/c/capitalexpenditure.asp, Capital Expenditure (CapEx) definition, accessed 02 April 2020.

Table 3.3: Compliance Directorate – Summary of the Director and Regional Budget allocations for the 2019/2020 financial year

ANNUAL DIRECTORATE COMPLIANCE BUDGET - DIRECTOR & REGIONS: 2019/2020		
COST CENTRE	**BUDGET ALLOCATION**	**SOURCE DOCUMENT**
Director: Compliance's Budget	R360 349.00	Oracle Expenditure Report – January 2020
West Coast Compliance	R2 136 564.00	Oracle Expenditure Report – January 2020
South West Coast Compliance	R3 625 485.00	Oracle Expenditure Report – January 2020
South East Coast Compliance	R2 082 269.00	Oracle Expenditure Report – January 2020
North East Coast Compliance	R1 906 674.00	Oracle Expenditure Report – January 2020
KwaZulu-Natal Compliance	R5 222 812.00	Oracle Expenditure Report – January 2020
TOTAL (COMPLIANCE BUDGET)	**R15 334 153.00**	

The South West Coast Compliance cost centre (561) covers Mossel Bay, George, Knysna and Plettenberg Bay. The South East Compliance cost centre (606) covers the Algoa Bay area, and it also extends from Port Elizabeth to Port Alfred. The North East Coast Compliance cost centre (621) extends from the Kowie River in the west, and it incorporates East London and Port St Johns to the Umtamvuna River in the east, a border between the Eastern Cape and KwaZulu-Natal (KZN) Provinces. During the period when fisheries management was under the erstwhile Marine and Coastal Management (MCM) Branch of the Department of Environmental Affairs and Tourism (DEAT), i.e. up to and including 200/2010 financial year, Ezemvelo KwaZulu-Natal Wildlife (EKZNW) agency was contracted by DEAT to implement the national MCS program along KwaZulu-Natal Province coastline and its hinterland. EKZNW is a Provincial agency that is mandated through the KwaZulu-Natal Nature Conservation Management Act (Act No.9 of 1997), to carry out biodiversity conservation and all related activities in the Province of KwaZulu-Natal[68]. However, due to political reasons that are outside the scope of this work, a decision was taken by DAFF to terminate the contract with EKZNW in 2015/16. Since then officials from all the other three coastal Provinces alternate in their deployment in the KZN Province as there are no permanent MCS offices in the Province. That warranted an establishment of Cost Centre (622) to budget and disburse funds for Compliance operations in the KZN Province coastline.

[68] http://www.kznwildlife.com/. Accessed on the 17 July 2020

The Fisheries Protection Vessels (FPVs) has two cost centres in Oracle, and they are the Fisheries Protection Vessels (Cost Centre: 641), and the FPVs Vessels Operation Cost (Cost Centre: 642) as depicted in Table 3.4. Both cost centres are under the direct control of the Director FPVs who is based in Cape Town.

Table 3. 4: Summary of the annual budget allocation of the two FPVs Cost Centres for the 2019/2020 financial year

DIRECTORATE: FISHERIES PROTECTION VESSELS (FPVS)		
COST CENTER	**BUDGET ALLOCATION**	**SOURCE DOCUMENT**
FISHERIES PROTECTION VESSELS (641)	R2 159 556.00	Oracle Expenditure Report – January 2020
VESSEL OPERATION COST (642)	R98 134 200.00	Oracle Expenditure Report – January 2020
TOTAL (FPVS)	R100 293 756.00	

Therefore, for the 2019/2020 financial year the total annual budget allocation for the Directorate FPVs is divided into two, i.e. a 98% budget allocation for the Vessel Operations Cost Centre (642), and a 2% budget allocation for the FPVs (641) cost centre. The MLRA mandates the Directorate FPVs to conduct sea patrols to protect the marine living resources within all the South African controlled territories. The two cost centres' budget structure in the FPV's Directorate also assumes the same structure of six subparts. However, not all of the budget, six subparts are applicable in the two cost centres as the difference in the area of operation, and nature of operations necessitate different approaches and resources.

The third MCS Directorate is the Directorate Special Investigations Unit (D: SIU) or Monitoring and Surveillance (D: M&S), and it has one cost centre in Oracle (516). This Directorate is also under the leadership of a Director who is based in Cape Town, and it is the lowest budgeted Directorate within the MCS Chief Directorate. The summary of the D: M&S annual budget allocation for the 2019/2020 financial year was R2 095 946.00 as presented in Table 3.5.

Table 3. 5: Annual budget allocation of the M&S Cost Centre for the 2019/2020 financial year

ANNUAL MCS BUDGET PER DIRECTORATE		
DIRECTORATE: MONITORING AND SURVEILLANCE		
COST CENTER	**BUDGET ALLOCATION**	**SOURCE DOCUMENT**
Monitoring and Surveillance (516)	R2 095 946.00	Oracle Expenditure Report – January 2020
TOTAL (M&S)	**R2 095 946.00**	

This Directorate ensures that the South African Constitutional declarations on equitable access to, and sustainable utilisation of natural resources are fulfilled. That is achieved through monitoring that access by various communities, groupings and individuals, whilst monitoring and classifying criminal activities, to ensure that appropriate legal action is taken against the criminal elements without affecting law-abiding stakeholders.

Therefore, the total MCS annual allocated budget for the 2019/2020 financial year was R112 501 083.00, divided amongst the three Directorates as follows: Compliance Directorate is R10 111 341.00 (8.99%), Directorate FPVs is R100 293 756.00 (89.15%) and Directorate SIU/M&S R2 095 986.00 (1.86%) as reflected in Table 3.6. However, it is worth noting that in the budgeting process of MCS, there may be predilections in the allocation of funds to the three Directorates. Examples of such biases are the combined Professional and Special Services Cost budget for the three directorates, which is the single largest allocation in total MCS budget (R101 895 169.00 or 86.55%). From this amount, a sum of R98 207 100.00 (99.30%) is allocated to the D: FPVs. The other two Directorates share the remaining R688 069.00 or 0.7% of the total Professional and Special Services Cost budget.

Table 3. 6: Summary of the combined budget of the MCS Directorates for 2019/2020

ANNUAL BUDGET ALLOCATION FOR THE MCS THREE MCS DIRECTORATES FOR 2019/2020				
BUDGET SUBPART	**SOUTH AFRICAN MCS DIRECTORATES**			**TOTAL BUDGET ALLOCATION PER SUBPART**
	COMPLIANCE	**FPVs**	**SIU/M&S**	
Administrative Cost	R10 463 484.00	R2 018 817.00	R1 783 798.00	R14 266 099.00
Inventory Cost	R893 600.00	R51 979.00	R94 186.00	R1 039 765.00
Professional & Special Services Cost	R3 643 069.00	R98 207 100.00	R45 000.00	R101 895 169.00
Miscellaneous Cost	-	-	-	-
Asset Related Expenses	R209 000.00	R660.00	R173 002.00	R382 662.00
Capital Expenditure	R125 000.00	R15 200.00	-	R140 200.00
TOTAL	**R15 334 153.00**	**R100 293 756.00**	**R2 095 986.00**	**R117 723 895.00**

A similar case is that of the Administrative Cost budget. The Administrative Cost budget is the second-largest single budget subpart allocation at R14 266 099.00 or 12.12% of the total MCS annual budget allocation. From that total budget, a sum of R10 463 484.00 (73.35%) is allocated to the Compliance Directorate, and the other two Directorates share the remaining R3 802 615.00 (26.65%). That is an interesting observation considering that the Administrative Cost budget carries the bulk of staff deployment cost, i.e. transportation (road or air); accommodation; vehicle hire; fuel of vehicles. That activity is centred in all the three Directorates' operations, individually and collectively, as they all deploy their inspectors for coastal patrols; at-sea patrols; manning of roadblocks; post-landing inspections. The underlying reason for this bias in budget allocation is that the Compliance Directorate has 33 coastal stations in the Northern, Western and Eastern Cape Provinces, whereas the FPVs Directorate has seven stations in the Western and Eastern Cape, and three for the SIU/M&S Directorate also in the Western and Eastern Cape. Although there are contrasting views on the bias in the allocation of funds, especially under the Administrative Cost budget, with some

arguments that it may lead to unintended adverse consequences that may hamper the effectiveness of the FGA in the implementation of the MCS program, the counter arguments are that the Compliance Directorate has more inspectors, and the fact that coastal patrols and inspections are also mainly conducted by that Directorate.

3.3.1. Other sources of funding for the South African MCS program

There are other funding sources from DEFF available to bolster the implementation of the South African MCS effort, i.e. other than the Chief Directorate MCS. Those are the Marine Living Resources Fund (MLRF) and Operation Phakisa. The MLRF budget contribution to the South African MCS program (Table 3.7) is only for the cost that is related to vessel management. The MLRF contributes an additional R127 865 198.16 to the R98 895 169.00 from the MCS Chief Directorate budget towards the Vessel Operating Costs (VOC) (Table 4.6). The DEFF vessel fleet, i.e. both the fisheries research and MCS patrol vessels, are managed by the South African Maritime Safety Authority (SAMSA), and the MLRF budget contribution is utilised to service the SAMSA contract with DEFF. Also, funds from the MLRF are for quay space rental, which is paid to the Transnet National Ports Authority as landlords in the South African port system, i.e.in terms of the National Ports Act (Act 12 of 2005). The other component of the DEFF vessel fleet are the Antarctica and Islands research /supply vessel (SA Agulhas II), and the biodiversity and oceanographic research vessel (Algoa). Both are funded outside of the MLRF, i.e. from the annual budget allocation that the DEFF receives from the National Treasury, and are managed by a private company (African Marine Solutions). Therefore, they are not affected by the MCS budget or MLRF budget for their operations.

Table 3. 7: Monthly MLRF budget towards annual vessel management cost for the 2019/2020 financial year.

ANNUAL VESSEL MANAGEMENT FEE PAID BY THE MLRF TO SAMSA	
BUDGET ITEM	**FIXED EXPENSES INCURRED BY SAMSA FOR MANAGEMENT OF THE DAFF FLEET**
Management Fees	R 23 949 128.40
Crew Costs	R 78 000 000.00
Quay 500 Rent	R 18 000 000.00
Quay 500 Security	R 734 092.80
Ships agent fee including Transnet National Ports Authority (TNPA) costs	R 3 360 000.00
Insurance (averaged over 12 months)	R 3 821 976.96
TOTAL	**R 127 865 198.16**

The other source of partial funding for the South African MCS program is Initiative 5 of Operation Phakisa (Table3.8), which is referred to as the Enhanced and Coordinated Compliance and Enforcement Program[69]. A detailed Operation Phakisa budget allocation for the 2019/2020 and 2020/2021 financial years destined to augment the MCS budget is shown in Table 4.8. For the 2019/2020 financial year, a total amount of R2 256 750.00 was made available to the MCS program through Operation Phakisa. According to the Initiative 5 division of budget a sum R202 500.00 was be allocated to the MCS related travel expenses; and R382 500.00 for the acquisition of MCS related venues and facilities. A further, sum of R202 500.00 was allocated for training and development aimed at improving MCS capacity. All these Operation Phakisa budget sub-items, when put alongside the DEFF MCS budget, are mostly aligned with the Administrative Cost budget subpart of the MCS budget. Therefore, in the 2019/2020 financial year, there was an additional sum of R787 500.00 or 34.89% of the total Operation Phakisa budget, that contributed to the MCS budget, particularly under the Administrative Cost budget. That is important considering that all except the Directorate Compliance budgeted R70 000.00 for training and development of personnel in the MCS annual budget. However, even that R70 000.00 was for bursaries, not short term training,

[69] Unlocking the Economic Potential of South Africa's Oceans: Marine Protection Services and Governance - April 2019 to March 2020 Report.

seminars and other relevant short term information sharing or human capital development sessions. The Operation Phakisa Computer Hardware (R67 500.00), and Surveillance equipment (R 202 500.00) budgets provided a much need cash injection in the lowest budgeted subpart of the MCS budget, the Capital Expenditure Cost which was R140 200.00. Thus giving a total of R410 200.00 towards the MCS CAPEX budget. That is particularly important to the D: M&S considering that it is the Directorate with the least budget, especially for surveillance equipment considering the nature of their operations. As a result, a small boat for special operations; computers for the secretariat, two-way radios and a Forward-Looking Infrared (FLIR) surveillance equipment, handcuffs and ammunition were procured for MCS operations using these funds.

Table 3. 8: Initiative 5 budget for joint marine environment enforcement for 2019/2020 and 2020/2020 financial years[70]

OPERATION PHAKISA – INITIATIVE 5 (OCEAN GOVERNANCE)			
BUDGET STANDARD ITEM	**BUDGETED AMOUNT**		**MCS (DAFF) BUDGET SUBPART & STANDARD ITEM EQUIVALENT**
	FINANCIAL YEAR: 2019/2020	**FINANCIAL YEAR: 2020/2021**	
Travel Expenses	R202 500.00	R234 900.00	**Administrative Cost:** Public Transport (Domestic); Subsistence & Meal and Rental Cars Cost
Venues and Facilities	R382 500.00	R443 700.00	**Administrative Cost:** Hiring of Venues
Training and Development of Employees	R202 500.00	R234 900.00	**Administrative Cost**: Bursaries granted; class and book fees and Training
Consumable Supplies: Uniforms and Clothing	R202 500.00	R234 900.00	**Inventory Cost:** Uniforms and Protective Clothing
Consumables: SP & OS Stationery	R45 000.00	R52 200.00	**Inventory Cost: Stationery**
Equipment: Telecommunication Equipment <R5000.00	R67 500.00	R78 300.00	**Inventory Cost:** Computer Expenditure <R5000.00

[70] Actual budget of the Ocean Governance (Initiative 5) of Operation Phakisa for the financial years 2019/2020 and 2020/2021 sourced from the Branch Ocean and Coasts, and specifically from the Oceans Economy Chief Directorate which is mandated by DEFF to disburse all funds that are for the Operation Phakisa Projects across various government Departments and other relevant stakeholders.

Equipment: Kitchen appliances	R45 000.00	R52 200.00	**Inventory Cost:** Consumables
A&S/O/S: Professional Staff	R225 000.00	R261 000.00	**Professional and Special Services:** Temporal Staff; Consultants, and Human Resources Management (HRM)and Medical Professionals
Catering: Stakeholder Engagements	R157 500.00	R182 700.00	**Professional and Special Services:** Catering
Air Chartering Services	R180 000.00	R208 800.00	**Professional and Special Services**: Service Fees
Consumables: IT	R6 750.00	R7 830.00	**Asset Related Cost:** Repair & Maintenance - Computers
Secretariat Equipment: Movable	R225 000.00	R261 000.00	**Asset Related Expenses**: Small assets not capital assets
Portable Electronic Devices	R45 000.00	R52 200.00	**Asset Related Expenses:** Computer accessories and related equipment
Computer Hardware and System: Desktop	R67 500.00	R78 300.00	**Capital Expenditure:** Computer Equipment
Equipment: Surveillance Equipment	R202 500.00	R234 900.00	**Capital Expenditure: Asset Cost – Plant and Equipment**
TOTAL	**R2 256 750.00**	**R2 617 830.00**	

To carry over funds that were not spent in a particular financial year to the next was standard government practice, but that is no longer common. However, with the Operation Phakisa budget that seems to be generally permissible, hence for 2019/2020 budget, there were additional rollover funds from the 2018/2019 financial year funds. Therefore, for the 2019/2020 Operation Phakisa budget that was destined to support the National MCS efforts was a total of R5 011 350.00 with a sum of R2 256 750.00 being the Operation Phakisa annual budget for the 2019/2020 financial year (Table 3.8), and a sum of R2 754 600.00 as a rollover from the 2018/2019 financial year. Noteworthy is that there are specifications on the utilisation of the rollover funds.

Regarding OCIMS, the directive was that from the rollover funds, a sum of R550 000.00 must be used for intelligence data support. OCIMS is a monitoring tool that has been under

development over the past five years[71]. The development of this monitoring tool, which is for use by all sectors and government departments that play a role in ocean management broadly, is managed by the DEFF and was developed by the Council for Scientific and Industrial Research (CSIR). DEA paid all cost for its development, R55million over five years, and for the information packages that it provides, beneficiaries are encouraged to contribute. DAFF is but one beneficiary for ocean surveillance utilising Automatic Identification System (AIS) to reinforce the Vessel Monitoring System (VMS). The combination of AIS and VMS data in OCIMS is the basis for the Integrated Vessel Tracking (IVT) tool, one of the OCIMS nine decision support tools. The IVT was developed to be effectively a Maritime Domain Awareness (MDA) system. More information and explanation of both the AIS and the VMS are covered extensively in Chapter 2, Section 2.10 of this study. Therefore, the allocated R550 000.00 was to be used specifically to pay AIS data service providers. Given that VMS Operation Centre is under the management and control of the D: FPVs, this amount was allocated to the Professional and Special Services Cost.

3.3.2. Combined MCS budget for the 2019 / 2020 financial year

The South African MCS total budget for the 2019/2020 financial year was R248 626 812.16. This total budget was from three funding sources, all government sources with no additional foreign or private sector funding. The budget split was a sum of R112 501 083.00 which was the total budget of MCS from the MCS Chief Directorate. The additional amount of R130 121 948.16 was a combination of R127 865 198.16 from the MLRF (Table3.7), and R2 256 750.00 from the Operation Phakisa Budget (Table 3.8). During the allocation of this budget in the 2018/2019 financial year, Operation Phakisa was still under the Department of Environmental Affairs (DEA), and the MLRF was under the Department of Agriculture Forestry and Fisheries (DAFF). That has since changed as with effect from the 01 April 2020 the Fisheries Management Branch was officially moved to the Department of Environment, Forestry and Fisheries (DEFF).

[71] Internal DEA – Operation Phakisa Delivery Unit Reports of 201/2016 and 2016/17. The researcher was the Project Manager responsible for developing the Terms of Reference, Project Plan and implementation of OCIMS from the 2015/2016 to 2018/2019 financial years.

3.3.3. MCS budget expenditure for the 2019 / 2020 financial year

The Chief Directorate MCS's expenditure report as reflected in Oracle Expenditure Report of January 2020, shows a general under expenditure, at that time, of about R40 916 648.42 or 16.46%, given a total annual budget of R248 626 812.16 and annual expenditure of R207 710 163.74. That gives a wrong impression as most of the expenditure figures utilised in this assessment were for three quarters of the financial year, i.e. 01 April 2019 to the 31 December 2019, as released on the 20 January 2020. The exception was the MLRF contribution which is as per contractual obligations of DEFF to SAMSA, with a monthly fee of R10 655 433.18; hence it was possible to compute the annual figure. However, scrutiny of the expenditure report reflects some under budgeting areas on the part of the Department as there was over expenditure even though there was still one quarter remaining in the financial year.

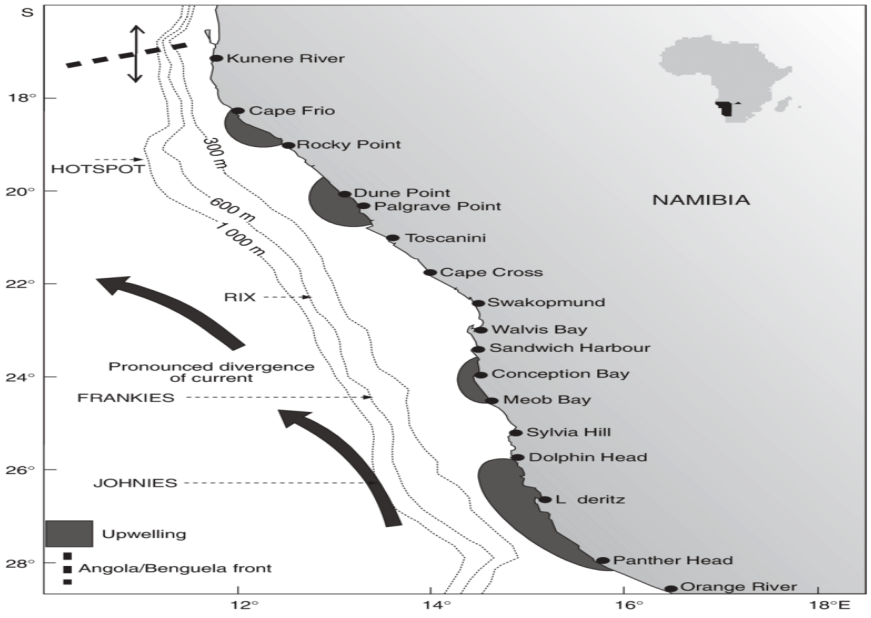
For the administrative Costs, the annual budget for the 2019/2020 financial year was R15 080 599.00 (7.29% of the total expenditure). The expenditure up to 31 December 2019 was R 18 738 032.00, which indicates that after three quarters of the financial year there was an over expenditure in the Administrative Cost budget by R 3 657 433.00 (24.25%). The same applies to the Asset Related Cost budget, with a budget allocation of R382 662.00 for the year, of which the actual expenditure on the 31 December 2019 was R795 299.00. The Capital Expenditure Budget was R410 200.00, and the actual expenditure under this budget subpart after three quarters of the financial year was R1 067 659.58. That translates to an over-expenditure of R657 459.58, suggesting that the allocated budget was insufficient for the Chief Directorate to fulfil its functions. A detailed analysis of the cost of MCS in South Africa and the budget constraints are dealt with in Chapter 7.

CHAPTER 4. FISHERIES GOVERNANCE IN THE REPUBLICS OF NAMIBIA AND MOZAMBIQUE

4.1. Fisheries governance in the Republic of Namibia

4.1.1. General introduction and background

Namibia has a coastline of approximately 1300 kilometres in the central region of the Benguela Current system (OECD 2012). The Benguela Current system extends along the eastern edge of the Southwestern Atlantic Ocean between Cape Agulhas (35°S) and the Angolan port of Namibe (15°S) (Sakko, 1998).



Map 4. 1: Namibian coastline showing the upwelling system and fishing grounds

(Source: Google Maps – 2020)

The Benguela Current system is one of the four major eastern boundary current upwelling systems in the world, all of which are characterized by the presence of cool surface waters and high biological productivity, (Roux & Shannon, 2004; Sakko, 1998). Such environments commonly support low diversities of species while at the same time being among the most productive habitats in the World (Barnes & Alberts, 2008; Sakko, 1998). As a direct result of this natural phenomenon, Namibian waters are characterized by a significant level of productivity and copious amounts of nutrients in the upper layers which promote a large

production of plankton and small pelagic fish, for example, pilchard (*Sardinops ocellatus*) and anchovy (*Engraulis japonicas*), that feed upon it (Barnes & Alberts, 2008; Chiripanhura & Teweldemedhin, 2016). Also, there are large stocks of hake *(Merluccius paradoxus* and *Merluccius capensis*) that are found in the deeper waters further offshore over the continental shelf together with other species such as monkfish (*Lophius vomerinus valenciennes* and *Lophius vaillanti regan*) and sole (*Austroglossus microlepis*) (Chiripanhura & Teweldemedhin, 2016; Barbara Paterson *et al.*, 2013).

According to Nichols (2004), in the period leading to the Namibian independence in 1990, Spain and the Union of Soviet Socialist Republic (USSR) vessels were the primary driving force behind a poorly controlled industrial-scale fishing activity in Namibia. Also, vessels from Portugal, South Africa, Romania, Poland, Bulgaria and Cuba did play a role in the decimation of Namibian fisheries. Collectively, these countries were heavily responsible for the general reduction of all major fish stocks in the Namibian waters (Belhabib *et al.*, 2015; Elago, 2004; Nichols, 2006; Oelofsen, 1999; Barbara Paterson *et al*., 2013). That on its own was not a new phenomenon, instead, collectively they further compounded an untenable situation, considering that in the 1960s South African started utilizing its fish processing ships just outside a 22-kilometre point which at the time was the jurisdiction of a Windhoek based local fisheries administration (Nichols, 2006; Barbara Paterson *et al.*, 2013). That, together with overexploitation, was the root cause of the dramatic decline in Namibian sardine catches, a similar fate to the anchovy fishery when the same vessels started targeting it. During the same period, the interest in the Namibian offshore fishing grounds grew tremendously, and was mainly precipitated by new developments, the exponential use of long-distance freezer trawlers, (Bonfil *et al*., 1998; Nichols, 2006; Sumaila & Vasconcellos, 2000). A related dimension to the pressure and overexploitation of the Namibian fisheries is said to have been the establishment of the International Commission for Southeast Atlantic Fisheries (ICSEAF). The ICSEAF was established in 1969, and it was touted as an organization which was intended to ensure sound management of fisheries stocks. Instead, as stated in many publications, ICSEAF was utilized by the majority of its 17 member states to legitimize pilfering of fish stocks in the southeast Atlantic area, with a particular focus in Namibian waters (Nichols, 2006; Barbara Paterson *et al*., 2013). According to Goodisan (1991), and with particular emphasis on the Namibian hake fishery, ICSEAF institutionalized pilfering of tremendous proportions. Putting this assertion into perspective Goodisan (1991) further states that, over 20 years of the ICSEAF existence from inception to its disbandment in 1990, 8 585 000 tons of hake valued

at R14 billion (USD35 560 000 000[72]) were illegally fished in Namibia by all the fishing nations that were members to the ICSEAF. Furthermore, despite the unscrupulous wealth that all the member States of the ICSEAF amassed in Namibia, ICESEAF only donated to Namibia a paltry USD 180 000 (R173 538[73]) which was through a Trust Fund that they established in 1981 (Goodisan, 1991). During the time that ICSEAF was operational in Namibia, the foreign fishing fleet reduced hake biomass to 20% of the 1969 to 1972 biomass when landings peaked at 1.1 million tons. There was no parity between the amount of fish taken out and the direct monetary benefit to Namibia as it only amounted to a 0.004% (Boyer and Hampton: 2001; Goodisan: 1991). Therefore, it is not surprising that immediately after Namibia attained its independence it declined ICSEAF membership due to both its tainted background and its direct negative impact in the Namibian fish stocks (Nichols, 2006; Barbara Paterson *et al.*, 2013).

Associated with Namibia becoming an independent State, it assumed responsibility for all ocean national governance systems and strategies as developed and implemented by the South African administration. That included inheritance of the marine zones, of which a fishing zone was a part, but with no 200 nautical mile Exclusive Economic Zone (EEZ) as was standard those days, (Bergh & Davies, 2004). With regards to the EEZ, the South African administration attempted in 1983 to claim the EEZ covering 560 000 km^2 through the United Nations Council for Namibia. However, the South African efforts were thwarted by both the South West Africa Peoples' Organization (SWAPO), a Namibian Marxist liberation movement that fought for the Namibian independence, and its principal ally at the time the former USSR (Bergh & Davies, 2004; Huggins *et al*., 2011). In 1990, the newly independent Namibia ratified the United Nations Convention on the Law of the Sea (UNCLOS) and made a full claim of the Namibian EEZ. Furthermore, resources to enforce all national jurisdiction responsibilities and obligations in the EEZ were almost non-existent, and the country had virtually no experienced personnel at the time of independence from South Africa (Bergh & Davies, 2004; Nichols, 2006).

[72] https://businesstech.co.za/news/finance/116372/rand-vs-the-dollar-1978-2016/ the Rand to United States of America dollar in 1990 where the exchange rate was R2.54 to USD1. Accessed 16 January 2020

[73] www.pounsterlinglive.com/bank-of-england-spot/historical-spot-exchange-rates/usd/USD-to-ZAR-1981, the Rand United States Dollar averaged 0.9641 in between January and December of 1981. Accessed 16 January 2020

4.1.2. Fisheries Governance, Legislative and Policy framework in the Republic of Namibia

Namibia's policy and legal framework for the marine fisheries sector, established after independence, allowed the application of management strategies that are appropriate to Namibia's specific circumstances. The immediate positive results of the legislative amendment process were the emergence of a business environment that expedited the growth of the Namibian fish processing industry (Nichols, 2006). This environment was also partly precipitated by the fact that after independence, the Namibian fisheries management assumed the identity of a newly established institution, the Ministry of Fisheries and Marine Resources (MFMR). That approach enabled the Namibian authorities to rid the administration of the institution of historical and socio-politico-economic impediments to the development of new policies (Belhabib *et al.*, 2015; Bergh & Davies, 2004; Nichols, 2006). Another dimension of the desired progressive development that newly independent States tend to underestimate if they are to achieve what Namibia achieved in the shortest possible time after gaining independence, is strong political leadership. In affirming this observation in the case of Namibia, Bergh and Davies (2004) argue that credence should be given to the Namibian political leadership as they were unwavering in taking legitimate and appropriate decisions even if unpopular, without focusing on political gains or popularity but rather on changing the status quo of the almost collapsed fisheries sector thus helping to ensure a better future for all Namibians. That was mainly advanced and implemented through the *"Namibianization"* campaign, which was about increasing ownership of shares held by Namibians in the marine fisheries sector to 90% (Oelofsen, 1999). Tangible results of this campaign were the increase in the number of Namibian owned vessels that were actively participating in the Namibian marine fisheries sector from 50.5% in 1991 to 83.8% in 1998 (Belhabib *et al.*, 2015).

Furthermore, Namibian companies were given 90% ownership of the small pelagic quotas, i.e. the pilchard (*Sardinops ocellatus*) and the anchovy (*Engraulis japonicas*) fisheries as well as the rock lobster fisheries *(Jasus lalandii*) (Belhabib *et al.*, 2015; Oelofsen, 1999). A similar approach was implemented in the hake industry which increased from 17% Namibian ownership at the time of independence to 80% in 2003, and that is almost similar to the horse mackerel (*Trachurus capensis*) fishery quotas which also moved from 14% to 80% (Belhabib *et al.*, 2015). It was important for Namibia to adopt this pro-development stance immediately

after it attained its independence. In consideration of the new Government's inheritance of a systematically depleted fish stocks, the expeditious establishment of a fisheries Ministry turned out to be the keystone of the broader redress strategy that emanated from strong political will to effect that desired change (Belhabib *et al.,* 2015; Fergus *et al.*, 2005). The collective outcomes of all these interventions yielded positive results considering that at independence the fisheries industry contribution to the Namibian GDP was 4%, which increased to 7.8% in 1997, and 10.1% in 1998 (Oelofsen, 1999).

The first Namibian fisheries sector management policy was outlined in the White Paper of December 1991 titled *"Towards Responsible Development of Fisheries Sector,"* as revised in June of 2004 (Nichols, 2006). The White Paper laid the foundations of both the Namibian fisheries management regime as well as development wherein it is pointed out that its main thrust is*, "to utilize the country's fisheries resources on a sustainable basis and to develop industries based on them in a way that ensures their lasting contribution to the country's economy and overall development objectives."* This central fisheries governance agenda, as encapsulated in the White Paper, was proposed to be driven through four main strategies which are, (*a) rebuilding of stocks; (b) building a national fishing and processing industry; (c) Namibianization,* as a strategy to ensure that all benefits that are realized through *the rebuilding of stocks* as well as the *building a fishing industry in Namibia* amass significantly to Namibians through increasing ownership of companies and vessels, new job creation and replacement of foreign labour by Namibian labour, and (d) empowerment, to ensure a fair balance of access and participation, to achieve and maintaining high levels of employment for Namibians, with more emphasis on previously disadvantaged individuals (Nichols, 2006; Oelofsen, 1999). After a policy development phase, the natural course of events would be the development of a legislative framework. Namibia followed a similar path as the Territorial Sea, and Exclusive Economic Zone of Namibia Act of 1990 (Act 3 of 1990) was among the first Acts to be promulgated by the Namibian Parliament. Through this Act, early indications of the new State of Namibia's commitment to the importance of a resolute and appropriate fisheries management regime was further amplified (Nichols, 2006). In Section 4 (3a) of this Act, it is stated that *"any law of Namibia which relates to the exploitation, exploration, conservation or management of the natural resources of the sea, whether living or non-living, shall apply."* Section 4 (3b) further states that *"Namibia shall have the right to exercise any powers which it may consider necessary to prevent the contravention of any law relating to the natural resources of the sea."*

In 1992 the Namibian parliament passed the Sea Fisheries Act and subsequently signed up to several international fisheries conventions, agreements and arrangements. Some of these Namibia is a party to include but are not limited to UNCLOS, UNFSA, SADC Protocol on Fisheries; CCAMLR; International Commission for the Conservation of the Atlantic Tunas (ICCAT), South East Atlantic Fisheries Organization (SEAFO)[74] . Ratification of international obligations by Namibia led to the amendment of the 1992 Act, which was later repealed and replaced in 2001 by the Marine Resources Act of 2000. The Marine Resources Act of Namibia (MRA), i.e. Act 27 of 2000 was promulgated on the 27 December 2000. In the preamble of the MRA it is stated that the Act is to, *"provide for the conservation of the marine ecosystem and the responsible utilization, conservation, protection and promotion of marine resources on a sustainable basis; for that purpose to provide for the exercise of control over marine resources; and to provide for matters connected therewith,"* (Government of the Republic of Namibia, 2018). The Act is arranged into a total of 10 Parts, with 65 Sections. For this study, important Parts of this Act are Part II, Section 3, which is about the control over marine resources. The other critically important Part is Part III, with Sections 4, 5, 6 and 7 which cover all matters about Fisheries inspectors; Powers of fisheries inspectors, Honorary fisheries inspectors and Fisheries observers respectively. A summary of the relevant Parts and their respective Sections, where sustainability and control measures are delineated in Table 4.1.

Table 4. 7: Summary of the Namibian Marine Resources Act Parts and Sections relevant to this study

SUMMARY OF THE NAMIBIAN MARINE RESOURCES ACT (ACT 27 OF 2000)	
PARTS AND SECTIONS OF THE ACT	**SHORT EXPLANATION OF THE SECTIONS**
Part II: General Policy For Conservation and Control Over Marine Resources • *Section 3: Control over marine resources*	❖ Section 3 links Act No.3 of 1990 (Territorial Seas and Exclusive Economic Zone Act) particularly Section 5, with the MRA, where the emphasis is on the determination and extent of the Namibian territorial sea and the EEZ. ❖ Section 3(1A) further emphasizes that the State owns and exercises sovereign rights over marine resources within the EEZ, the territorial waters and the

[74] www.the-eis.com/data/literature/WP_49_RCL_Int_Agreemen_and_Org.pdf , International and Regional Fisheries Agreements and Organizations in the SADC Region: Legal Assessment and Review – Working Paper No49 April 2006 – Accessed 06 January 2020

	continental shelf following the Namibian Constitution (Section 100) and the UNCLOS.
Part III: Officers • *Section 4: Fisheries Inspectors* • *Section 5: Powers of Fisheries Inspectors* • *Section 6: Honorary Fisheries Inspectors* • *Section 7: Fisheries Observers*	❖ Section 4 stipulates the process of appointing Fisheries Inspectors (F.I.), which is a function of the Minister of Fisheries. Any staff member of the Ministry can be designated as an F.I. through a notice in the Government Gazette. The Minister may also withdraw an appointment of any staff member as an F.I. ❖ Section 5 covers a wide range of powers that F.I.s have, which they can exercise anytime without a permit. Such powers include boarding and inspecting any vessel; enter and inspect any premises or vehicle which is transporting marine resources. ❖ In instances where there are reasonable grounds to suspect that an offence has been committed under this Act, the F.I.s may stop and inspect a vehicle that is suspected to be carrying marine resources, and that includes any confiscated fishing equipment that may have been used. In such cases vessels, fishing gear and documents may be seized as evidence or as a measure to prevent the continuation of such an offence. ❖ Section 7 outlines the process of the appointment of Honorary Fisheries Inspectors (HFIs), which is similar to that of F.I.s. Although they perform a similar function to that of F.I.s, the difference is that they cannot effect any arrest nor can they search any premises, cars or boats without a warrant. Furthermore, if they suspect that an offence has been committed, unlike F.I.s, they can only request the name of the person who may have information concerning the offence to furnish him or her with his or her name and address. ❖ Section 7 deals with Fisheries observers whose functions are different from those of F.I.s and HFIs, starting from their appointment which is done by the Observer Agency which is established using Part IV, Section 8 of the MRA. The observers are for observing the harvesting, handling and processing of marine resources. Also, they collect and record biological samples following the specifications of the MRA. Under particular specific instances, the Minister may request any person harvesting marine resources to host observers on board a fishing vessel, or premises that is used to harvest marine resources.

Whilst what is reflected in Table 4.1 may be the important parts of the MRA it is encouraging to note that the Namibian Ministry of Fisheries and Marine Resources (MFMR) is in the process of further tightening their regulatory framework. In the Ministry of Fisheries and Marine Resources Strategic Plan - 2017/18 - 2021/22 Policy and Legal Framework is one of the key five pillars in which the MFMR has set itself to excel on in order to deliver value to its stakeholders. By so doing the Ministry, MFMR, seeks to ensure responsive implementation of the regulatory framework, internal and external enforcement of regulations, policies and directives. Furthermore, in the five-year period of their strategic plan, MFMR seeks to raise the level of compliance through enforcing relevant and appropriate regulations and policies. Also, there is a commitment to strengthen their inspection and observer program capacity as that will enable MFMR to continue responding positively to the fishing industry's operations and demands.

4.1.3. Namibian fisheries: Structure and economic contribution

The marine fisheries sector in Namibia plays a significant role in production; employment; foreign exchange earnings and government revenue, and it is the third most significant contributor to the country's GDP[75]. In 2012 the sector's contribution to the GDP was 4.1%, and the Ministry of Fisheries and Marine Resources (MFMR) attributed such a contribution to the increase in fish processing activities onboard the fishing vessels as well as the increase in mid-water fisheries output[76]. In 2015 the annual marine fish landings were estimated at 550 000 tons, and that was valued at about N$7 billion (about USD465 million)[77]. As already alluded to, the Namibian marine fisheries sector is mainly industrial, and species that are caught in trawls off the coast of Namibia are the two species of Cape hake, i.e. the Cape hake or shallow-water hake (*Merluccius capensis*) and the deep-water hake (*Merluccius paradoxus*). The third hake species that naturally occurs in Angola is the Benguela hake (*Merluccius polii)*, and it is

[75] www.fao.org./namibia/fao-in-namibia/namibia-at-a-glance/en/, Food and Agriculture Organization – "Namibia at a glance" - accessed 06 January 2020

[76] www. the-eis-com/data/literature/Ministry%20of%20Fisheries%20and%20Marine%20Resources%20Annual%20Report%2012_2013pdf , Annual Report: 2012-2013, Accessed 06 January 2020

[77] www.namibian.com.na/index.php?page=archive-read&id=144030, "New Fishing Quota System to Be Introduced," an Article by Adam Hartman published on the 10 November 2015 in the Namibian –accessed 12 November 2018

also sometimes caught in Namibia (Boyer & Hampton, 2001). Other species that are also caught in the mid-water trawls in Namibia, but as bycatch to the hake industry, are the monkfish (*Lophius vomerinus*); the kingklip (*Genypterus capensis*); snoek (*Thyrsites atun*), and the West Coast sole (*Austroglossus microlepsis*) (Belhabib *et al.*, 2015; Boyer & Hampton, 2001; Oelofsen, 1999).

The mid-water trawlers target horse mackerel (*Trachurus capensis*), purse-seiners target pilchard (*Sardinops ocellatus*), juvenile horse mackerel and anchovy (*Engraulis capensis*). It is worth noting that there is a strong view in Namibia that there are two separate spawning stocks of horse mackerel, one from the northern Namibia and the other from the South African southern coast (Boyer & Hampton, 2001). These two separate spawning stocks of horse mackerel are believed to have separate genetic pools given the Lüderitz upwelling cell which leads to limited or no interaction between the two (Boyer & Hampton, 2001; Naish *et al*., 1991). Other fisheries at the industrial level include tuna fishing, rock lobster (*Jasus lalandii*) and deep-sea red crab (*Chaceon maritae*) fishing, (Elago, 2004).

In Namibian law, access to and exploitation of all living marine resources require that an individual or a group of individuals in the form of a company or organization has a fishing right. A fishing right is defined as a measure to control fishing activities within a sovereign country's EEZ through providing an individual, or a group of people under specific circumstances, with a fishing license to fish at a specific time and location (Appleby *et al*., 2018; Huppert, 2005). That is explained in Section 32(1) of the MRA, where it is stated that *"...no person shall in Namibia or Namibian waters harvest any marine resources for commercial purposes, except under a right, an exploratory right or a fisheries agreement."* All forms of rights and conditions of exploitation of resources are covered under different sections; for example, exploratory rights to harvest marine resources are covered under Section 34 (1-7). The use of fishing rights in Namibia started after independence, where the new Government contracted fisheries experts from development partner countries in a bid to assess the status of its almost collapsed fisheries (Fergus *et al.*, 2005; Huggins *et al.*, 2011). Presently, rights are the basis of all commercial exploitation of living marine resources in Namibia, and they are renewed at pre-determined intervals of 4 to 20 years (Huggins *et al*., 2011; Ithindi, 2003). These rights are issued to bidders who fulfil requirements which are inclusive of the extent of the Namibian ownership which must be at 51% Namibian, and a crew that must be at least 85% Namibian under the *Namibianisation* process, and investment in fishing vessels and the

requisite fishing experience are also required (Fergus *et al*., 2005; Huggins *et al*., 2011; Ithindi, 2003; Oelofsen, 1999). Putting this into perspective, in September of 2010 the Minister of Fisheries and Marine Resources in Namibia, as mandated by Section 33(1) of the MRA, and by notice in the Government, gazette called for applications for commercial fishing: Table 4.2 shows fishing rights, with their respective durations, that the Minister issued in September of 2010.

Table 4. 8: Number and duration of existing harvesting rights 2011/2012

FISHERY	**DURATION OF RIGHTS**				**TOTAL**
	Seven-Year	Ten-Year	Fifteen-Year	Twenty-Year	
Hake	62	4	34	0	100
Monk	18	2	7	0	27
Horse Mackerel	50	7	5	0	63
Large Pelagic	24	3	16	0	43
Red Crab	4	1	2	0	7
Rock Lobster	4	1	20	0	25
Line Fish	9	0	10	0	19
Orange Roughy	0	3	0	0	3
Pilchards	0	3	19	0	22
Mullets	0	0	13	0	13
Seals	4	1	2	0	7
Guano	2	0	1	0	3
Seaweed	2	0	1		3
TOTAL	179	25	130	0	334

Source: MFMR Annual Report - 2011/2012

In full consideration of the fisheries management efforts by the Government of Namibia since 1994 when the first batch of fishing rights was introduced for 4, 7 and 10 year periods, to when they were later increased to improve on the investment climate, a lot has been achieved (Huggins *et al*., 2011). What could be directly attributed to the strength of Namibian fisheries management effort is that during the same period, the total number of fishing vessels that were licensed to operate in the Namibian EEZ was 207 in 2007 but 239 in 2011/12, which was an improvement from the slight decline in 2011/2011 where the numbers were at 199 fishing vessels (Namibia Ministry of Fisheries and Marine Resources, 2012). These increases were possible because the stocks increased in abundance under good management. For example, the increase in the number of fishing vessels, especially demersal trawlers, was due to an increase in the Total Allowable Catch (TAC) of some species. The TAC in the hake fisheries increased

from 140 000 to 180 000 tons, and horse mackerel increased from 247 000 in 2010/2011 to 310 000 tons in 2011/2012 (Namibia Ministry of Fisheries and Marine Resources, 2012). That inevitably led to an increase in total landings where an improvement by 17% was realized in 2011/12 as the recorded total landings of 2011/2012 were 406 099 tons, compared to 343 874 tons in 2010/2011 (Namibia Ministry of Fisheries and Marine Resources, 2012).

Overall, the landed value of fish decreased by 0.25% in the period 2010 to 2011 i.e. from N$ 4 .621 billion to N$4 609 billion (Table 4.3). This slight decrease was attributed to both the fluctuations on some fish and fish products prices, as well as the severe impact of the global economic situation (Namibia Ministry of Fisheries and Marine Resources, 2012).

Table 4. 9: Value of Fish and Fish Products 2010 – 2011 in n dollars (N$ billion)

Year	2010	2011
Landed Value	4 620	4 609
Final Value	4 889	5 334
Export Value	4 264	4 984
% of total export of goods	13%	14%

Source: An adaptation from the MFMR Annual Report – 2011/2012

With regards to the final value of fishery products, which is the value of fish products in the processed form for the export market utilizing factory prices, there was an increase of 9% from N$4 889 billion in 2010 to N$5 334 billion in 2011. The 9% increase was due to the increase in demersal, tuna and pelagic fisheries landings as explained in the preceding text. An increase was also observed in the export value of fisheries, which is also an indicator about parity of the Namibian dollar with other foreign currencies on earnings that are brought into Namibia, which increased by 14% from N$4 264billion in 2010 to N$4 984 billion in 2011 (Namibia Ministry of Fisheries and Marine Resources, 2012).

Although much focus has been on the Namibian commercial fisheries, which are the predominant fisheries in Namibia, there are subsistence and recreational fisheries as well. Even though their level of development, their monetary value and the level of importance may not necessarily be equated to any of the commercial fisheries, their role in the broader socio-economic strategies of the Namibian Government is still important. With regards to subsistence fisheries, the main reason for it to be less developed in Namibia is due to the harsh and inhospitable environment of the Namib desert which in turn affects the Namibian coastline

(Roux & Shannon, 2004; Sumaila, 2000). However, Barnes and Alberts (2008) point out that in spite of that there is still a well- established subsistence fishery in Namibia, but the main problem is that it is often confused with the recreational fishery. Belhabib *et al*. (2015) are of the view that in order to achieve a clear separation of these two sectors, i.e. recreational and subsistence fisheries, the fisheries governance authorities in Namibia should give more focus to their respective main aims and objectives.

Recreational fishing occurs along a stretch of 260 km of the Namibian coastline, where it is done for leisure, and it is reasonably regulated. That is in contrast with subsistence fishing which is about personal consumption of fish or exchange for money and it occurs mainly around Swakopmund; Henties Bay and Terrace Bay where the level of enforcement of regulations is very low (Barnes & Alberts, 2008; Belhabib *et al.*, 2015; B. Paterson *et al*., 2014). In the past, (Kirchner and Beyer (1999) argued that it was critically important that the regulatory framework for recreational fisheries should be improved considering that there was a steady decline in some of the targeted species of this sector, particularly the silver kob or kabeljou *(Argyrosomus japonicas*) and the west coast steenbras (*Lithognathus aureti*).

4.1.4. An overview of Monitoring, Control and Surveillance in Namibia: The institutional arrangements of MCS

Key to a positive outcome for socio-economic, ecological and conservation targets that are set by Government is a well-structured and highly effective law enforcement or regulatory compliance regime (Sutinen & Kuperan, 1998). In essence that is an appropriate formula for addressing a typical antagonistic relationship between the Government or regionally set objectives and the non-compliance with regulations, for example, IUU fishing, which continues to hamper many livelihoods and the health status of global fisheries (Sjöstedt & Sundström, 2014; R. Sumaila *et al.*, 2006). Unfortunately, and in most instances, governments, fall short in attending decisively to such transgressions (Bulte *et al.*, 2003). However, it seems as if the performance of Namibia has been generally good in this regard. Immediately after independence, Namibia implemented a fisheries law enforcement regime that swiftly installed law and order in the fisheries sector where foreign vessels that were fishing illegally in

Namibian waters were arrested, and crews were prosecuted (Huggins *et al*., 2011; Oelofsen, 1999; Sjöstedt & Sundström, 2014).

It started in 1991 when the Ministry of Fisheries and Marine Resources (MFMR) was established with primary responsibility for the management of the marine living resources within the Namibian waters, (Bergh & Davies, 2004; Nichols, 2006). The organizational structure of MFMR, apart from the Minister and the Deputy Minister's offices, is such that under the Office of the Permanent Secretary there are four Directorates[78]. The four Directorates, as illustrated in Figure 4.1 are, (a) the Directorate of Resources Management (DRM) which is responsible for scientific research and advice; (b) the Directorate of Operations (DoO), responsible for monitoring, control and surveillance; (c) the Directorate of Policy, Planning and Economics (DPPE), responsible for MFMR planning activities, formulating fisheries policies and legislation as well as undertaking research to advise on the socio-economics of the sector; and (d) the Directorate of Aquaculture (DoA), responsible for the administration and development of aquaculture. In addition to these directorates is a General Services Division (GSD) which provides support services, concerning adequate human resources or personnel administration function, to the Ministry, (Namibia Ministry of Fisheries and Marine Resources, 2012).

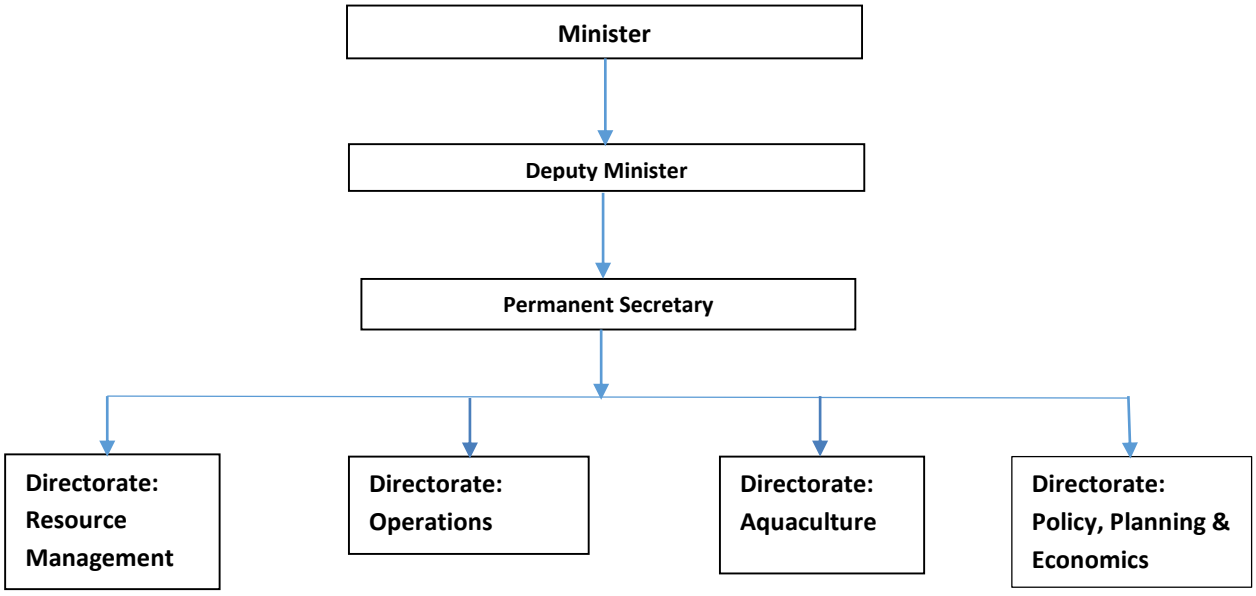


Figure 4.1: Ministry of Fisheries and Marine Resources Organizational Structure (Source: MFMR: 2010/2011).

[78] http://www.mfmr.gov.na/management-profile, organizational structure, management profiles and responsibilities of each directorate in the Namibian Ministry of Fisheries and Marine Resources, access

The Directorate of Operations, which is the main focus of this study, is entrusted with the practical management, registration and control of all fishing activities. It discharges its responsibilities through implementation and enforcement of all fisheries legislation, and their specific management measures and conditions applicable to fishing rights. Furthermore, the Directorate of Operations manages the entire administrative process of all aquatic resource utilization. This responsibility encompasses the application of rights of exploitation and fishing quotas, the issuance and administration of fishing licenses, and the collection of quota fees and other levies. Bergh and Davies (1998) sum up the existence and functioning of the Directorate of Operations by stating that it is about ensuring the enforcement of all relevant fisheries laws and regulations through the institutionalized monitoring, control and surveillance (MCS) national program. This responsibility is further divided into three categories: - *(a) the restriction of fishing activities to those that are entitled to do so; (b) ensuring that fishing activities are conducted within the legal and administrative guidelines; (c) and ensuring that the revenue from landings is correctly calculated,* (Bergh & Davies, 2004; Namibia Ministry of Fisheries and Marine Resources, 2012).

Furthermore, to ensure effectiveness in all MCS operations and distribution of all resources to achieve the objectives as outlined above, there is an integrated management and operations system in place. All senior management of the MCS Directorate is stationed in Windhoek, the capital city of Namibia, and where the Head Office of MFRM is located. Walvis Bay and Lüderitz are operational bases for coastal and sea-based patrols, as well and surveillance activities. The air-wing for aerial surveillance is based in Arandis, just outside of Swakopmund. Noteworthy is that a wide range of activities such as the analysis and planning of operations, deployment of fishery officers and fishery observers onto fishing vessels; a compilation of fisheries statistics and calculation of revenue are mandated to operational stations (Bergh & Davies, 2004).

4.1.4.1. MCS Operations in Namibia

Information from the 2011/12 MFMR Annual Report was used extensively in writing this part of this research work as it was the most recent information available at the time of writing, and it is still considered to give a reasonable indication of the scales of the MCS operations. As stated in the preceding text, fisheries in Namibia are largely commercial and the presence of only two ports that are designated as the only ports for all commercial fisheries landings is a

significant factor in ensuring an adequate to high success rate of marine resources management (Huggins *et al.*, 2011; Sjöstedt & Sundström, 2013; Sumaila *et al.*, 2006). However, some scholars argue that even after independence, and despite all the interventions made by the new Government, piracy by unlicensed vessels and unreported discards continued to be part of tenacious violations within the Namibian EEZ, especially in the mid-water fisheries which are regarded as economically less important fisheries (Bergh & Davies, 2004). However, other scholars, for example, van Zyl, (2001) argue for the opposite that, the resolve of the Namibian Government to deter and curb illegal fishing and all other related transgressions remained intact, even with, at times, meagre resources. Amplifying this assertion further Sjöstedt and Sundström (2014) state that with regards to MCS institutional arrangements and their impact thereof, Namibia is a regional success given its low levels of fisheries transgression. Huggins (2011) is of the view that much has been achieved through a multi-dimensional approach from the Government that included well-structured port inspections, where fishery control officers intensified their vigilance with counting and weighing of offloaded fish. Also, courts weighed-in to support the MCS efforts as they are the ultimate enforcers of fisheries management laws, from the period after independence they holistically supported the Sea Fisheries Act of 1992 and subsequently the Marine Resources Act of 2000 (Fergus *et al.*, 2005; Huggins *et al.*, 2011). The availability of MCS equipment was regarded as a strength of the Namibian MCS program, even though there are redundancies (Namibia Ministry of Fisheries and Marine Resources, 2017). Similarly, the Namibian MCS program has a fully operational and reliable VMS, but a weakness in the system is the inability to communicate directly with all the parties concerned within the Ministry. For example, direct and effective communication which results in coordinated strategic planning between the Information, Communication and Technology (ICT) Division, the mandate of which is to manage and service all Information Technology equipment, of which the VMS is categorised as one. Furthermore, to ensure regional MCS integration, a strength of the Namibian MCS program is that all MCS Protocols on Fisheries with some SADC States are in place (MFMR 2017/18 to 2021/22 Strategic plan: 2017). That is in spite of some of the MCS equipment not being place, for example, aerial patrols that were reduced significantly in the recent past because the Ministry's Directorate of Operations is predominantly using only one fixed wing aircraft as opposed to two that they used some years ago (Pramod, 2018). Unfortunately, that may be viewed as a weakness in the Namibian MCS program.

Observations were that the Namibian MCS strategy is comprised of land and sea inspections that are mostly conducted by inspectors, but that some observers are deployed as part of the observer scheme for the collection of both scientific data and monitoring of landings (Boyer & Hampton, 2001; Sjöstedt & Sundström, 2013). According to Bergh and Davies (2004), an MCS system has four spatial dimensions, which are air; sea; land and remote sensing. The activities of the Namibian MCS management model conform to such a doctrine as illustrated in Figures 4.1 and 4.2.

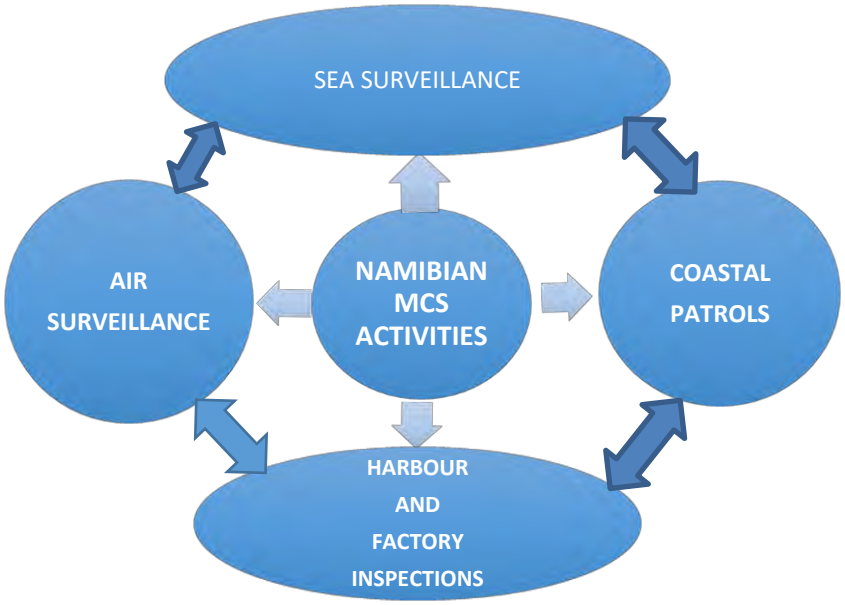


Figure 4. 2: An illustration of the Namibian MCS Operations based on information in the MFMR: 2010/2011).

Fisheries sea surveillance activities are carried out by eight patrol vessels, i.e. two coastal patrol vessels "Nataniel Maxuilili" and "Anna Kakurukaze Mungunda"; one offshore patrol vessel "Elephant"; one coastal patrol craft "Oryx"; and three patrol boats, the "Brendan"; "Simbwaye" and the "Marlim". The "Nataniel Maxuilili vessel " (Figure 4.3), was built in 2002, and it is a 1 421 deadweight tonnage (DWT) vessel, with an overall length (LOA) of 95m, a beam of 14m and a draught of 4.2m[79].

[79] http://www.shipspotting.com/gallery/photo.php?lid=932742, picture and vessel technical specifications of the Nathaniel Maxuilili FPV. Accessed 20 January 2020

Figure 4.3: Nathaniel Maxuilili Fisheries Patrol Vessel (Namibia)
(Source: Google: 2020)

The Anna Kakurukaz Mungunda *FPV* is the sister ship of the Nathaniel Maxuilili *FPV,* and it was built in 2003, and its deadweight tonnage (DWT) is 1 490, with an overall length (LOA) of 59m, a beam of 12.63m and a draught of 4.2m[80]. Both of these vessels were deployed to patrol the Namibian EEZ and monitor the fishing activities of the national fishing fleet, which, according to MFMR (2011/2012) were made up at the time of reporting of 237 fishing vessels flying the Namibian flag, and foreign fishing vessels that would be in the Namibian waters for refurbishment, stores, bunkers or to land their catch. During the reporting period, the two patrol vessels undertook eight special missions during the seal harvesting time in the fishing grounds between Henties Bay and Cape Cross where their mandate and the main objective was to monitor all fishing activities. Also, during the same period, i.e. the 2011/2012 financial year, they undertook additional 12 patrols missions in the Namibian Exclusive Economic Zone (EEZ). During this period both vessels spent a total of 272 days at sea, where a total of 114 Namibian fishing vessels were inspected, and a further 300 other fishing vessels were observed, including cargo and tanker vessels. Inspectors recorded 16 transgressions that ranged from the utilization of irregular round-straps to incomplete logbooks where fines amounting to N$4,800.00 were issued (Namibia Ministry of Fisheries and Marine Resources, 2012).

80 https://www.marinetraffic.com/en/ais/details/ships/shipid:763094/mmsi:659291000/imo:9285603/vessel:ANNA_KAKURUKAZE_MUNGUNDA, Vessel technical details of the Anna Kakurukaz Mungunda FPV. Accessed 20 January 2020

MCS activities on land vary considerably from fishery to fishery. However, in Nambia in order for fishing vessels to be issued a clearance certificate, they are required by law to undergo port inspection at the beginning of the fishing season (Chiripanhura & Teweldemedhin, 2016). At the end of all fishing trips, fishery inspectors monitor the offloading of fish as the catch is brought ashore or transshipped within the limits of the harbour, as transhipment at sea is not permissible in Namibia (Chiripanhura & Teweldemedhin, 2016; Oelofse; 1999). Table 6.4 hereunder depicts the number of vessels per fishery that were monitored and inspected by observers and inspectors between 2006 and 2012. Upon completion of each inspection, compiled inspection reports are utilized as a source of information on catches, which are often cross-referenced with the logbook data as well as data submitted by vessel operators to the authorities in order to calculate levies, quota control and scientific assessment, Davies, 2004; (Bergh & Davies, 2004; Chiripanhura & Teweldemedhin, 2016).

Table 4. 10: Number of licensed vessels by fishery monitored and inspected from 2006 – 2012

FISHERY	2006	2007	2008	2009	2010	2011	2012
Small Pelagics	16	9	11	10	8	8	7
Demersal Trawl	78	87	91	71	63	68	85
Longliners	39	30	18	18	13	11	11
Midwater	10	13	10	9	9	11	18
Deepwater	4	2	0	0	0	0	0
Large Pelagics	65	67	88	48	40	71	50
Linefish	15	15	15	15	14	18	29
Crab	2	2	3	3	3	3	5
Rock Lobster	18	32	31	29	33	33	27
Monk	22	20	25	16	16	16	18
TOTAL	**269**	**277**	**292**	**219**	**199**	**239**	**256**

Source: MFMR: 2012/2013

For coastal surveillance and onshore monitoring operations, fisheries inspectors from Walvis and Lüderitz inspectorate offices were deployed to enforce fisheries legislation along the country's coastline. During the 2011/2012 financial year, the two offices collectively undertook 2 746 daily coastal patrols, with 2 109 for Walvis Bay and 637 for Luderitz. During the same period, they staged 106 joint manned roadblocks with Namibian Police (Nampol), and 38 overnight patrols. A total number of fisheries law contraventions that were reported during this period was 1 026 counts, with 989 from Walvis Bay and 37 transgressions for Luderitz. These infractions ranged from fishing without permits, harvesting and retention of juvenile fish; exceeding the daily bag limit; possession of prohibited baits to the retention of lobsters in berry,

(Namibia Ministry of Fisheries and Marine Resources, 2012). Collectively, the two offices issued fines amounting to N$225,655.00. The other aspects of onshore monitoring that both inspectorate offices looked at were the inspection of fishing activities in harbours, onshore fisheries processing plants, and the monitoring of fish landings. With regards to fish landings in the financial year 2011/2012, landings of a total of 2 437 Namibian fishing vessels were inspected or processed, i.e. 1 796 vessels in Walvis Bay and 641 vessels in Lüderitz. Furthermore, a sum of 205 Namibian fishing vessels was processed and cleared for new licenses. The Walvis Bay inspectorate also monitored 112 foreign fishing vessels that were fishing in the ICCAT, IOTC, Angolan and Falkland Islands (Malvinas) waters (Namibia Ministry of Fisheries and Marine Resources, 2012).

Aerial surveillance is the premier method used to monitor, locate and track fishing vessels and thus provide a complete overview of activities in the EEZ. Through aerial operations photographic evidence for infractions such as fishing in closed areas and poaching can be easily collected, but arrests of vessels are impossible to effect, unless helicopters are used, (Bergh and Davies: 2004). For air surveillance the Namibian MCS program uses two patrol aircrafts, the Sea Eagle I and Sea Eagle II. During the 2011/12 financial year, the two aircrafts undertook 31 patrol missions where a total of 165 fishing vessels were observed, including 82 cargo or tanker vessels. Additional were seven technical flights, 3 VIP and eight training flights. Coordinating such a complex mix of MCS platforms and activities is a challenging task for the MCS organization, a task made no easier by the geographical spread of operational centres. Coordination and information links take the form of quarterly and annual reports; briefing and debriefing sessions, mission reports; the compilation of statistical summaries, compliance registers, a vessel register and a wide area network that links Windhoek, Walvis Bay and Lüderitz as presented in the annual report and other reports of MRMR, (Namibia Ministry of Fisheries and Marine Resources, 2012, 2017).

4.1.4.2. Cost of MCS Operations in Namibia

According to Sutinen and Andersen (1985), the costs that would be incurred in perfect and complete enforcement would be far greater than the economic revenue resulting from it. In Namibia from 1994 to 1997, the costs supported by the Government for fisheries management, including fisheries research and MCS system, was about 6% of the landed value. That fell to 4.9% in 1998 and 3.6% in 1999 (Namibia Ministry of Fisheries and Marine Resources, 2012). The increasing value of the landed catch explains this decrease. Also, these costs appear reasonable compared with other costs of fisheries management in the World (Chiripanhura & Teweldemedhin, 2016; Namibia Ministry of Fisheries and Marine Resources, 2012). However, it is important to note that enforcement is frequently the costly element of fishery management, accounting for one quarter to one half of all MCS operations expenditure (Sutinen & Kuperan, 1999). Before the 2010/11 financial year, financial records of MFMR that are available or accessible through public platforms are limited. For the 2004/2005 annual budget, a figure of N$91 473 000.00 for the operational budget is stated, and the MCS activities fall under the operations budget albeit with other activities of the Ministry. Further clarity on the budget is only available in the 2011/12 annual report where the budget allocation for the Ministry was N$238 885 000.00, with N$180 242 000.00 as Operational expenditure (OPEX) and N$58 643 000.00 as Capital expenditure (CAPEX) (MFMR: 2011/2012). In these figures, there is no clarity on the actual expenditure as directly relevant to MCS operations. That is also the case with the available information of the 2012/2013 financial year, where the budget allocation for MFMR is said to have increased to N$257 463 000.00, with an OPEX of N$204 463 000.00 and a CAPEX of N$53 000 000.00 (Namibia Ministry of Fisheries and Marine Resources, 2013).

In the MFMR budget speech of 2019/2020 which was delivered in the Namibian Parliament, clear budget allocations were reflected[81]. For that financial year the budget allocation for MFMR was N$250 214 000.00, with an OPEX of N$229 504 000.00, and a CAPEX of N$20

[81] http://www.google.co.za/url?sa=t&rct=j&q=&esrc=s&source=web&cd=3&ved=2ahUKEwiErJ7g-snnAhUE9IUKHb3eDlYQFjACegQIAhAB&url=http%3A%2F%2Fwww.parliament.na%2Findex.php%2Farchive%2Fcategory%2F184-speeches-2019%3Fdownload%3D8536%3Avote-22-fisheries-and-marine-resources&usg=AOvVaw0stqYzh2pH5woc2uJYRlYj – Vote 22: Ministry of Fisheries and Marine Resources **2019/20** FINANCIAL YEAR BY Honorable Bernhard Esau, MP MINISTER OF FISHERIES AND MARINE RESOURCES. Accessed 11 February 2020

710 000.00. As illustrated in Table 4.5, the OPEX was further divided into: Operational activities (N$65 222 505.00) which were 28.42% of the operational budget, and salaries (N$164 281 495.00) and that was 71.58% of the operational budget.

Table 4. 11: Namibian Ministry of Fisheries and Marine Resources Budget for 2018/2019

OPEX BUDGET		**CAPEX BUDGET**
BUDGET STANDARD ITEM	BUDGET ALLOCATION	
Ministry Operational Activities	N$65 222 505.00	
Salaries	N$164 281 495.00	
SUBTOTAL	N$229 504.00	N$20 710 000.00
TOTAL	**N$250 214 000.00**	

Source: (Namibia Ministry of Fisheries and Marine Resources, 2019)

From the Ministry's operational budget, which was N$65 222 505.00, a sum of N$13 764 599.00 was allocated to the Operations Directorate for all its MCS operational activities for the 2018/2019 financial year. The Operational activities budget was added to the development and personnel budget allocations that were N$3 500 000.00 and N$56 803 597.00 respectively. That gave a total budget allocation of N$74 068 556.00 for the MCS Main Division (Table 4.6) for the 2019/2020.

Table 4. 12: Namibian Monitoring, Control and Surveillance Directorate Budget for

MCS MAIN DIVISION BUDGET		
Development Budget	N$3 500 000.00	
**Operational Budget	N$13 764 599.00	
Personnel Budget	N$56 803 597.00	
Subtotal	**N$74 064 196.00**	

2019/2020

**MCS Operational budget include N$7 811 965.00 which is an allocation for MCS program/activities

Also, from the MCS Main Division budget was a personnel budget allocation of N$56 803 957.00 (Namibia Ministry of Fisheries and Marine Resources, 2019). Noteworthy, is the fact that for MCS *"program /activities"*, the budget allocation was N$7 811 965.00, and that was for operations, maintenance and repairs of all patrol crafts that are inclusive of aircraft, ships

and vehicles. Furthermore, in Namibia, MCS operations include both inland and sea inspections, as well as aerial patrols that are undertaken within the EEZ and the airspace of Namibia (Namibia Ministry of Fisheries and Marine Resources, 2019).

The Minister acknowledged that this budget is limited, as he stated during his budget speech that even with limited resources the Ministry commits to effect and maintain a world-class MCS system both inland and in the marine environment within the Namibian EEZ. That commitment is further explicated in the MFMR strategic plan 2017/18 – 2021/22 wherein it is stated that the desired outcome of the Namibian MCS program by 2022 *"aims to achieve a significant sustainable and efficient utilization of natural resources, maximize and share the benefits equitably."*

The strategic plan further elaborates on seven strategic objectives which are viewed as the building blocks of the Strategic plan. Enforcement of compliance with more strengthened fisheries legislation is one of the seven strategic objectives. The implementation of this strategic undertaking is budgeted for under the MCS project, which is divided into two sections, coastal patrols as well as maintenance and administration. A total sum of N$326 million is allocated to this MCS project over five years starting from 2017 to 2022, of which N$283million is OPEX, and N$43 million is developmental budget. Noteworthy is that N$ 326 million over 5 years is about N$65 million per year, which is close to but less than the N$ 74 million allocated in 2018/19. Although the underlying reasons for this difference or a budget breakdown was not provided, the assumption is that this is a five-year budget allocation and a considerable CAPEX budget allocation may only be done for one year. In this case a sum of N$20 710 000.00 was for CAPEX in 2018/2019, and that may explain the difference in the budget in the following years.

4.1.4.3. Strengths and weaknesses of the Namibian MCS Program

The MCS system is often viewed as the core of the *'state model'* for fisheries governance. In line with this view, the Government of Namibia has invested considerable efforts in their MCS program, and it can be well-argued that that has led to an effective system which has shown promising results in the global fight against the scourge of IUU fishing, (Chiripanhura & Teweldemedhin, 2016). That could be attributed in part to the fact that the Government of

Namibia, identified training early after independence as the critical building block in the development of local MCS knowledge and experience. Even though its short-term MCS goals, with regards to reduced illegal fisheries, were achieved in a relatively short time, the most considerable challenge of human resources development was left with still a lot to be done (Bergh & Davies, 2004, 1998). This approach has been implemented with the assistance of cooperating partners, and in 2002 it resulted in a total MCS workforce, including fishery observers of 353. The training itself has taken many forms, but three programs stand out as having been particularly important: the fishery inspector and observer course, a nine-month course that has now trained 64% of the inspectors and observers. Furthermore, there is training of observers in catch and scientific monitoring through the commercial sampling program.

The environmental conditions of Namibia's two major ecological phenomena, the Lüderitz Upwelling Cell in the south and the Angola-Benguela Front in the north, form natural barriers limiting the migration of many fish stocks, especially pelagic species. However, some Namibian fish stocks are shared with Angola and some with South Africa, for example deep-water hake *(Merluccius paradoxus)* and horse mackerel (*Trachurus capensis*). Managing these requires cross-border collaboration as there are frequent reports of cross-border IUU fishing activities (Cochrane *et al.*, 2019). Encouraging latest developments in response to the reported IUU incidents is the dialogue between Namibia and Angola to develop measures to deter IUU fishing, and the MOU between South Africa and Namibia which part of its intentions are the combating of IUU fishing (Cochrane *et al*., 2019). Noteworthy is that, with many political complications that tend to be introduced through stocks managed by several nations, Namibia has avoided such complications thus far. Similarly, most fish stocks occur within 100 nautical miles or so of the coast, hence being far from the limits of the EEZ and thus are not straddling stocks,(Bergh & Davies, 2004).

The operating costs of the MCS system constitute a significant part of the total costs of fisheries management. Bergh and Davies evaluated the Namibian MCS system which they also approached from an economic perspective by comparing costs and benefits generated from the MCS system while assessing the results of compliance of fishing operations, (Bergh & Davies, 2004; Chiripanhura & Teweldemedhin, 2016). One of their significant findings is that during the period 1998 to 2004, revenue from the combined fisheries has remained higher than the operating costs incurred by Government on the MCS system. They amounted to an average of 56% of the total operating revenue of the Ministry from 1994 to 2001, (Bergh and Davies,

2004). Generally, it is estimated that national MCS costs range from 25% to 50% of all operating costs, (Bergh & Davies, 2004; Sutinen & Kuperan, 1999). Therefore, the Namibian MCS costs are somehow higher than the average.

Although much has been said about how good and well-grounded the Namibian fisheries management regime is, some studies indicate that it has not been entirely successful. For an example, the sardine stocks remain depleted, despite a conservative management policy, while a newly developed orange roughy fishery blossomed and collapsed in just four short years, (Bergh & Davies, 2004). Also, Namibia has two only landing sites which are Walvis Bay and Lüderitz, which is said to be highly efficient for the commercial fishing fleet, but it does not include or cater for small scale fisheries. Overall, the MCS system in Namibia appears to be at least reasonably efficient. In a country where small-scale fisheries were dominant or important, such as Mozambique or South Africa, the Namibian MCS system on its own would not be appropriate or feasible due to massive costs and human resources required to monitor the number of vessels and activity at sea as well as the numerous landing sites, (Chiripanhura & Teweldemedhin, 2016).

Another weakness in the Namibian fisheries is corruption. Although policymakers have identified corruption in fisheries as a challenge on the rise, it is seldom covered in management and or fisheries governance plans (Nunan *et al.*, 2018; Yan & Graycar, 2020). Corruption for public office bearers is defined as the misuse of government facilities for self-enrichment, divided into two categories: bureaucratic and political corruption (Sumaila *et al*., 2017). Public servants mainly conduct bureaucratic corruption to increase their income, so it is opportunistic, unlike political corruption, where politicians are lobbied to influence governance processes to benefit themselves (Sumaila *et al*., 2017; Yan & Graycar, 2020). Both types appear to have been present in Namibia in the past. For example, the case of Teko Trading involving a Chinese and two Namibian nationals, which after ten years in court was struck of the roll despite overwhelming evidence of N$ 128 million paid in bribes[82]. Corruption in Namibian fisheries was brought to the fore through a scandal that has come to be commonly known as “Fishrot”. According to the Namibian article, the extent of the Fishrot case, according to the Bank of Namibia's Financial Intelligence Centre, involves more than N$10 billion; 27 countries; 303

[82] https://www.namibian.com.na/207283/archive-read/The-Fishrot-Case-Cannot-Fail. The Fishrot Case Cannot Fail. Accessed 24 February 2021

individual bank accounts, and around 700 business accounts. At the centre of this scandal were two Namibian Ministers, the Minister of Fisheries and Marine Resources, Minister of Justice, and the Namibian branch of Icelandic fishing company Samherji[83]. It is alleged that Samherji also paid bribes to top public officials for the company to gain privileged access to Namibia's marine living resources, particularly fisheries[84]. The Samherji bribes are alleged in the same publication to have reached the President's office, which were directed towards the 2019 Presidential campaign. Whilst the extent of Fishrot is still unfolding, it is evident that fisheries corruption is difficult to measure as it is seldom incorporated in crime statistics or even exposed (Graycar & Monaghan, 2015; Yan & Graycar, 2020). Corruption in fisheries has a direct negative impact on food security and the country's ability to alleviate poverty and failure to achieve economic growth (Sumaila *et al.*, 2017). Furthermore,corruption at high political levels, as is the case in Namibia, undermines law the effectiveness of a national MCS program (Sumaila *et al*., 2017).

[83] https://www.corruptionwatch.org.za/how-the-fishrot-scandal-robbed-namibia-of-millions/. Corruption News: How the FISHROT scandal robbed Namibia of millions. Accessed 24 February 2021

[84] https://www.occrp.org/en/daily/13669-leaked-affidavit-implicates-namibian-president-in-fishrot-scandal. Leaked Affidavit Implicates Namibian President in Fishrot Scandal. Accessed 24 February 2021

4.2. FISHERIES GOVERNANCE IN MOZAMBIQUE

4.2.1. General introduction and background

The researcher encountered numerous barriers to acquiring recent and relevant information for this part of the study. The published information is sporadic, and a lot of available information is now quite old, and it did not prove easy to get responses to requests for completing the questionnaire and other information from local stakeholders. Although it has been challenging to get recent information on MCS in Mozambique, this review is based on the most recent information that could be located for this research work. The Republic of Mozambique is in the south-eastern part of the African continent (Map 4.2).

Map 4. 2: Map of Mozambique showing the Provinces, Regions and major coastal cities (Source: Google, 2020)

Its coastline is the third-longest coastline in Africa and is approximately 2 770 kilometres long (Mozambique NPOA-IUU, 2011). It extends from 10º28'S latitude in the north to 26º51'S latitude in the south (Mozambique NPOA-IUU, 2011). As described in the Mozambican Fisheries Master Plan (2009), there are three distinct regions of the Mozambican coastline: the North Coast, the Centre Coast and the South Coast regions (Republic of Mozambique Ministry of Fisheries, 2011b).

The North Coast extends over a length of approximately 840 kilometres, and coral and deeper reefs predominantly characterise it, but most prominently it has a narrow continental shelf. The

region is interspersed with sheltered bays and inland waters on coastal islands especially in Cabo Delgado, including northern and central districts of Nampula. The Centre Coast region extends over a length of approximately 980 km, and it straddles the two southernmost districts of Nampula and the Govuro district of the Inhambane Province. This region is parallel to the Sofala Bank, and it is an area which carries most rivers relative to its size in the Mozambican coastline. Besides, it has channels bounded by mangrove forests a phenomenon that leads to the distinct character of this region in the Mozambican coastline, that of sheltered estuaries, sandy shores and protected coastal islands. The South Coast region covers a length of about 950 kilometres where its central part runs parallel to the deepwater Boa Paz bank of the Govuro district in the Inhambane Province and extends further south to the far south of the Maputo Province. This part of the Mozambican coastline is characterised by sandy shores and deep coastal waters with coral reefs and, rocky banks and some sheltered bays. The fundamental difference in these three coastal regions' characteristics is the wide-ranging fauna and flora and the fishing in Mozambique (Republic of Mozambique Ministry of Fisheries, 2011b).

According to Afonso (2004), Mozambique is one of the world's poorest countries, where 70% of the country's total population lives below the poverty line, and 80% of the country's total population live in rural areas. In addressing some of these challenges, fisheries are viewed as occupying a strategic position in the broader framework of the Mozambican economic development strategy and self-sustenance and food security of coastal communities (Afonso, 2004). In emphasising this point further, and sharing the same views as expressed by Afonso (2004), the Mozambican Ministry of Fisheries in MCS Management Plan: 2007 -2012 (2006) stated that the fishery sector is a major contributing factor to the economy and the livelihoods of the population of Mozambique. It is also critically important to note that apart from marine fisheries in Mozambique there are also two crucial continental masses of inland waters which are the Lake Niassa, which is shared with the Republic of Tanzania and the Republic of Malawi, and the Cahora Bassa reservoir (Republic of Mozambique Ministry of Fisheries, 2011b). Even though the Republic of Mozambique is endowed with marine resources and freshwater fish, there seem to be some challenges regarding Monitoring, Control and Surveillance (MCS). That is both at institutional arrangement level and the requisite resources level. This sub-chapter attempts to determine the Republic of Mozambique's central government's overall situation in managing its fisheries and particularly its marine fisheries.

4.2.2. Fisheries Governance: Legislative, and Policy framework in Mozambique

According to Afonso (2004), fisheries legislation in Mozambique is characterised by three different periods which are the colonial period, i.e. before 1975; the civil war period from 1975 to 1990, and the current period which extended from 1990 to 2004, the time at which the document was produced. During the colonial period, the two most important pieces of legislation in Mozambique were the 1965 shallow water shrimp fishery legislation and the 1971 Fisheries Maritime Legislation which was subsequently reviewed in 1974 (Afonso, 2004). However, during the civil war period, no significant fisheries management legislation was adopted as the main focus was on winning the war by all affected parties (Afonso, 2004). The only important piece of legislation promulgated during this period is Decree or Law no31/76 (Figure 4.3) which declared a 200-mile Mozambican Exclusive Economic Zone (EEZ) in 1976 (Mozambique MCS Management Plan: 2006).

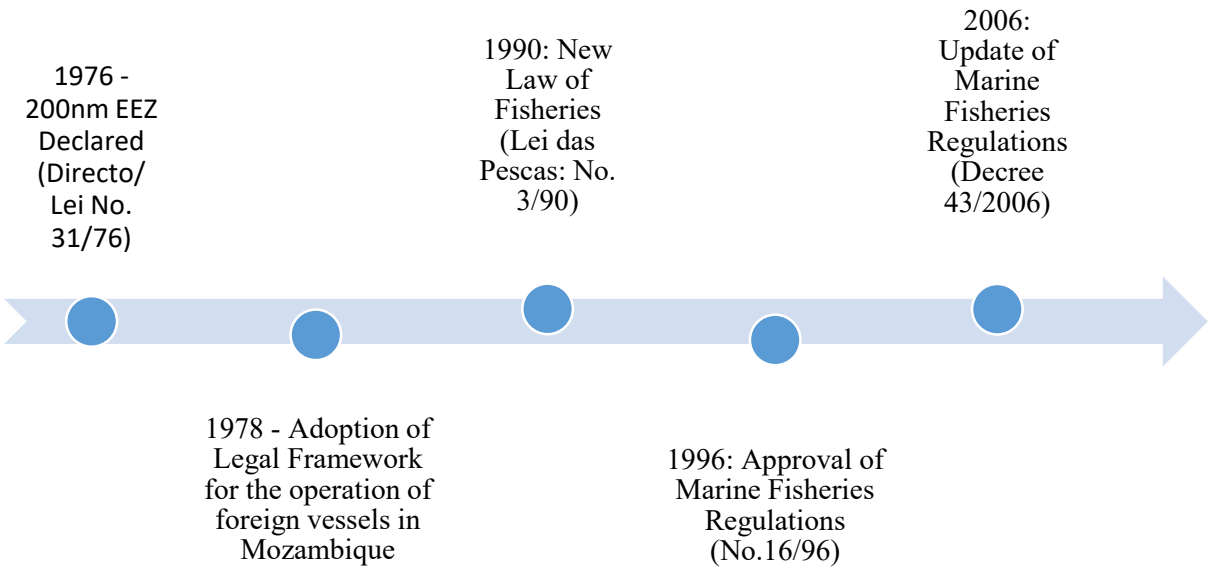


Figure 4.4: The development of Fisheries Law timeline in Mozambique: 1976 - 2006

However, during the post-internal conflict period, particularly between 1990 and 2004, numerous Acts of law and fisheries regulations, which were in line with global trends and international law legislative frameworks, were adopted in Mozambique (Afonso, 2004). The Fisheries Act of 1990, adopted as Act no 3/90, was the first act to be adopted in the current era and its main objective was to establish the framework for fishing activities in Mozambique

(Afonso, 2004). Article 3, Title I, Chapter I of Act no 3/ 90 clearly explains the domain of fishing resources, the organisation of the fishery management, the development of management plans and the resolution of fish conflicts (Mozambique Act no 3 / 90). Also, Article 3, Title II and Chapter II of Act no 3 / 90 cover regulation requirements on the requirements for the fishing licenses, registration of fishing vessels and the obligation to declare catches (Mozambique Act no 3 / 90). All primary matters around MCS, i.e. fishing surveillance, infringements and sanctions, are dealt with under Article 3, Chapter IV of Act no 3/ 90 (Mozambique MCS Policy, 2010).

Chapter IV's fundamental principles and objectives were further consolidated in 2003 when the Mozambican government approved and subsequently adopted General Regulations of Maritime Fisheries Law. Primarily the General Regulations of Marine Fisheries Law were to close gaps in the law, especially on licensing and fisheries law enforcement conflicts (Afonso, 2004). The other aspect of the General Regulation of Maritime Fisheries Law was to repeal the 1971 regulations (revised in 1974). Besides, they were meant to explicate different fisheries categories by species, vessel sizes, and other fisheries' specifications (Afonso, 2004; Republic of Mozambique Ministry of Fisheries, 2010). Moreover, these regulations removed the ambiguity that prevailed at the time on the size and season of authorised marine species and fishing requirements for the wide-ranging fisheries (Afonso, 2004).

Another vital point in the General Regulations of Maritime Fisheries Law, as introduced through Decree no 43 of 2003, is that for the first time in Mozambique the installation of the VMS in sea-going fishing vessels was made mandatory (Republic of Mozambique Ministry of Fisheries, 2010). Furthermore, through that Decree, the reviewed set of regulations within the broader ambit of the General Regulations of Maritime Fisheries Law created a legislative framework encapsulating principles of the SADC Protocol on Fisheries as well as some provisions of the FAO Compliance Agreement (Republic of Mozambique Ministry of Fisheries, 2006). In essence, 2003 proved to be one of the most productive years in Mozambique's new approach to fisheries management. It also resulted in the development and adoption of the current Marine Fisheries Regulation (REPMAR), which ushered into Mozambique the modern fisheries management approach (Castiano, 2004). Through REPMAR issues of co-management in fisheries, the obligatory use of devices to protect endangered species and conformity to specific standards of fishing practises reducing bycatches were introduced and institutionalised for the first time in the Mozambican fisheries sector (Castiano, 2004).

4.2.3. Mozambican fisheries: Structure and Economic contribution

Mozambique's fisheries sector is divided into three categories: industrial, semi-industrial, and artisanal fisheries (Afonso, 2004). According to the Ministry of Fisheries' Fisheries Master Plan (2011), in 2007 the industrial fishing sector had 123 licensed fishing vessels of which 92 were shrimp trawlers operating in the Sofala Bank; 22 gamba trawlers on the continental slope and lastly long-line fishing vessels all with a combined total of about 4 500 professionals working on the vessels (Republic of Mozambique Ministry of Fisheries, 2011b). Gamba trawlers are deepwater prawn trawlers that target pink shrimp (*Haliproides triarthus*) and the giant gamba shrimps (*Aristaemorpha folicae*)[85]. The industrial fishing sector is further subdivided into four sub-sectors: industrial shrimp trawl, industrial line fishing, industrial seine and longline tuna fishing and the deepwater industrial lobster fishing sub-sector (Republic of Mozambique Ministry of Fisheries, 2011b). For this particular fishing sector, there are fishing vessels capable of spending extended periods at sea equipped with onboard fish processing equipment and freezers (Afonso, 2004). Regarding the industrial shrimp fishery, over the years shrimp catches have increased gradually, and at the time of its publication, they were between 6000 and 7000 tons per annum with an annual export value of about USD50-60 million (Republic of Mozambique Ministry of Fisheries, 2011b). In the industrial trawl fishing in the Sofala Bank which is done through joint ventures between the Government of Mozambique and foreign fishing companies, the deepwater shrimp (*Penaeus monodon*) is a target species, more than 70 to 80% of the catch is bycatch[86] (Pereira et al., 2014; Republic of Mozambique Ministry of Fisheries, 2011b). Mostly the bycatch is not of any commercial value, and this leads to copious amounts of fish discards if they are not alternatively transferred to artisanal fishers, which is a highly encouraged practise due to it being part of the broader food security strategy (Republic of Mozambique Ministry of Fisheries, 2011b).

Industrial line fishing, where target species include the slinger sunbream (*Chrysoblephus puniceus*), red snapper (*Lutjanus sanguineus*), and others, is practised along the entire coastline of Mozambique at varying ocean depths that range between 25 and 200 metres. Even though catches have not been more than 300 tons per annum in the past, the sector is still economically viable (Republic of Mozambique Ministry of Fisheries, 2011b). All catches are processed and

[85] http://www.fao.org/fi/oldsite/FCP/en/MOZ/body.htm. General geographic and economic data 2 Fisheries data. Accessed 11 May 2020

[86] http://www.fao.org/fishery/facp/MOZ/en#topOfPage. Fishery and Aquaculture Country Profiles: The Republic of Mozambique. Accessed 22 December 2020

graded on board fishing vessels with almost all of the high-grade products destined for the European markets and South Africa, whereas the lower value products are consumed in Mozambique. For both the industrial seine and the longline tuna fishing sectors, licences to operate within the Mozambican EEZ are issued by the fisheries authorities within the Ministry of Fisheries in Maputo, Mozambique (Republic of Mozambique Ministry of Fisheries, 2010). The extent of both fisheries ranges between 12 nautical miles from the coastline to the 200 nautical mile mark of the Mozambican EEZ, and for the industrial seine fishing from 10º32ˈS latitude and the 20ºS latitude (Republic of Mozambique Ministry of Fisheries, 2011b). The tuna longline fishing occurs between 20ºS latitude and 26º52ˈS latitude, but a more favoured fishing ground by all the fishing vessels in this sector is below the 25ºS latitude. The peak fishing season in this sector is between May and August, but it should be noted that the foreign vessels that are participating in this sector do not employ Mozambicans. All their catches are processed onboard fishing vessels and transferred to other vessels or landed in foreign ports, means their catches do not form part of the Mozambican fish products export market (Republic of Mozambique Ministry of Fisheries, 2011b).

As the name suggests, industrial lobster fishing targets the Mozambican lobster (*Palinurus delegoae*), and vessels in this sector operate adjacent to the Boa Paz bank between 22ºS latitude in the Vilanculos area and 27ºS latitude in the Inhaca area. After 1995 the fishery was technically abandoned by almost all operators due to overexploitation of the resource, thus resulting in lower catches-per-unit effort. At the time of publication of the Mozambique Fisheries Masterplan, it was gradually recovering from that undesirable position (Republic of Mozambique Ministry of Fisheries, 2011b). The semi-industrial fishing sector in Mozambique is also further subdivided into four categories. These categories are the semi-industrial shrimp trawling fishery of the South of Sofala; the semi-industrial shrimp trawling fisheries in Maputo Bay and the River Limpopo estuary; the semi-industrial shrimp fishery in Angoche and the semi-industrial line fishery that takes place between 21ºS latitude and the far south of the country (Republic of Mozambique Ministry of Fisheries, 2011b).

The three semi-industrial shrimp fisheries, albeit at different geographical areas within the Mozambican EEZ, all target the same species, the Indian prawn (*Penaeus inducus)* and the Brown shrimp (*Metapenaeus monoceros)*, of which both have the same bycatch. Management of the Angoche fisheries is primarily through a prohibition period referred to as the *"Veda"* (Santos, 2007). The prohibition period is about controlling the reduction in the numbers of juvenile fish, and it usually lasts three to four months in the areas where shrimps and prawns

are known to spawn and grow (Santos, 2007). In the South of Sofala and Maputo Bay and the River Limpopo estuary, industrial shrimp trawling vessels are not allowed to fish in these areas. Again, in the fisheries in the South of Sofala and Maputo Bay and River Limpopo estuary, effort control is implemented through a combination of the number of vessels permitted to participate in these fisheries and the fishing gear used (Santos, 2007).

In Angoche there had been a notable reduction in vessel numbers attributable to the low value of shrimp available to the semi-industrial fleet which was further exacerbated by changes to export requirements, which reduced the economic viability of the sector (Sousa *et al.*, 2018). Furthermore, in northern Angoche competition between the semi-industrial fleet and the artisanal fleet led to the semi-industrial fleet suspending its operations in the area in 2014 (Penn and Sousa: 2018). In response to these challenges, a Ministerial decision declaring a closed-season for shrimp fisheries for the Sofala Bank area, incorporating the district of Angoche and southern areas of Nicoadala/Quelimane was issued from the 1 to 31 January 2016[87]. For the same period, the Ministerial decision also prohibited handling; processing; procurement and transportation of new consignments of shrimps.

There are inland fisheries, mainly in Lake Niassa and the Cahora Bassa, where fishing activities are equivalent to the semi-industrial fishing activities (Republic of Mozambique Ministry of Fisheries, 2011b). Economically viable fisheries in these inland fisheries are for ornamental fish mostly caught in Lake Niassa and exported via air, whereas in the Cahora Bassa reservoir kapenta (*Limnothrissa miodon*) is the main catch. The kapenta fishery is regarded as the second most important fishery in Mozambique in terms of landed quantity, as during the period 1995 to 2000 landed catches ranged between 6 000 – 12 000 tons (Kelleher, 2002). In the year 2009 of the total landed catches in this fishery, 10 000 tons were consumed in the Mozambican domestic markets, indicating the health status of this fishery over the years (Republic of Mozambique Ministry of Fisheries, 2011b).

The artisanal fishery plays a significant role in the food security of Mozambique. The research done by the Ministry of Fisheries in 2007 revealed that at the time 334 000 people were participating in this fishery, located in about 1 217 fishing centres throughout Mozambique where all of them were either directly or indirectly dependant on the fishery (Republic of

[87] http://www.fao.org/faolex/results/details/en/c/LEX-FAOC152128. Ministerial Decision No. 110/2015 establishing a closed-season for shrimp fisheries within the Sofala Bank. Accessed 29 December 2020

Mozambique Ministry of Fisheries, 2011b). From the 334 000 people, 280 000 were artisanal fishers, of whom 41% used boats of different kinds while 43% of them were not using any boats (Republic of Mozambique Ministry of Fisheries, 2011b). The group mix of the artisanal fishing sector over and above fishers is made up of processors; artisanal boat carpenters; net makers; naval mechanics and traders selling fishery produce; fishing gear and other inputs (Republic of Mozambique Ministry of Fisheries, 2011b). In 2007 artisanal fishers utilised 42 300 items of fishing gear, of which 18% were beach seine nets; 23% handlines and 42% surface gillnets (Republic of Mozambique Ministry of Fisheries, 2011b). During the same period, i.e. 2007, it was established that an average of 1 100 Community-Based Organisations (CBOs) participated in artisanal fishing. Of this number, 315 were fishing associations; 353 were rotating savings and credit groups (RSCs) and the remaining 415 were mainly community organisations focussing on fisheries co-management (CCPs), construction of schools, health posts and drinking water (Republic of Mozambique Ministry of Fisheries, 2011b).

In conclusion, the entire fisheries sector in Mozambique, i.e. marine fisheries, inland water fisheries and aquaculture production, was estimated to contribute 4% to its Gross Domestic Product (GDP) (SADC, 2016). The 4% fisheries contribution to GDP was 222 822 tons of annual fisheries production, which constituted 222 101 tons of capture fisheries and 721 tons from aquaculture. In 2017 capture fisheries tonnage further increased to 329 320 tonnes, of which about 232 300 tonnes was from marine fisheries, and the balance was from inland water fisheries[88]. Even with that fish production tonnage, in 2017, Mozambique still imported fish valued at USD 74 million whilst exporting fish that was valued at only USD 42.2 million. That implies that in 2017 Mozambique imported fish that was almost twice the value of exported fish. The most recent estimate was that in Mozambique the fisheries sector employs about 374 949 people, with 374 027 people employed in marine and inland fisheries, whereas 922 people are employed in the aquaculture sector (SADC, 2016).

[88] http://www.fao.org/fishery/facp/MOZ/en#topOfPage. Fishery and Aquaculture Country Profiles: The Republic of Mozambique. Accessed 22 December 2020

4.2.4. An overview of fisheries administration and management in Mozambique

There have been numerous changes in Mozambique fisheries governance over the years, particularly after the year 2000. The last significant change came after the October 2014 Mozambique general elections which brought an end to a Ministry of Fisheries that up to that point had made significant strides in fisheries governance for Mozambique. The Ministry of Fisheries' dissolution was followed by the formation of a new Ministry of the Sea, Inland Waterways and Fisheries (MIMAIP), which has a more comprehensive mandate than the former department. In the World Bank's Fisheries Co-Management in Mozambique publication (2019) the mandate of the new Ministry, i.e. MIMAIP, is outlined as follows,

- *"Exercising state authority over the sea, inland waters and fisheries;*
- *Authorising and supervising the planning, concessions, research and other activities that require the use of the sea, inland waters and their ecosystems;*
- *Promoting the use and exploitation of sea resources, inland waters and their ecosystems;*
- *Promoting and coordinating the prevention and reduction of pollution of the aquatic environment and improving the state of their ecosystems.*[89]*"*

To implement its mandate MIMAIP had to conduct an organisational structure analysis to determine areas of weakness and duplication, so that strengthening and consolidation of activities could be implemented (International Bank for Reconstruction and Development / The World Bank, 2019). In 2016 that internal process resulted in the merging of the National Institute for Small-scale Fisheries Development (IDPPE) and the National Aquaculture Institute (INAQUA) to form the Institute for Fisheries and Aquaculture Development (IDEPA). IDPPE was an institute focusing on fisheries research, extension and support of small scale fisheries and artisanal fisheries, and technical and socio-economic research (Kelleher, 2002). The fundamental reason for merging the two was that IDPPE and INAQUA were viewed as performing similar functions and servicing the same communities regarding fisheries and aquaculture extension and development. Senior management structure within all MIMAIP

[89] https://ndf.fi/sites/default/files/ndf_c50_fishcc_lessonslearned.pdf. Fisheries Co-Management in Mozambique lessons from the artisanal fisheries & climate change project (FISHCC) 2015–2019. Accessed 24 December 2020

institutions was also changed significantly to conform to the new Mozambican fisheries governance dispensation.

Furthermore, from 2018, Mozambique's central government started a process of decentralisation that was implemented utilising 2004 Mozambique constitutional amendments, and that had a direct impact on the restructuring process of MIMAIP (International Bank for Reconstruction and Development / The World Bank, 2019). The decentralisation process was about transferring certain powers and financial resources from the national government level to provincial and district or local government levels. The decentralisation process's strategic reason was to effectively address local fisheries-related challenges, bolster and raise all stakeholders' engagement, including traditional fishing communities and improving service delivery[90]. Also, MIMAIP established Provincial Directorates (DPMAIPs) and put under them all the functions that were previously performed through provincial delegations by national fisheries institutions like IDPPE, INAQUA and the erstwhile National Directorate of Fisheries Administration (ADNAP). The current information in the MIMAIP website indicates that the management structure of MIMAIP consists of 17 institutions that are a combination of National Directorates, autonomous institutions, and a system of complex cross-management arrangement with other government Ministries through the establishment of specific Departments[91] (Figure 4.5).

[90] http://documents1.worldbank.org/curated/en/403651525888008345/pdf/126083-WP-PUBLIC-SwioFish-Brochure-Eng-KJ-Mar6-ENGLISH.pdf. Communities livelihoods fisheries: Fisheries Governance and Shared Growth in Mozambique. Accessed on the 24 December 2020

[91] http://www.mimaip.gov.mz/o-ministerio/sistema-organico/. Organic System. Accessed on the 24 December 2020

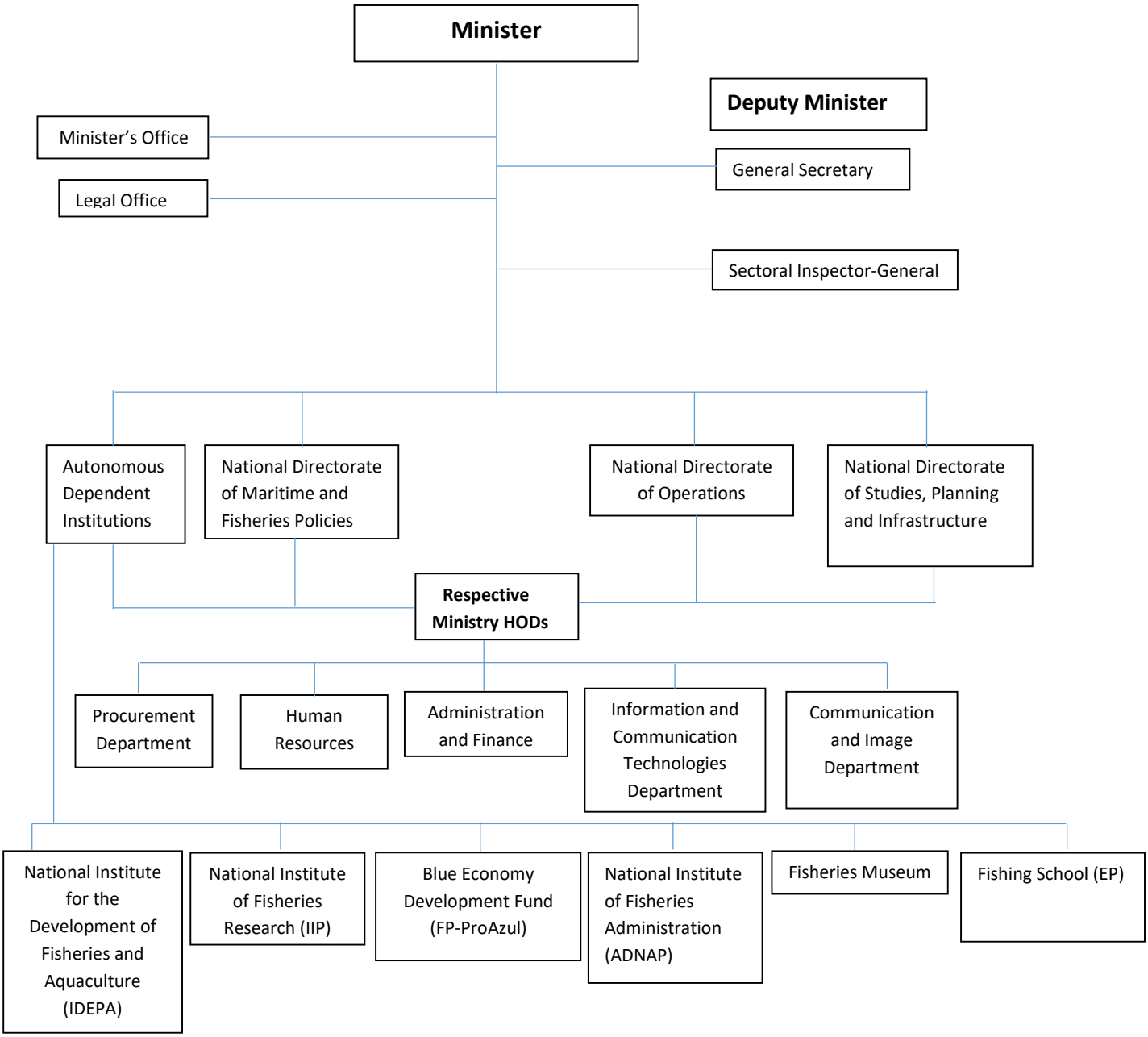


Figure 4.5: Mozambican Ministry of the Sea, Inland Waters and Fisheries (MIMIAP) Organisational Structure including National Directorates, Departments and Institutes

Within MIMAIP, there are Human Resources; Administration and Finance; Information and Communication Technologies; Communication and Image Departments, and the Procurement Department. All these Departments are headed by the Head of the Central Autonomous Department, i.e. a Permanent Secretary in Mozambique. For example, the Administration and Finance Department will be headed by the Permanent Secretary of the Economy and Finance Ministry, whereas the Information and Communication Technologies Department would be headed by the Permanent Secretary of Transport and Communications Ministry.

4.2.5. The institutional arrangements of MCS in Mozambique

MCS is one of the critical components of a well-structured fisheries management regime for any country. Presently that responsibility in Mozambique is with the Ministry of the Sea, Inland Waters and Fisheries (MIMIAP), and more specifically with the National Fisheries Administration Institute, ADNAP[92]. ADNAP is a public institution under MIMIAP as explained, but it is administratively autonomous from the Ministry, and its personnel are not regarded as part of the Ministry. The Mission of ADNAP is stated as to, "contribute to the conservation of living aquatic resources susceptible to fishing through efficient and sustainable management, based on scientific and legal prescripts and in the participation of all beneficiaries, with a view of optimising the present and future economic and social benefits for the country[93]." It is responsible for both fisheries management and fisheries monitoring[94]. The ADNAP further states that the Fisheries Monitoring Service is led by a Director of Central Services appointed by the Minister.

The Fisheries Management Service's responsibilities include, but are not limited to, monitoring and ensuring responsible use of fishing resources in marine and inland waters; implementation of monitoring programs onboard fishing vessels, and keeping the Vessel Monitoring System (VMS) for fishing vessels and their centre operational. ADNAP carries out that responsibility through the implementation of all relevant fisheries management policies and strategies. Furthermore, ADNAP also performs all administrative procedures that are a pre-requisite for granting access to Mozambique fish resources following applicable fisheries legislation. Furthermore, ADNAP is also responsible for all MCS functions about activities of national and foreign fishing vessels that utilise Mozambican national ports for landing, and other port calls related to their fishing activities. Since the establishment of MIMIAP in 2015, there have been some noticeable achievements in the Mozambican MCS efforts.

However, it has also been pointed out in the Valsson and Stokkan (2014) report that, the Mozambican MCS organisational structure is not ideally set up. That is because of the MCS

[92] https://ndf.fi/sites/default/files/ndf_c50_fishcc_lessonslearned.pdf. Fisheries Co-Management in Mozambique: Lessons from the artisanal fisheries & climate change project (FISHCC) 2015–2019. Accessed 23 December 2020

[93] https://www.adnap.gov.mz/. Who we are: About us – Mission. Accessed 25 December 2020

[94] https://www.adnap.gov.mz/gestao-de-pescarias. Services: Fisheries Management & Fisheries Monitoring. Accessed 23 December 2020

split mandate where the VMS; Electronic Reporting System (ERS), legal and licencing activities are put under the National Directorate of Fishery Administration (ADNAP), whilst MCS operations and enforcement are accommodated under the National Directorate of Fisheries Surveillance (NDFP). That negatively impacts the inspectorate's ability to receive and analyse intelligence information in real-time, resulting in poor responsiveness and inappropriate deployment strategies (Valsson & Stokkan, 2014). Furthermore, and about MCS operational procedures, Mozambican fisheries inspectors were found to be unable to properly execute their responsibilities (Valsson & Stokkan, 2014). For example, MCS activities that they were found to encounter difficulties in implementing were control of fishing gear, and calculation of fish holds contents (Valsson & Stokkan, 2014).

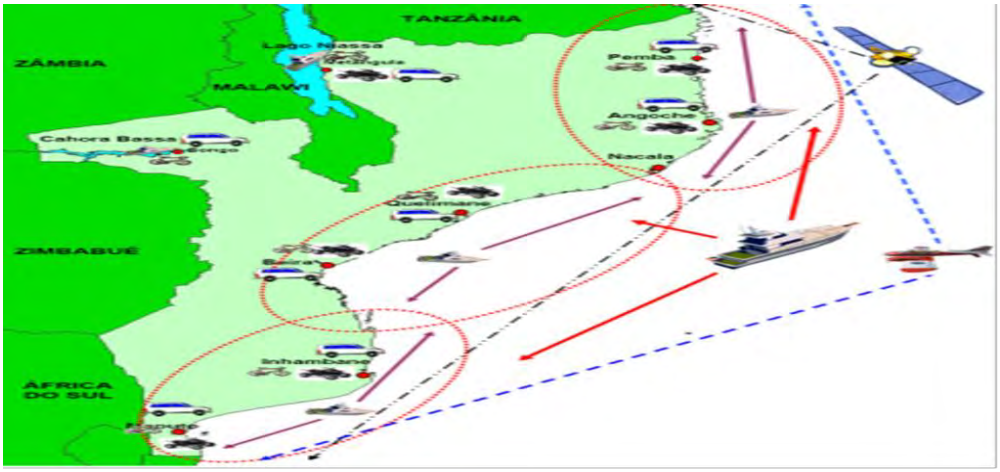
In December 2015, in recognition of the importance of the Statement of Commitment (SoC) to combat Illegal, Unreported and Unregulated (IUU) fishing and in support of Article 9 of the SADC Protocol on Fisheries, MIMIAP started to increase its MCS capacity in the Gaza Province by providing surveillance boats. A major achievement was realised by the new Department in March 2016, when the Mozambican MCS officials confiscated a Panamanian flagged longline fishing vessel (F/V NESSA 7). The transgression list of the vessels included entering Mozambican waters without requesting entry as per norm and entering and using the port facility without following due processes (SADC, 2016). With the help of South Africa and Fish-i-Africa, gathered intelligence further revealed indisputable evidence that F/V NESSA 7 also participated in different maritime unlawful activities (SADC, 2016). Vessel owners and the Master of the vessel were also prosecuted in Mozambique, the fine was about MT4.5 Million (USD230 000), with the Master barred from fishing in Mozambique for 36 months.

4.2.5.1. MCS Operations and cost of operations in Mozambique

Information about Mozambican MCS operations, and associated cost, was relatively sparse for this research work. Mostly reference material that had to be utilised was about ten years old or more. That created a problem as it tends to be challenging to ascertain whether the information is still valid or not. Also, available information covered the period up to, and including 2014, when there was still the Ministry of Fisheries. That has since changed as a new Ministry, MIMIAP was established in 2015. However, considering the strength and management of the Mozambican small scale fisheries as compared to that of South Africa, it

could provide useful ideas and examples for the South African small scale fishery as it continues to develop. Furthermore, the organisational structure and regional management of MCS in Mozambique whereby regions are semi-autonomous could also be a model that South Africa may learn from given challenges that South Africa is experiencing with its MCS central command model.

However, referring to the available information before 2015, and in explaining MCS operations in Mozambique Kelleher (2002) argued that two divisions of the National armed forces play a limited but crucial role in the MCS operations in the Republic of Mozambique, i.e. both the Marinha de Guerra (Navy) and the Força Aerea (Air Force). Apart from the inshore patrol vessels, the Navy which has a staff complement of about 2000, owns and operates Rigid Hull Inflatable Boats (RHIBs) which are utilised for MCS operations at Inhambane and Xai-Xai (Kelleher, 2002). Besides, the Navy has several small patrol vessels at Lake Niassa, with an additional RHIB on Cahora Bassa in the Songo region. On the other hand, the Air Force owns and operates several helicopters, but just like the Navy, it does not have a budget for maritime patrols (Kelleher, 2002). However, the Ministry of Fisheries leased an intermediate-sized Maritime patrol vessel named Kuswag FPV, with the option of buying (Republic of Mozambique Ministry of Fisheries, 2011a). Ideally, this vessel was meant to provide regular patrols in the Sofala Bank region during crucial months and the deeper EEZ during other times of the year (Republic of Mozambique Ministry of Fisheries, 2011a). Map 4.3, is a map of Mozambique with ideal MCS operations covering the country's entire EEZ, emphasising priority fisheries.



Map 4. 3: Map of Mozambique with an ideal MCS illustration (Source: Mozambique Ministry of Fisheries – MCS Management Plan, 2006)

At the time it was published, Kelleher (2002) reported that the Ministry of Fisheries had for MCS operations, a total budget of 714 million meticais (MT) (USD24 393 577.04 million)[95] of which MT63 million (USD2 152 374.45) was for salaries. Although clear records of this budget's overall disbursement are lacking, some information was provided for DPAP in the Sofala Region. According to Kelleher (2002), in the Sofala Region, the DPAP has 28 staff members, where 5 of them have university-level education and 6 with technical qualifications. Salaries of these staff members come from different sources as ten of them are paid from the National Treasury (OGE), and the remaining staff members' salaries come from either the FFP or the short term contracts. Furthermore, total revenue to the value of MT2 307million (USD78 817.90) was derived from licenses and sanitary certificates, and an additional MT3million (USD102 494.02) was accrued from the semi-industrial fleet (Kelleher: 2002).

Vessels that are utilised for fisheries patrols in Mozambique are the MV Kuswag and the MV Antillas Reefer. The MV Kuswag has an overall length (LOA) of 29 meters, and it has been operated as the lone Mozambican MCS vessel from 2008 to 2011. It is a small vessel considering that from bow to stern it measures 29 meters, hence it is not used to conduct patrols for the entire Mozambican EEZ., On the other hand, the MV Antillas Reefer has an LOA of 53 meters, hence it was contracted to patrol the high seas or to cover the entire Mozambican EEZ for its fisheries patrols[96]. That difference in size, use and area of coverage for each patrol vessel is reflected in cost associated with each vessel over a similar period of time. The cost of running the Kuswag was USD 900 000.00 in six months, for 50 sea days, compared to the MV Antillas Reefer, which was USD 1 900.000 for six months, with 75 sea-days.

Therefore, it is important that Mozambique's MCS capability and its regional impact are better understood in order to gauge its overall contribution to the region's collective fisheries sector management approaches. That is informed by the strategic position that Mozambique occupies in the SADC region, particularly to South Africa as they share borders in land and marine environments. It is also important to note that Mozambique has the fourth longest coastline in Africa, where 66% of Mozambicans reside, and that 85% of reported catches are credited to

[95] https://www.currencyc.com/2002-usd-mzn.html, the average exchange rate of the United States Dollar and the Mozambican Metical (Meticais) in 2002 was: USD1 = MT29.27. Accessed 15 May 2020
[96] https://www.stjornarradid.is/lisalib/getfile.aspx?itemid=0a804194-a075-11e8-942c-005056bc530c. Mozambique Fisheries Surveillance Report, 2014 February-April 2014. Accessed 26 December 2020

small scale fishers[97]. In addition, with regards to the important position that Mozambique occupies in SADC, calls for a better understanding of the country's fisheries sector could potentially be better articulated through the SADC.

The establishment of MIMIAP in 2015 was viewed as a commitment by the Mozambican Government to consolidate the country's action in support of economic development of the sea, which is directly linked to the SADC's regional blue economy framework and to the South African Operation Phakisa's Blue Ocean Economy to a certain extent. Furthermore, Mozambique and South Africa together with other SADC coastal and Island States, are part of the South West Indian Ocean Fisheries Governance and Shared Growth Program (SWIOFish). SWIOFish is a regional approach program aimed at consolidating management and development of the region's fisheries sector, which is informed by the shared ecosystems and resources, serving to attend to common goals and address challenges in cross border-border matters[98]. SWIOFish is a World Bank supported program that seeks to increase the economic benefit of coastal communities from fisheries and environmental activities that occur within their respective communities. SADC driven programs, and other foreign funded programmes in the region serve as a major catalyst for regional cooperation. Therefore, recognition that different fisheries, their importance and contribution to individual countries' respective GDPs, and the level of development and management of those fisheries promote an environment of information sharing and mutual growth, are the underlying reasons for Mozambique to be part of this work.

4.2.5.2. Strengths and weaknesses of the Mozambican MCS Program

The fisheries legislative and policy framework in Mozambique experienced some significant developments since the early 2000s. It could be argued that it is one of Mozambique's strengths, and be evaluated through its impact in the overall Mozambican MCS effort. For example, Mozambique approved the Master Plan for Fisheries 2010 - 2019, with the main objective

97 https://www.sadc.int/files/9814/8724/5613/SADC_Fisheries_Fact_Sheet_Vol.1_No._1__Focus_on_Mozambique.pdf. SADC FISHERIES FACT SHEET, VOLUME 1, NO. 1, January 2016: FOCUS ON THE MOZAMBIQUE FISHERIES SECTOR. Accessed 08 July 2021.

98 https://www.worldbank.org/en/programs/africa-program-for-fisheries#3. The World Bank: Africa Program for Fisheries. Accessed 08 July 2021

being to strengthen fisheries administration and deliver on capacity building of the fisheries governance authority (Republic of Mozambique Ministry of Fisheries, 2011b).

Furthermore, it aimed to develop institutional capacity to ensure compliance with legislation and management measures and define conditions of access to resources. The responsibility of regulating and enforcing fisheries-related laws lies with the Ministry of the Sea, Inland Waterways and Fisheries (MIMAIP).

Mozambique's domestic policy and legislative strength have helped galvanise the country's participation not only at the regional level but also on a global scale. From a regional perspective, an example is the establishment of the Regional MCS Coordinating Center (MCSCC) in Katembe, outside of Maputo. The objectives of the MCSCC are to coordinate SADC Regional fisheries MCS and enforcement activities, drive all programs that are in support of capacity building aimed at the full implementation of the SADC Protocol on Fisheries, and develop a framework for the implementation of a regional Fisheries Patrol Plan[99]. The genesis of the regional MCS centre was the signing of the 2008 statement of commitment to strengthen regional cooperation in the fight against IUU fishing's scourge, of which Mozambique is a signatory. That was followed by the signing of the Charter to establish the regional MCSCC in 2017. Its objective is to provide a legal framework for establishing and operationalising a regional coordinating centre that will coordinate all MCS activities in the SADC region.[100].

MCSCC is generally viewed as building on the 2001 agreement of SADC States which culminated in the approval of the SADC Protocol of Fisheries, of which Mozambique was part of that historical decision as is the case with MCSCC. It is a significant step forward in addressing concerns raised by Valsson and Stokkan (2014) that, the SADC States regional cooperation was insignificant to a point where they could not deal effectively with IUU fishing. Therefore, the establishment of the MCSCC can be technically linked to their recommendations that, the SADC States and RFMOs should cooperate and promote sustained sharing of information between all Parties on suspected infarctions and reported catches (Valsson & Stokkan, 2014). Also, with regards to coordination of regional MCS effort, views of the FAO

[99] https://nfds.info/experience/mozambique/. NFDS. Accessed 28 December 2020

[100] https://www.sadc.int/news-events/news/angola-becomes-8th-member-state-sign-charter-establishing-sadc-monitoring-control-and-surveillance-coordination-centre/. 17 Oct 2019
Angola becomes the 8th Member State to sign the Charter establishing the SADC Monitoring Control and Surveillance Coordination Centre. Accessed 28 December 2020

are that it is a platform that will bring together MCS programs of SADC and the Indian Ocean Commission, and that will be a catalyst for European Union (EU) funding through its ECOFISH Program[101]. Another example is the Agreement on Port State Measures to Prevent, Detect and Eliminate Illegal, Unreported and Unregulated Fishing (PSM), which Mozambique signed on 4 November, ratified 19 August 2014, of which its national plan was updated in June 2019[102].

Available information suggested that generally, the MCS situation in Mozambique is such that there is inadequate overall enforcement of regulations (Sjöstedt & Sundström, 2013; Valsson & Stokkan, 2014). That results in only a small fraction of the 75% of fisheries that are managed being managed appropriately and effectively (Cunningham & Bodiguel, 2006). Infarctions include high under-reporting of catches, artisanal fishers who fish during the closed season and in marine protected areas, and severe overfishing of shallow waters (Jacquet *et al.*, 2010; Sjöstedt & Sundström, 2013). Also, there is the least monitoring of the artisanal fisheries sector which comprises numerous species where different fishing methods and gear are utilised (Samoilys *et al.*, 2019). Therefore, weak implementation of the national MCS program, characterised by an insufficient number of appropriately trained and equipped inspectors and the non-existence of an effective VMS system to monitor activities of all foreign fishing vessels within the Mozambican EEZ completes the problematic situation of Mozambique (Agnew *et al*., 2009; Sjöstedt & Sundström, 2013).

The utilisation of technology plays a vital role in the fisheries monitoring and surveillance plan, and the absence of a fully functional Vessel Monitoring System (VMS) in Mozambique that is manned the entire day throughout the year has been identified as another shortfall of the MCS system (Valsson & Stokkan, 2014). The inability to monitor all fishing activities at the offshore fishing grounds is a tempting situation to unscrupulous owners and operators of fishing vessels, considering economic returns they are likely to realise through their illegal activities (Agnew *et al*., 2009). The insufficient MCS capacity has also led to difficulties in enforcing and monitoring to ensure that industrial fishing vessels are not fishing in areas that are specifically reserved for small scale fisheries (Republic of Mozambique Ministry of Fisheries, 2010). Furthermore, chronic unavailability of funds from the Mozambican central government, and

[101] https://www.seafoodsource.com/news/environment-sustainability/sadc-states-developing-joint-strategy-to-combat-iuu. SADC states developing joint strategy to combat IUU. Accessed 04 February 2021

[102] http://www.fao.org/port-state-measures/news-events/detail/en/c/1202090/. Agreement on Port State Measures (PSMA). Accessed on the 29 December 2020

over-reliance on inconsistent donor funding has been identified as a major weakness for the Mozambican MCS program[103]. This weakness's direct impact on the Mozambican MCS program is the cancellation of operations and patrols due to irregular payments to the vessel operator by the Ministry of Finance (Valsson & Stokkan, 2014).

However, after the establishment of MIMIAP in 2015 there was a major improvement with institutional arrangements, particularly with rectifying the detrimental two centres of power model in certain MCS functions as outlined by Valsson and Stokkan (2014). An example of the adverse effects of that model was the loss of operation time by patrol vessels due to lack of coordination between the erstwhile Ministry of Fisheries and the Defence and Security Forces that were managing and operating vessels on behalf of the Ministry of Fisheries (Valsson & Stokkan, 2014). Currently, MCS administrative activities and management of resources is, to a large extent, streamlined within MIMIAP (International Bank for Reconstruction and Development / The World Bank, 2019). The regional MCS model, which is about the devolution of duties from a central command model to regional autonomy, is a model that South Africa should learn from. That is another strength of the Mozambican MCS program where National Institutes, managed by appropriately qualified personnel with oversight done by a National Department that is directly relevant to a particular support function, are responsible for corporate functions of the Regional or Provincial MCS structures (International Bank for Reconstruction and Development / The World Bank, 2019).

The current internal conflict or war situation at Cabo Delgado in the northern parts of the country is another weakness in Mozambique's fisheries governance. In understanding the impact of war, it is argued that war leads to severe losses of life, destruction of infrastructure and livelihoods, and it often results in a long-term refugee problem[104]. Permanent damage to the socio-political and economic institution due to war is another high risk to good governance. In the case in Mozambique the process is still unfolding, but certainly fisheries have been directly and heavily impacted upon in the Cabo Delgado region. For example, the key port of Mocimboa da Praia, an important fishing port for the region, was captured by the insurgents following a fierce fighting between the ISIL (Islamic State of Iraq and Levant) insurgents and

[103] https://www.stjornarradid.is/library/03-Verkefni/Utanrikismal/Throunarsamvinna/uttektar--og-ryniskyrslur/External-independent-review-of--fisheries-surveillance-operations-in-Mozambique-2014.pdf. Accessed 29 December 2020

[104] https://www.sipri.org/commentary/blog/2015/consequences-internal-armed-conflict-development-part-1. The consequences of internal armed conflict for development (part 1). Accessed 23 February 2021

the Mozambican marines who were assisted by South African mercenaries[105]. Furthermore, expectations for 2020 were for the region to produce 40 000 tons which could not be realized due to 5 000 fishers who were unable to undertake any fishing activity because of terrorist attacks[106]. That compelled MIAP to move away from traditional fishing districts of Mocímboa da Praia; Palma, and Macomia, where there is higher fishing production to Mecúfi, Metuge and Ibo districts, where there is no adequate fishing infrastructure as the government never invested in these areas as they are not traditional fishing communities. While some areas may benefit ecologically from reduced fishing effort, others may suffer long-term harm. With the rule of law compromised there was of cause no implementation of the national MCS program in the Cabo Delgado region at the time this study was concluded.

[105] https://www.aljazeera.com/news/2020/11/11/we-want-the-war-to-stop-attacks-spread-in-mozambique. Civilians reel as violence spins out of control in Mozambique. Accessed 23 February 2021
[106] https://clubofmozambique.com/news/armed-attacks-compromise-fishing-in-cabo-delgado-162499/. Armed attacks compromise fishing in Cabo Delgado. Accessed 23 February 2021

5. RESEARCH APPROACH / METHODOLOGY

5.1. Introduction

In their scholarly work Myers & Worm (2003) detailed the importance of effective fisheries governance by analysing the impact of ecological degradation of the marine environment coupled with the overexploitation of marine living resources. This analysis was made to recognise the significant role marine fisheries in developing countries continue to play in socio-economic development (AU-IBAR, 2016). The observed sustained negative pressure on marine living resources has far-reaching adverse consequences to the most impoverished communities that depend entirely on them (AU-IBAR, 2016; The International Bank for Reconstruction and Development & The World Bank, 2004). As further argued by Alcock (2002) and Sjöstedt & Sundström (2013), this observation can mainly be attributed to fisheries governance institutions' failures. However, Gibson *et al.* (2005) and Sjöstedt & Sundström (2013) went further in their overall assessment of fisheries governance challenges that manifest themselves in negative pressure to living marine resources to be the failure in Monitoring, Control and Surveillance (MCS). Numerous experts agreed on the failure of the MCS institutions in developing countries, which led to support that many international bodies and foreign governments gave to the developing countries to establish their MCS capacity (Sjöstedt & Sundström, 2013). The Southern Africa region through the Southern African Development Community (SADC) benefited immensely from that intervention, especially from the European Union (EU) and the United Nations Food and Agricultural Organization (FAO) (Sjöstedt & Sundström, 2013).

Currently, all the coastal countries in the SADC region do have MCS programs of which, when this study was developed, there was no certainty about their level of development and effectiveness. That can be attributed to the unavailability of research literature that would directly respond to such information needs. Some clarity on the fundamental reasons for this dilemma is given by (Sjöstedt & Sundström, 2013), that after the conclusion of the SADC Protocol on Fisheries negotiation and it's coming into force, not many studies were commissioned to investigate its implementation and effectiveness. Such studies could have been critically important and highly beneficial to the region as they would have served to determine the policy domestication process and the policy implementation process's impact at both the regional and national levels. (Sjöstedt & Sundström, 2013) further state that, for their

study, the other intention was to contribute and improve on the available SADC fisheries governance body of knowledge. However, immediately after their observation on the absence of information in the SADC region several studies were commissioned by the African Union Commission (AUC) and the New Partnership for Africa's Development the NEPAD, for example, a study titled, *"Policy Framework and Reform Strategy for Fisheries and Aquaculture in Africa,"* (AUC-NEPAD, 2014). *"Status of Surveillance Systems in Southern Africa: Strengthening National and Regional Capacities for Combating Illegal, Unreported and Unregulated Fishing,"* which was published in 2016, is another crucial work for SADC that was commissioned by AUC. Both of these studies gave a justifiable and a commendable attempt in answering difficult questions about fisheries governance in the region. However, given the vast void regarding information needs, and the difficulty in getting information from various countries which is a major limiting factor, both studies could not cover all areas of fisheries governance in the region. Therefore, this study is about fisheries governance, focusing on MCS structures and effectiveness in examples from the SADC region. Although the study sought to respond to questions about the MCS effectiveness in the SADC region, the study does not cover all the coastal states of the SADC region, but only Namibia, South Africa and Mozambique, which, as select representative of the region, was to reflect on the different MCS approaches in the region.

The main focus of this study was South Africa, a country that is part of the SADC region, and a country which is endowed with a robust commercial fisheries sector. Assumptions were that it also has an adequate MCS system. In conducting this research full consideration was given to the ethical aspects of collecting information through questionnaires and interviews. The individuals approached were all adults holding responsible positions within their different organizations. The purpose of the project and the role that the information provided was explained to them and they were under no obligation or duress to participate in the study. Those who did, did so voluntarily. Anonymity of responses has been protected and all information gained through meetings and interviews with participants was recorded and stored by the researcher and only the researcher and his supervisors have access to raw data and the identity of the source of that data.

The investigation was to be based on an array of factors that ranged from the South African MCS organisational structure and institutional arrangements to its operations and to test further if all aspects of the MCS national program were in accordance with international MCS literature and international fisheries governance tools. Additional to the international

governance tools as described in Chapter 2, and to give a more regional focus was utilising the SADC Protocol's policy guidelines on fisheries. The other two countries selected to serve the purpose of a limited comparative analysis for this study were the Republics of Namibia and Mozambique. In this study's research design, only some parts of the MCS information from the Namibian and Mozambican national programs were used to better understand and reflect on the regional MCS arrangements' dynamics. However, the overall approach to this study was not only to focus on national MCS organisational structures, or institutional arrangements from the three respective countries but also to examine the composition and effectiveness of compliance and enforcement mechanisms in consideration of their importance in understanding MCS processes holistically (Gibson *et al*., 2005; Sjöstedt & Sundström, 2013).

In the literature review chapter, the primary observation was that in all the global MCS instruments that were reviewed institutionalised collaborative regional MCS effort is the desired approach that is most likely to improve MCS effectiveness (Cochrane & Garcia, 2009). This observation implies that SADC needs an institutionalised regional collaborative MCS effort if the SADC region's countries are to be fully synchronised with the best international practices (SADC Protocol on Fisheries, 2003). It is imperative, though, to state that such an approach is well articulated in the SADC protocol. Furthermore, to realise success in their regional MCS endeavours they all need that institutional arrangements for which main drivers range from political will to practical issues, for example pooling of available resources (SADC Protocol on Fisheries, 2003).

However, this all starts with well-established individual National MCS programs. Namibia, like South Africa, has a well-established commercial fishery where commercial fishing fleets use Lüderitz and Walvis Bay ports for landing their catch[107]. There is also a reasonably strong subsistence or artisanal fishery in Namibia that dates back some 2000 years even though the Namibian coastline is mostly viewed as inhospitable (Roux & Shannon, 2004; Sumaila, 2000). This age-old tradition suffered heavily under both the colonial and the apartheid era, institutionalised through exclusion laws during Namibia's occupation by Germany and later South Africa (Sowman & Cardoso, 2010). Even though it is not regulated the same way as the recreational fishery, it thrives in areas like Swakopmund, Henties Bay and Terrace Bay (Barnes & Alberts, 2008; Belhabib *et al*., 2015). The Republic of Namibia is also considered a country with a robust MCS system (Kelleher, 2002). The robust MCS system led to a significant

[107] http://www.fao.org/fi/oldsite/FCP/en/NAM/profile.htm - Namibian Fisheries Profile, accessed 12 March 2019

increase in international confidence towards Namibia's MCS capability, because when it gained independence the estimated number of trawlers that were fishing illegally in Namibian waters was 100 (Belhabib *et al*., 2015; Nichols, 2006). On the other hand, Mozambique does not have a well-established commercial fishery as the existing industrial fishing comprises of joint ventures between the Government of Mozambique and foreign fishing from countries like Japan and Spain[108]. Instead, it has a wide-spread artisanal fishery that accounts for about 80% of the total marine catches[109]. Assumptions were that the Mozambican MCS system is not well-developed and as such, not that effective when viewing it from the point of view of the international MCS framework. The fisheries of Namibia and Mozambique are discussed further in Chapter 4.

The study used all available, relevant information in the published and unpublished literature and also relied on information collected by key people engaged in or actively participating directly or indirectly in MCS operations of their respective countries. These targeted groups for the consultations were government fisheries officials, at different levels of seniority, senior ranking personnel in the fishing sector and some representatives from NGOs where possible. In South Africa, a total number of 35 questionnaires were distributed to prospective respondents for this study. The split for the 35 questionnaires was 27 questionnaires given to DEFF officials from the Senior Management level of the MCS Chief Directorate or Fisheries Control Officers (FCOs). Out of the 27 questionnaires, 13 were received back, and 12 of them were completed fully, and one was not satisfactorily completed, and it was not used in the evaluation process. The other eight questionnaires were given to DEFF Stakeholders, i.e. the Fishing Industry representatives and Non-Governmental Organisations actively participating in all fishing governance matters. For this study, this group will henceforth be referred to as the SAFIR group. From the eight questionnaires given to the SAFIR group, six were received back, four from the Fishing Industry representatives and two from the NGOs.

In Mozambique, seven questionnaires were given to senior government officials and former senior government officials who were at the time serving in other regional bodies or Mozambican government fisheries management agencies. Out of the seven questionnaires, three were returned. In Namibia, six questionnaires were given out to the Fisheries Ministry officials at various management levels of the organisation, and only three were received back.

[108] http://www.fao.org/fishery/docs/DOCUMENT/fcp/en/FI_CP_MZ.pdf - Accessed on the 12 March 2019
[109] http://www.fao.org/fishery/docs/DOCUMENT/fcp/en/FI_CP_MZ.pdf - - National Fishery Sector Overview: The Republic of Mozambique. .. Accessed 29 June 2021

However, due to the low number of returns from Mozambique and Namibia, a decision was taken not to use the two countries' results. Further details and analysis of the results for South Africa are covered under Chapter 6, Section 6.3.4 of this study, whereas Namibia and Mozambique are covered under Chapter 4.

5.2. The research approach and design

The research approach for this study was a combination of both the exploratory and empirical research approaches. The empirical approach is defined as a way of gaining knowledge through direct and indirect observations or experience. On the other hand, exploratory research is defined by Saunders *et al*. (2009) as valuable means of establishing the status quo of certain specific environments or events to determine new insights; or make inquiries about a specific phenomenon from a different viewpoint than as per usual. In some previous fisheries management related studies various researchers successfully used both the exploratory and empirical research approaches, for example, Raemaekers (2009), in his study entitled *"Rethinking South Africa's Small-scale Fisheries Management Paradigm and Governance Approach: Evidence from the Eastern Cape."* In this study, as it was straddling over both the qualitative and quantitative research paradigms, led to considerations of using additional research tools. A decision was to use a structural approach similar to that followed in the RAPFISH technique. The reason for selecting the RAPFISH type approach for evaluating a system was that it could be utilised to cover both the qualitative and quantitative aspects of research.

RAPFISH technique is delineated as a multi-disciplinary rapid appraisal technique utilised in the fisheries sector as a tool for evaluating the comparative sustainability (Pitcher & Preikshot, 2001). In giving more explanation about the nature and application of the RAPFISH technique Pitcher & Preikshot (2001) state that RAFPISH technique, *"employs simple, easily scored attributes to provide a rapid, cost-effective and multi-disciplinary appraisal of the status of a fishery, in terms of comparative levels of sustainability."* Given the fact that MCS is one of the tools that are used in fisheries governance to ensure rational use and sustainability of fisheries, and the fact that RAPFISH technique has the description of sustainability in a numerical form through a set of scored attributes, was an additional encouragement for its use in this research.

Furthermore, this technique was utilised to conceptualise the criteria that are the basis of the questionnaire and the development of the scoring method, which enabled the quantitative analysis of this study. Presentation and analysis of results where this technique's utilisation is displayed is under Chapter 6 of this study.

5.3. The development and design of the MCS assessment framework

5.3.1. The development of the data collection tool

The primary data collection tool that was used for this study was a questionnaire. The questionnaire's content was informed by an extensive literature review process premised within several United Nations (UN) documents and other relevant UN agencies literature about the international law framework applicable to global fisheries governance regimes. Documents that were used in this regard included the United Nations Convention on the Law of the Sea of 10 December 1982 (UNCLOS); the Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (UNFSA); the FAO Code of Conduct for Responsible Fishing; the International Plan of Action against Illegal, Unreported and Unregulated fishing (IPOA-IUU) and the Port State Measures Agreement (PSM). Furthermore, The Food and Agricultural Organization (FAO) Fisheries Technical Paper (2002) which details the recent trends and standards in Monitoring, Control and Surveillance, was also utilised for providing the guiding principles of the questionnaire and taking into consideration that MCS is a central component in the present-day fisheries governance processes. The other important document that was also used extensively for providing the guiding principles for the development of a framework for testing the effectiveness of an MCS program was the chapter published by Bergh and Davies in 2009. The questionnaire's scoring method was based on the RAPFISH technique (Pitcher & Preikshot, 2001).

The development of this questionnaire was further underpinned by two objectives of which the first was to break-down the features and requirements of an effective MCS system into its fundamental components, thereby providing a tool for the determination of the effectiveness of different national MCS programs in the SADC region and potentially in other countries too.

The second objective was to develop a testing tool to investigate different MCS programs' completeness in the SADC region. Although there was an indication that the framework could be used to analyse the MCS programs of each of the three countries included in this study, the meagre return of questionnaires from Namibia and Mozambique made it impossible to continue with the regional MCS assessment. However, prospects of utilising the research framework developed for this study and yielding positive results for the region in the process, mainly if used within an exploratory research approach context, cannot be discounted. For South Africa, it was a different scenario as the questionnaire proved to be useful in both exploratory and empirical research approach.

The exploratory research approach was valuable in the development of this questionnaire in the generation of good quality information that assisted in the reduction of the research project's level of bias[110]. However, the starting point was the identification and thorough understanding of respondents. That was achieved through numerous interviews with DAFF MCS personnel to better understand their natural attitude and professional opinion about MCS. That holistic understanding of respondents shaped the manner with which the questionnaire was to be structured and the entire design of the survey[111]. The researcher was in the Senior Management structure of MCS in South Africa for more than six years, which allowed for the excellent cooperation with the current officials in the current structure, and direct access to the facilities, personnel, infrastructure and all MCS operations was provided.

5.3.2. The structure of the questionnaire

5.3.2.1. Part A: The background information

The questionnaire that was utilised for this study was designed, as one of the key objectives, to develop an effective research questionnaire that could be used as a testing tool for effectiveness of other MCS programs in the world after the completion of this study. The full questionnaire is attached to this thesis as Appendix A. The process and approach that was utilised in its

[110] http://fluidsurveys.com/university/exploratory-research-4-ways-implement-research/ - *"Get a Grip of the Issue with Exploratory Research "* - Accessed on the 30 March 2019
[111] http://fluidsurveys.com/university/exploratory-research-4-ways-implement-research/ - *" 4 Ways to Implement Exploratory Research into a Research Plan"* – Accessed on the 30 March 2019

development are the FAO guidelines of a nine-point framework in questionnaire design[112]. The nine-point framework includes:

- *Deciding on the information required;*
- *Defining the target respondents;*
- *Choosing the method or methods of reaching target respondents;*
- *Deciding on the question content;*
- *Developing the question wording;*
- *Putting questions into a meaningful order and format;*
- *Checking the length of the questionnaire;*
- *Developing the final survey form.*

With adherence to the nine-point framework, the structure of the questionnaire was broken down into four (4) parts which are:

Part A – *The background information*;

Part B- *Evaluation of the MCS Enablers*;

Part C- *Evaluation of an MCS System process and its effectiveness – the reactive approach*, and

Part D- *Evaluation of an MCS system process and its effectiveness – proactive approach*

Part A is about a National MCS program's background information in all countries that this study focused on. The advice on the approach of the development of Part A, i.e. with specific reference to the structure and content of questions, is given in the FAO questionnaire development guidelines where it is advised that a researcher should identify and define target respondents that are to suit the needs of his or her research[113]. As MCS was the main subject of this study, MCS practitioners and fisheries managers and other stakeholders directly involved in fisheries governance were the target respondents. That was done with the

[112] www.fao.org/3/w3241e/w3241e05.htm - Questionnaire Design, Chapter 4 page 3, assessed on the 05 April 2015

[113] www.fao.org/3/w3241e/w3241e05.htm - Questionnaire Design - Define the target respondent, Chapter 4 page 3, assessed on the 26 March 2019

realisation of the value they were going to add to the research as they were all active practitioners in the MCS field when this research study was developed. The other consideration during the identification and definition of respondents was that they could provide useful information and insight to the research subject. The following step was to decide on the content of the questions and most aspects of question-wording. Results of this particular exercise were Part A of the questionnaire, which comprised of a total of 21 questions. Questions one to 13 were operational questions, and questions 14 to 21 were strategic questions.

To a large extent, the operational questions were directed to the inspectors who are ordinarily viewed as operational, and the strategic questions were directed to the managers whose responsibilities are regarded as strategic in FGAs. However, responses from all the questions were still expected and equally important from all the respondents irrespective of their portfolios and level of responsibility within the organisation. Part A's main characteristics are premised on that researchers should ask easy to understand and answer questions that are viewed as not *"threatening."*[114]. Therefore, the nature of questions in Part A even though they could be grouped into two categories, the intentions were that they should be easily understandable to the respondents. The level of easiness that is referred to is in two-parts. In the first instance, it was the ease of scoring, i.e. *"Yes"* or *"No"*, where the respondents were not required to formulate answers in their own words[115].

Secondly, the formulation of questions was such that the information that was sought from the respondents was more about the tools that they use on their day-to-day functions, and the assumption was that responses would come easily. Furthermore, in the development of questions in Part A, literature for the guiding principles suggested that opening questions that are straightforward and easy to understand and score were the basis of gaining the respondent's full participation in the survey and assist towards supporting or dispelling the hypothesis being tested. Although questions in Part A did not have any numerical score attributes attached to them, the view they provided could still be used in the testing of one or more hypotheses that were established during the research design phase[116].

---

[114] www.fao.org/3/w3241e/w3241e05.htm - Questionnaire Design - Decide on question content, Chapter 4 page 4, accessed on the 26 March 2019

[115] www.fao.org/3/w3241e/w3241e05.htm - Questionnaire Design - Development of the question wording, Chapter 4 page 5, accessed on the 26 March 2019

[116] www.fao.org/3/w3241e/w3241e05.htm - Questionnaire Design - Decide on question content, Chapter 4 page 3, assessed on the 26 March 2019

5.3.2.2. Part B: Evaluation of the MCS system enablers

Part B of the questionnaire was focusing more on MCS enablers. In broad terms, enablers are defined by the United Nations Development Program (UNDP), as a function of activities that are at the centre of both efficiency and effectiveness in any program[117]. To satisfy this definition, and utilising the FAO guidelines for the development of a questionnaire as explained above, this part of the questionnaire was divided into three different but interrelated sub-parts which are,

- ***B.1.*** *– The enabling environment;*
    - (a*)* ***B.1.1****. – Management / Strategic Level Assessment and National Institutional Arrangements* and
    - *(b)* ***B.1.2****. - Regional and International integration.*
- ***B.2****. – The legislative Framework and Administrative Measures;*
- ***B.3.*** *– Evaluation of infrastructure and physical resources*

Following this outline, a specific focus in this part of the questionnaire was on the national MCS program's rigorous systematic analysis. The analysis encompassed collecting appropriate data that enabled the testing of the hypotheses for this study. That included conducting all fundamental statistical analysis relevant to this study. Therefore, it was critically important that the questionnaire has a prescribed wording to ensure that all respondents received the same stimulus to respond consistently, albeit differently. To achieve this stage's objectives, the MCS enabling environment needed to be tested and evaluated for both efficiency and effectiveness. As with all the other parts of the questionnaire, the enabling environment's guiding principles were derived from an array of available MCS literature and governance literature in general. Questions ranged from rating the fisheries Ministry's performance where its mandate and responsibilities are attached, to budgeting and financial responsibilities. An in-depth clarification and discussion about this part of the questionnaire are presented further in the following sections.

[117] www.unaids.org/files/media_asset/2... Understanding and acting on critical enablers and development synergies… accessed on the 11 March 2019.

i) Part B. 1. –The enabling environment

The enabling environment part of the questionnaire, i.e. Part B.1, was further subdivided into two parts, and it had a total of 20 questions (Appendix A). The first ten questions, i.e. question 22 to 31 under subpart B.1.1, were about MCS management and strategic level assessment and institutional arrangements. From question 22, information was sought to establish the level of performance of a government department charged with managing fisheries. In this question, there were two interrelated but different aspects of Government, i.e. government performance and the public sector governance. Frederickson *et al.* (2012) define government performance as more about the sitting Government's accountability to the population that voted them into office. On the other hand, public sector governance has been defined by Hill & Lynn (2005) as, *"regimes of laws, rules, judicial decisions, and administrative practices that constrain, prescribe and enable the provision of public supported goods and services."*

Therefore, asking a question about a *"rating"* that MCS practitioners were to allocate to a fisheries governance government department or Ministry with regards to its performance, was intended to bring to the fore data that would respond to almost all of the attributes of governance performance and their direct relevance and impact to a national MCS program as explained by (Hill & Lynn, 2005). The other dimension of this debate which is more relevant to governance performance and fisheries is advanced by Sjöstedt & Sundström (2013) that in Africa what has been a common occurrence is the diminishing impact or least respect paid to the authority of a government department entrusted with fisheries management. These arguments necessitated that questions about government performance be posed to the respondents, for example, question 22 and question 23. The status quo is clearly defined from the data they provide, leading to the development of appropriate interventions and recommendations. Strategic management matters covered by questions 24 to 26, is defined as *"the process of evaluation, planning, and implementation designed to maintain or improve competitive advantage*[118]*."* planning in this instance refers to the ability to develop business models and provision of corporate direction. Implementation refers to the structure and strength of leadership and their respective abilities in building the appropriate organisational structure and the desired organisational culture, thus guiding the organisation through all corporate

[118] https://www.researchgate.net/profile/Tanya_Sammut-Bonnici/publication/272352897_Strategic_Management/links/59f6ff27aca272607e2be413/Strategic-Management.pdf?origin=publication_detail – accessed on the 26 March 2019

governance requirements (Sammut-Bonnici & Galea, 2015). All this explanation resonates well with the attributes of public sector governance as described by Hill & Lynn (2005), but the other aspect of fisheries governance that these two questions sought to address is what could be termed as social cohesion in the fisheries-governance setting. Social cohesion in the fisheries sector is often the desirable function of fisheries co-management. Management of resources and the management cost are shared between the fishing fraternity and government[119].

Fisheries co-management is defined as an arrangement between Government and the fishing community, or communities that are the direct beneficiaries of fishing activities that occur in their immediate environment, where accountability in the management of that particular resource is apportioned between the Government and the fishing community (Nielsen, 1996; Pomeroy *et al.*, 1998). However, Gutiérrez *et al.* (2011) point out that there should be strong and stable leadership for a successful co-management to exist. That also serves as a deterrent for instrumental co-management development, where communities may enforce government regulations without ever interrogating them through an open consultative process. An in-depth analysis of various co-management models is not necessarily the subject of this study, although it may be interesting to pursue further in other studies. Therefore, it is essential to note that questions 22 to 24 were not designed to take the matter further than this point.

Questions 25 and 26 were developed to test the institutionalised strategic partnerships that FGAs have to strengthen their fisheries governance ability. Therefore, given this underlying reason for developing both questions 25 and 26, and their individual and collective objectives thereof, it was equally important to understand, where possible, each of the countries' posture towards this position. In the South African situation, the undertaking by Government to have such a partnership is explicitly reflected in Chapter 2, Sections 5 to 8 of the Marine Living Resources Act (MLRA), Act 18 of 1998. Section 5 is about the undertaking of the Minister of Agriculture, Forestry and Fisheries to establish fisheries Consultative Advisory Forum (CAF), whose duties are outlined under Section 6 (a) i-v and 6(b). As stated in the Act, the CAF duties include "*the management and development of the fishing industry, including issues relating to the total allowable catch*", and *"the establishment and amendment of operational management procedures, including management plans."* Similarly, in Part IV, Section 24 of the Marine

[119] http://www.fao.org/3/a-bs228e.pdf - Sourced from the document entitled *"Value Chain in fisheries Co-management."* Accessed 30 March 2019

Resources Act (MRA), Act 27 of 2000 in Namibia, there is an undertaking from the Minister of Fisheries and Marine Resources to establish the Marine Resources Advisory Council (MRAC). The primary function of the MRAC, as stated in the Namibian Act, is to advise the Minister on all matters about fisheries, including those matters that are to be investigated.

As explained, fisheries advisory councils' importance is one of the critical success factors in fisheries governance. A practical example of how fisheries advisory councils could be of assistance, and be central in fisheries governance, is displayed by the Caribbean Community (CARICOM). CARICOM, established in 1973, comprises of 15 States whose main objective is economic integration. Fishing is part of the economic activities in the region. In their writings, Mahon and Oxenford[120] explains the undertaking by all Member States of CARICOM, that Fisheries Advisory Committees (FAC) be established as institutions that will advise respective Fisheries Ministers on all matters about fisheries inclusive of conservation, development and fisheries management broadly. Given this development in the CARICOM region, such institutional arrangements and the extent to which they go in fisheries governance broadly and their strategic importance in the SADC region's MCS programs had to be investigated. Therefore, questions 25 and 26 were developed to determine the existence of such or similar bodies and establish the value of their inputs to fisheries' overall strategic governance in their respective countries and the SADC region.

Finance is another enabling aspect of an MCS program, hence questions 27 to 29. Cochrane and Garcia (2009) state that an indication should be given of all available financial resources in an MCS program's strategic plan. This indication should be flexible enough to indicate both the allocation and utilisation of available resources and the alternative funding source if the allocated financial resources are far less than the program's needs (Bergh & Davies, 2009). What has been a prevalent inconvenience in many MCS programs is the unavailability of permanent financial resources, and in many instances, this situation has led to the ineffectiveness of inspectors, and in worst-case scenarios, there would be no functional VMS within the EEZ of the country (Pramod *et al*., 2008; Sjöstedt & Sundström, 2013). These are

120 https://www.researchgate.net/profile/Robin_Mahon/publication/253452674_BARBADOS_CASE_STUDY_THE_FISHERIES_ADVISORY_COMMITTEE/links/0deec531860681bc97000000/BARBADOS-CASE-STUDY-THE-FISHERIES-ADVISORY-COMMITTEE.pdf?origin=publication_detail – accessed 31 March 2019

but some of the manifestations of the chronic insufficient budgets that tend to be allocated to the national MCS programs, especially in developing countries.

In certain instances, insufficient budgets are a direct result of amorphous FGA institutional structures which inevitably have a litany of responsibilities, and due to their prioritisation process, their respective MCS programs are at the tail-end of their catalogues (Randall, 2004). Kelleher, (2002) succinctly explains this quandary when he asserts that "*Monitoring, control and surveillance are integral functions of a fisheries management regime. Because of the close linkages between these functions and other fisheries management activities in terms of administration, budgets, capital assets and personnel, the costs of MCS are often difficult to identify."* He further extrapolates that the determinant of MCS cost in any fishing nation is influenced by numerous factors inclusive of fisheries' political and ecological profile in that particular country and the regulatory framework and management objectives to mention a few.

That may be the fundamental reasons for Randall, (2004) to argue that as a consequence of realising the expensive nature of an effective MCS program, those that are in strategic positions in FGAs must clearly articulate their effective and appropriate enforcement expectations to their respective implementation units if a good budgeting process is to be realised. Unfortunately, the downside of that statement is the frequent misinterpretation of *"effectiveness"* to mean omnipresence in implementing the *"deterrence concept"* leading to increased MCS costs. In an attempt to avoid this abyss, numerous researchers have put forward research proposals on the best possible ways to minimise MCS costs, but most, unfortunately, recommendations that have been put forward thus far are more about changing the MCS model without taking into consideration other factors like social benefits of an effective MCS program (Randall, 2004). Even though that is the case, there are some encouraging developments in the funding of MCS programs where Sjöstedt & Sundström (2013), referred to the fishing industry providing funding to fisheries governance efforts through fees are collected via National Treasury. That is a welcomed development, but there is a need to investigate further for other models that may exist, or other practices in the region that may be shared amongst the parties to strengthen the effectiveness of both national and regional MCS programs. That is part of the reason that questions 27 to 29 in the questionnaire were developed.

A similar approach was adopted in the development of sub-section ***B.1.2***., i.e. *Regional and International Integration*. That is covered by questions 32 to 34 of the questionnaire. Question

32 sought to determine the existence and level of cooperation as an institutionalised initiative from each country and the other SADC Party States. Similarly, question 33 was about investigating formal cooperation agreements between the three countries or the other SADC States, as per individual legislative framework or policy directives. The formal cooperation that the question set to investigate focused on either a Memorandum of Understanding (MOU) or a Memorandum of Agreement (MOA) between the countries. The nature of formal agreements among the Parties depended on the agreed scope, and level of cooperation that is sought to be established between individual Parties. The MOU is defined as an agreement that is not legally binding to any of the two or more parties that would be signing it[121].

However, much as it is not binding, an MOU should meticulously detail each signatories' roles and responsibilities. The difference between the MOU and the MOA is that the latter, unlike the MOU, becomes binding if one party's offer is subsequently accepted by the other.[122]. It is worth noting that with MOA litigation is often a possibility or rather a high-risk area for either of the Parties if there has been a breach of the signed agreement between the two Parties. Therefore, for this part of the questionnaire and focusing on the MOU or MOA content, provisions of the SADC Protocol on Fisheries (2002) as the primary source of information and guidance were used. The SADC Protocol on Fisheries (2003) emphasises the importance of international integration, i.e. in Article 6, which is further supported and elaborated in Article 8 but with specific emphasis on harmonisation of laws which must be done within the context of international law. The same sentiments are expressed in Article V of the Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas (FAO, 1995a). All these tools as mentioned above draw their reference to the international legal framework in ensuring international and regional integration directly from Section 2, Article 197 of UNCLOS (United Nations, 1982) wherein it is stated that, *" States shall cooperate on a global basis and, as appropriate, on a regional basis, directly or through competent international organisations, in formulating and elaborating international rules, standards and recommended practices and procedures consistent with this Convention, for the protection and preservation of the marine environment, taking into account characteristic regional features."*

[121] https://legaldictionary.net/memorandum-of-understanding/ - The document accessed was the long definition and examples of a Memorandum of Understanding - Accessed on the 07 April 2019
[122] https://legaldictionary.net/memorandum-of-understanding/ - The difference between and a Memorandum of Understanding and an Agreement – p1 : Accessed on the 07 April 2019

There are obligatory tools that are in full support of international cooperation and integration; there are also voluntary global tools that fully support the notion of international cooperation and regional integration in the management of marine living resources. An example of such a tool is best illustrated by Article 3 of the FAO Code of Conduct for Responsible Fisheries (FAO, 1995b), which alludes to its use, which should conform with all other global tools in the fisheries management terrain. However, particular focus to MCS is covered under Article 7.1.7 where States, within their means, are strongly encouraged to establish effective MCS programs that can respond to their national needs and their regional and international obligations. Therefore, questions 32 to 34 were developed using the above mentioned global tools as guidelines, and a lot more were covered in detail under the International and Regional Legal and Policy Framework Chapter of this study. In addressing cooperation especially of compliance and law enforcement in fisheries governance agencies, i.e. both at the national and international level, that is also immensely encouraged as those institutional arrangements play a pivotal role in ensuring rational use or sustainable utilisation of resources (Kuruc, 2003).

Given this assertion, it then became necessary for this study that the level of cooperation within each of the three countries and at the regional level be explored further, resulting in the development of question 34 in the questionnaire. Through question 34, cooperation in law enforcement and compliance or accountable management of living resources at the national or regional level, that is fully supported by almost all global ocean governance or marine living resources management tools as can be read in Articles 73 (3-4), 117 and 118 of UNCLOS (United Nations, 1982), and Article 7 (SADC Protocol on Fisheries, 2003) to mention but a few, was also investigated.

(ii) B.2. The legislative framework and administrative measures

All questions under sub-part ***B.2*** were formulated to test governance broadly, but with more emphasis on the legislative framework's status, policy formulation and implementation, and the MCS management imperatives in particular. Before getting into the detail of the legislative framework and administrative measures, it is worth noting that the use of the term *"governance"* has gained ascendency over the use of *"management"* such that it is a widely

used term by scholars in different disciplines, of which fisheries is one of such disciplines[123] (Ysa *et al*., 2014). Governance is defined by Ysa *et al*. (2014) as an interaction that is between Governments, Community Based Organisations (CBO), Non-Governmental Organisations (NGOs), and a plethora of other different stakeholders depending on a particular subject matter, where the implementation of policy directives is monitored and reviewed. This definition brings to the fore an essential aspect of governance that the present-day governments are not the absolute centres of power that they used to be, but rather an important primary stakeholder in the decision-making process that is reliant to other stakeholders of similar and equal importance to guarantee an appropriate and effective decision-making process (Ysa *et al.*, 2014).

Rittel & Webber (1973) argue that the underlying reason for this change in approach, where now governments are partially relinquishing their traditional status of absolute power to other parties is due to the escalation of societal complexities driven by the emergence and dynamism of current problems. In the fisheries sector, IUU fishing is an example of current problems that need a change in government approach Agnew *et al.* (2009); Miller & Sumaila, (2014), where governments should be adopting positions that are about collectivism and that are decisive. Ysa *et al.* (2014) further state that governance has a multiplicity of facets where, for example, structural or institutional governance reference can be made to the formal and informal institutions that are part of that particular institutional arrangement of which all should be synchronised in action. More relevant to this study is governance as a process, where its direct implications are on the dynamics that fortify the policy formulation process (Levi-Faur, 2011; Ysa *et al*., 2014). They further infer that the decision-making process, compliance, and control can be viewed as the mechanism of governance, whereas strategy governance may be interpreted as both the institutional and mechanical design. The questions in subsection B.2 of the questionnaire are intended to address governance, as advanced by Ysa *et al.* (2014), supported by Levi-Faur (2011) albeit with particular emphasis on the legislative framework and administrative measures as applicable to MCS. This approach was for determining the level of governance and its form, through data analysis at both the national level of the countries participating in this study and at the regional level where all the identified countries are Parties to the regional collective.

[123] https://www.researchgate.net/publication/269107473 - What is governance? – accessed in March 2019.

Article 8, paragraph 1 of the SADC Protocol on Fisheries (2003) encourages all State Parties to harmonise legislation to ensure that a collective management regime of shared marine living and non-living resources is established. Therefore, questions 35 to 37 were developed to test the extent of implementing this policy directive, i.e. from the SADC Protocol on Fisheries point of view. However, as displayed in Chapter 2 of this study, several international law prescripts are also in full support of this policy directive. Questions 38 to 41 were about the collection and testing of data about the structure and effectiveness of the national MCS program's general administration. That extends from ascertaining the existence of a three or five-year national MCS strategic plan, control and coordination of the national MCS program, testing the effectiveness of the existing line of command in implementing and achieving the national MCS objectives program. That is also premised on the fact that there should be only one government Department or government agency that is mandated to carry out that particular function. In this regard, the significance of having only one government department that acts as a lead agent in all matters about MCS instead of two or more is succinctly explained by Flewwelling and Cullinan, (2001) that it is the basis of excellence in discharging the country's responsibilities in as far as MCS is concerned, as well as the country's fisheries governance international obligations. They further elucidate the matter by stating that a sole mandated Fisheries Governance Authority improves on communication as there tends to be only one original point of command to all components or units of MCS, and that translates to precision and efficiency as indecision, and conflicting messages are eliminated from the equation. Although, this sounds like an ideal structural arrangement it does not imply that other law enforcement agencies and other relevant agencies are not needed to support the national MCS program in carrying out its mandate (Flewwelling & Cullinan, 2001).

Under Section B.3., which was about the evaluation of infrastructure and physical resources, there were questions 42 to 48 which were developed to investigate the status of infrastructure and physical resources as a critical enabler to be evaluated for efficiency and effectiveness. According to Bergh and Davies (2009), physical resources and hardware that are inclusive of, but not limited to, vessels, VMS and buildings are the most common and critical components for MCS. Kelleher (2002), further emphasizes the importance of infrastructure in determining the nature and capabilities of national MCS operations where the necessary infrastructure and buildings are the main determining factors. For example, and with specific emphasis to VMS, Girard and Du Payrat (2017) and Selbe (2014) agree that technology, for example the VMS, is

the cornerstone of all the present-day MCS efforts. Selbe (2014) further argues that VMS is a cost-effective means of MCS that has succeeded in ensuring that IUU fishing is thus portrayed in many ways as a high-risk-low-reward activity through its effectiveness and accuracy in pinpointing the rogue elements in the fishing sector. Of equal importance to VMS's role in fisheries governance broadly, is its use in assisting scientific research, for example, biomass removal and impacts of fishing activities to the environment, (Hinz *et al.*, 2013; Muench *et al*., 2017; Shepperson *et al*., 2018).

These questions probed the availability, utilisation and the overall compliance with VMS regulations across all fishing sectors. Also, the questions were intentionally structured such that they have a narrow but deep focus on some aspects of VMS in the national fleet, and within the EEZ of each participating country. Closely linked to this, for example, were aerial-based aspects of MCS, i.e. where aircrafts are utilised as a part of the whole for the country's MCS program. For aerial surveillance, both fixed-winged aircraft and helicopters can be used equally, depending on some of the National MCS program implementation plan's finer points. In the SADC region, the Namibian Fisheries offices in Arandis, just outside of Swakopmund, have two fixed-winged aircrafts exclusively used for the Namibian national MCS program. The expert views of Bergh and Davies, (2009) and Flewwelling *et al*., (2002) on the use of aircrafts in aerial maritime and fisheries surveillance are that they can be used to cover large areas, which may extend beyond areas of national jurisdiction to incorporate regional and high seas areas. These are some of the fundamental reasons underpinning the development of questions 46 (a-c) and 47. The detailed data on the availability and extent of utilisation of aircrafts in MCS operations in the SADC region can be collected and evaluated to determine the level of their effective use.

In most instances and whenever MCS is the main subject of discussions, infrastructure, equipment, and the most sophisticated technology are at the forefront. However, as explained in the introduction to question 49 in the questionnaire, what also holds true is that at the centre of an effective MCS program is a team of experts who must pull together everything about the MCS program. In all formal institutions like the Fisheries Governance Authorities (FGAs), those teams are mostly led by managers or individuals who have been mandated by the relevant authority to carry that particular responsibility. In support of this view Cochrane and Garcia (2009) states that the tactical decisions which give credence to the translation of objectives of fisheries management at large, and in this instance with more emphasis to the national MCS program, are operational objectives that are geared towards yielding positive results in the

desired effectiveness of the national program. From both the operational and strategic end, the organisational structure was explored with questions 49 (a-c) and 50 (a-b). Also closely linked to those was the investigation of both the relevant and requisite level of training in the organisation's various levels, which was done through questions 51 and 52.

5.3.2.3. Part C: Evaluation of an MCS system process and its effectiveness – The reactive approach

Part C of the questionnaire focuses on the reactive approach of the MCS program and the possible steps that must be taken to evaluate its effectiveness. This part of the questionnaire is divided into four (4) subparts which were developed in accordance with Bergh and Davies (2009) core components, or dimensions of an MCS program and they are ***(a)*** *before fishing;* ***(b)*** *while fishing;* ***(c)*** *during landing,* and ***(d)*** *post landing*. The natural progression from the available literature that provided the guidelines for the MCS system components was to align the design and detail of the questionnaire in Part C as follows:

- **C.1** – *Before / Prior Fishing – At Port Inspections;*
- **C.2**. *During Fishing or At Sea Boarding*, with a further subpart of **C.2.1**. *Safety and Catch Inspection*;
- **C.3**. *During Landing / At the Landing Sites, Declared Fishing Harbors and Commercial Ports, with a further subpart of* ***C.3.1*** *Inspection of Foreign Fishing Vessels;*
- ***C.4.*** *Post Landing Inspections.*

The approach used in this Part of the questionnaire conforms with steps four; five and six of the FAO guidelines of a nine-point framework in a questionnaire design. The core of these steps is on consolidating the question content through appropriate wording selection and finally ensuring that the appropriate sequencing of questions is explicitly meaningful regarding the overall objectives of the study. Most importantly is to acknowledge that the four dimensions of MCS as outlined above are about MCS as it relates to fisheries as fisheries management is about managing fishers and not fish[124]. This observation implies that MCS operations that

[124] http://www.fao.org/3/y3427e/y3427e0a.htm - CHAPTER 8: FISHERY MONITORING, CONTROL AND SURVEILLANCE by Per Erik BERGH[12] and Sandy DAVIES[13] – accessed 19 April 2019

should be considered in designing an MCS strategy should encompass the four key dimensions if positive results within a reasonable budget are achieved. They are all equally important; hence it cannot be used to represent all the four MCS dimensions in any MCS strategy. Also, the ability to conduct cross-checking tends to be severely affected if all the MCS effort is put only on one MCS dimension, for example, in prior or before fishing phase instead of all four. Therefore, in the designing phase of an MCS strategy the MCS four dimensions should be included so that all the monitoring and surveillance attributes can be spread across all of them to ensure efficiency and effectiveness[125]. Cochrane and Garcia (2009) further elaborated he importance of this approach, where they emphasise that there are both advantages and disadvantages in each of the aspects of MCS, and their individual use should be carefully considered given different situations that they are to be used in.

(i) C.1. Before / Prior to fishing – At port inspections

Bergh and Davies (2009) state that the before fishing inspection phase is part of an MCS system's core components, and as the name implies it takes place before fishing expeditions. During this phase, all fishing vessels and their crews should be inspected to ascertain their compliance with existing rules and regulations. In this part of the questionnaire questions, 53 to 57 in the questionnaire focused on two separate but interlinked matters. The first matter was the formal or institutionalised approach to undertake at port inspections, the existence and the scope of Standard Operating Procedures (SOP). The second area of focus was the state or level of preparedness of inspectors to undertake port inspections, and that included their level of training and tools that they are supposed to use to carry out the inspection. An SOP is defined as, *"a set of step-by-step instructions compiled by an organisation to help workers carry out complex routine operations. SOPs aim to achieve efficiency, quality output and uniformity of performance while reducing miscommunication and failure to comply with industry regulations."*[126].

[125] http://www.fao.org/3/y3427e/y3427e0a.htm - CHAPTER 8: FISHERY MONITORING, CONTROL AND SURVEILLANCE -2.2.6 MCS dimensions - by Per Erik BERGH[12] and Sandy DAVIES[13] – accessed 19 April 2019

[126] https://en.wikipedia.org/wiki/Standard_operating_procedure - Standard operating procedure – accessed 19 April 2019

Question 53 sought to establish whether there was an overall SOP that covers all aspects of the port inspection dimension of MCS across several different fisheries, especially in complex situations where there are both commercial and artisanal fisheries. Furthermore, considerations in the formulation of questions 53 and 54 were that SOPs serve to ensure that all the relevant national legislation, policy directives, procedures, and standards are included in the MCS operations. This approach has been noted to lead to efficiency and effectiveness; reduction of errors; safe working environment and protection of inspectors in areas, and instances of potential liability.[127] Figure 5.1 is a schematic representation of the different parts of an MCS SOP as utilised in MCS programs, including drivers of an SOP, and the purpose they serve towards achieving the overall objectives of an MCS program.

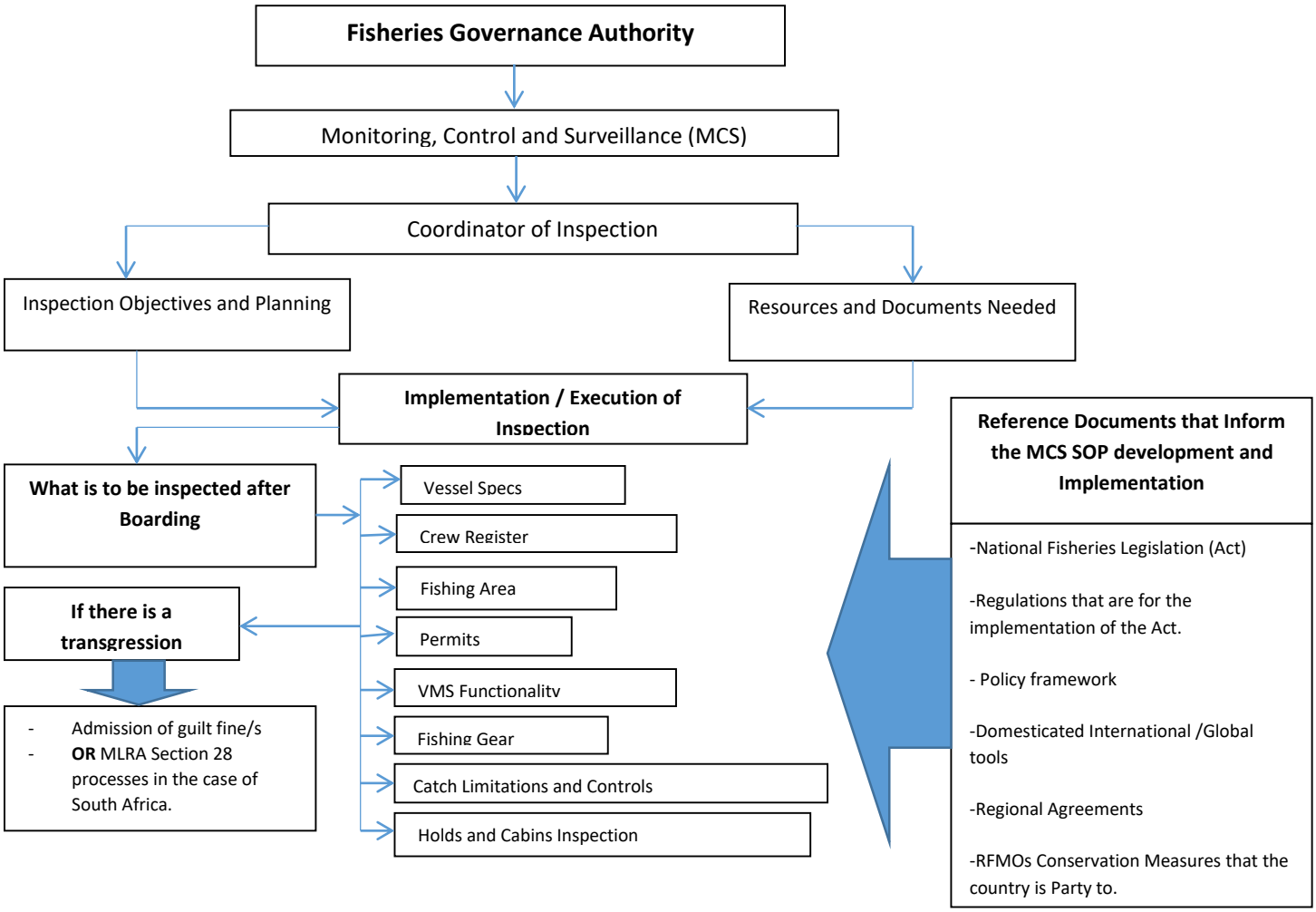


Figure 5.1: A schematic representation of an MCS Standard Operating Procedure

[127] https://www.brampton.ca/EN/Business/BEC/resources/Documents/What%20is%20a%20Standard%20Operating%20Procedure(SOP).pdf - What is Standard Operating Procedure? – accessed 19 April 2019

As illustrated in Figure 5.1, Fisheries governance responsibility lies with the Fisheries Governance Authority, and all MCS related activities are attended to by the MCS unit. One of the MCS unit's responsibilities is to develop various System of Procedure (SOP) documents that may either be general or specific in nature and purpose. A general SOP is, for example, the one that deals with the recruitment and selection process of MCS inspectors. Its development is engrossed on human resources and labour relations matters, where all considerations are about the expression of applicable domestic laws and policies. An example of an MCS purpose-specific SOP would be a hake fishery at port inspection SOP. In this particular SOP, among other things, there would be a distinct expression of international laws which are about the obligations of a particular country as illustrated in Figure 5.1 above.

Questions 55, similarly to questions 56 to 57 although there is a slight difference in their respective areas of focus, sought to solicit information about the state of inspectors' state of readiness to deliver on their assigned responsibilities. The question elaborated on the matter by specifying issues ranging from how professional are inspectors in their presentation of themselves to the fishermen or any party they will be inspecting, to field equipment that they need to carry when out in the field conducting inspections. Fisheries Control Officers (FCOs) or Inspectors should always be professional when conducting inspections, such that they avoid any discriminatory conduct towards any fisherman or fishing group, but they should also be not hesitant to act if there is sufficient evidence of infarctions[128]. In formulating these questions, attention was deliberately on inspectors as most available MCS literature in the region focusses more on observers and observer programs than inspectors (Cochrane & Garcia, 2009; Sjöstedt & Sundström, 2013).

Justification for this bias towards observers is given by Sjöstedt and Sundström (2013) and Pramod (2011), noting that 91.5 % of the fishing fleet within the Namibian EEZ is covered by observers. Therefore, a resultant prevalent practice in Namibia is for observers to give some attention to traditional MCS functions that consist of landing sites monitoring and sea and air patrols, while focusing mainly on collecting scientific data which is a world-wide practice for

128 https://www.efca.europa.eu/sites/default/files/atoms/files/CC%20for%20the%20training%20of%20fisheries%20inspectors%20and%20union%20inspectors.%203%20General%20principles.pdf - CORE CURRICULUM FOR THE TRAINING OF FISHERIES INSPECTORS & UNION INSPECTORS : General principles and specific types of fisheries inspection (**Chapter 4** — Inspection and proceedings (85) – Accessed 19 April 2019

observers (Sjöstedt and Sundström, 2013). Important to note is that the legislative framework in both Namibia and South Africa are in full support that traditional MCS functions must only be conducted by FCOs and HFCOs not observers. In the Marine Living Resources Act (MLRA) of South Africa (Act 18 of 1998) that is elucidated in Chapter 2, Section 9 (1-3), where it starts of by stating that FCOs and Honorary FCOs (HFCOs) are appointed by the Minister of the Fisheries Governance Ministry (RSA (Republic of South Africa), 1998a). Their respective powers are listed under Chapter 6 of the Act, which is law enforcement. Section 50 (1-5) covers all matters explicitly about observers. Under Subsection 3, it is stated that *"an observer shall exercise the scientific, compliance, monitoring and other functions determined by the Minister."*

Similarly, the Marine Resource Act (MRA) of Namibia (Act 27 of 2000), under Part III, Section (4-5) it is the Minister who appoints and designates Fisheries Inspectors (Government of the Republic of Namibia, 2018). Part III, Section 7 (a-e) explains the appointment and the respective functions of observers in fisheries management. Under subsection 7(a and e) respectively, it is stated that *"observe the harvesting, handling, and processing of marine resources and related operations and to record data concerning such operations,"* and *"perform such other activities as may be agreed upon between the Minister and the agency, but not inconsistent with paragraphs (a) to (d)."* In both countries, therefore, observers are not law enforcement or peace officers, but rather play a supportive role to MCS as with other aspects of fisheries governance.

The MLRA, Chapter 6, Section 51(1) and 52 (2a-m), encapsulate all duties and powers of fishery control officers to enforce all aspects of the Act with or without any warrant if there are reasonable grounds to believe that a transgression was committed. Similar powers and duties are assigned to FCOs in Namibia following Part III, Section 5(1a-f) and 5 (2a-c). Further similarities for both countries in the responsibilities of FCOs, in particular those that are promoting collaboration and cooperation in the implementation of international and regional MCS obligations, are captured in Part III, Section 5 (3a-c) of the MRA and Chapter 6, Section 52 (a-b) of the MLRA. Both elucidate the powers and functions of FCOs beyond the Namibian and the South African borders respectively, where Article 111 of UNCLOS is succinctly mentioned as a reference point and framework within which FCOs from both countries are to the model implementation of their respective duties. Therefore, as an inherent part of an MCS strategy or program, law enforcement activities in both countries are left to the FCOs or

inspectors; hence their role, conduct, and utilisation of MCS field tools needed to be adequately investigated through this questionnaire.

(ii) C.2. During fishing / As sea boardings

Questions 58 to 61 were the four questions in the questionnaire developed to investigate the "during fishing" MCS dimension. Cochrane & Garcia, (2009) point out that it is the only MCS dimension through which infarctions can be detected at the site where they were committed. They further argue that valuable information that can be cross-referenced for variables like time, date, and position, which is vital in the technical controls of an MCS program, can be collected through *fishing* MCS dimension activities. In all the MCS dimensions, although there are different resources to implement them with, human resource is the constant variable. Similarly, to questions 53 to 56, questions 58 to 60 were developed to determine the role and readiness of inspectors during the *fishing* MCS dimension. Through these three questions, information was sought to establish the existence of specifically designed and developed SOPs. Furthermore, a determination was to be made if this SOP is standalone or supplementary to a more general MCS SOP that addresses different aspects of the MCS strategy. Although at sea inspections are mainly conducted utilising patrol vessels, which all experts in MCS operations agree are very expensive to procure and operate (Bergh & Davies, 2009; Flewwelling *et al.*, 2002; Randall, 2004), questions 58 to 60 were not seeking information about vessels and vessel operations but rather the MCS activities of inspectors that use them as platforms to carry out their respective duties.

It should be noted though that fisheries' governance and safety at sea are not usually viewed as conjugate concepts and can lead to management plans that are deficient of the safety at sea concept as an essential subset of fisheries governance.[129]. Furthermore, due to overexploitation of fisheries, the distances that fishers had to travel to productive fishing grounds are increasingly getting further from the coastline, raising the risk of dangerous situations at sea. Another downside of that is MCS efforts as stipulated in national MCS programs, must be designed to adequately respond to those fisheries that are also continuing to change in

[129] http://www.fao.org/3/I9185EN/i9185en.pdf - GLOBAL REVIEW OF SAFETY AT SEA IN THE FISHERIES SECTOR, p13. Accessed 16 June 2018

character. Therefore, for at-sea boarding preparations and implementation, there needs to be seamless planning and execution. Figure 5.2 illustrates the complementary leadership roles that are to be played by the Captain of the vessel and the Chief Fisheries Officer (CFO) that lead to successful at sea MCS inspections if appropriately executed but are likely to result in disaster if there are tensions or there is lack of synchronisation between the two. According to Flewwelling and Cullinan (2001), the vessel's Captain has a role of ensuring his crew's safety and the boarding party or the inspectors, through accurate reading of weather conditions and the sea state. The CFO, on the other hand, is strictly regarded as responsible for the operational command of the patrol vessel, and his responsibilities emanate from the MCS program and its various work and implementation plans.

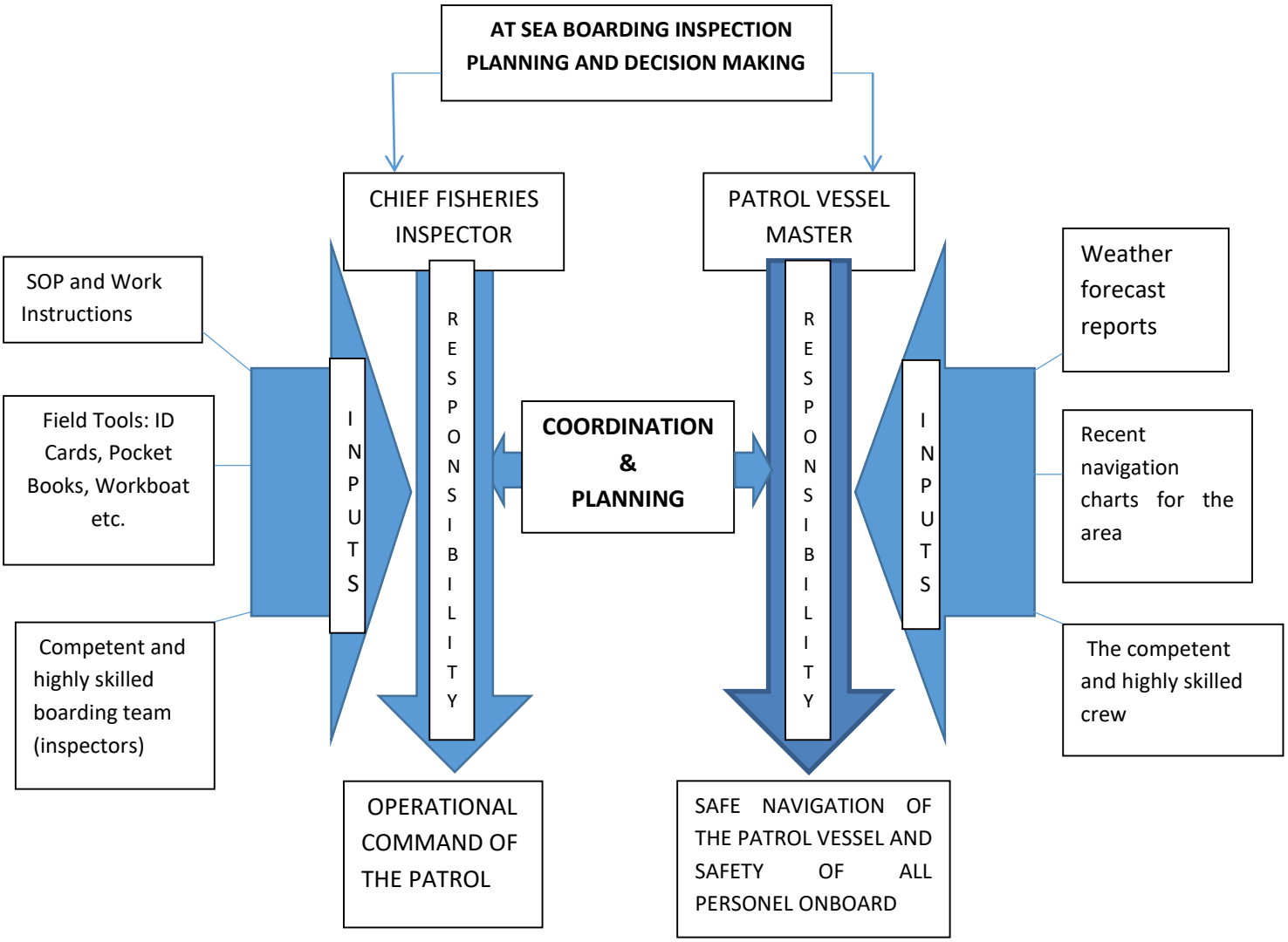


Figure 5. 2: An illustration of planning and implementation of at sea MCS process

While SOPs can virtually be viewed as a conduit of delivering on compliance obligations and targets, Arias (2015) raised a different but relevant point about compliance and its coverage in the existing literature. Arias (2015) argued that mostly compliance does not feature very strongly in conservation literature, even though impacts of non-compliance can be severe, for example, the *"death of poachers and the murder of rangers"*, (Branch *et al*., 2013; Dudley *et al.*, 2013). The main point of this discussion is that, whilst focus on SOPs may be on ensuring delivery on the part of South Africa, for example, to its international obligations, SOPs can also be utilised as an instrument to measure and test a wide range and levels of compliance within the published rules and regulations that are governing fisheries.

Therefore, in consideration of this study's statement and scope, compliance and non-compliance still need to be measured and tested. The reason being that the values of each can be translated into indicators of sustainable utilisation of the natural resource, and the effectiveness of laws that govern the use of natural resources. A proposal could therefore be made for development and continued use of questionnaires similar to this one. Alternatively, a modification of this questionnaire to be utilised as a testing tool of MCS effectiveness could serve the purpose of increasing the volume of available literature on fisheries law enforcement and compliance. That literature would be a resource that could ensure a sustained improvement and effectiveness of global or regional MCS programs.

(iii) C.2.1. – Safety and catch inspection

Remolà and Gudmundsson (2018) argue that fishing activity at sea is often portrayed as the most dangerous job in the world where the reported loss of life per year stands at 80 fishers per 100 000. These statistics are mainly drawn from reports provided by countries with institutionalised sound accident reporting regimes coupled with a rigorous analytical framework. Implications of this qualification are that in countries where there are no accident reporting and analysis regimes, chances that fishers' mortality rate through accidents that ordinarily would have been prevented are high (Remolà & Gudmundsson, 2018). Considerations of the safety of fishers in fishing vessels is a subject better dealt with through the assessment of the implementation of the Torremolinos International Convention for the Safety of Fishing Vessels (1977) by a particular member State to the International Maritime

Organization (IMO) (International Maritime Organization (IMO), 1993). The Torremolinos Convention (1977) was superseded by the Torremolinos Protocol (1993) and the Cape Town Agreement (2012) of which the latter is about the implementation of the provisions of the Torremolinos Protocol (1993) that were drawn directly from the Convention on the safety of fishing vessels[130]. The IMO is an organisation responsible for the global regulation of maritime transport, and fishing vessels are a subgroup of that category. However, in recognition of the difference between fishing vessels and other ships, the IMO decided on developing a different regime for the regulation of fishing vessels, the Torremolinos Convention (1977).

Differences between the fishing vessels and other cargo-carrying vessels are not only on design and operation, but other vessels would load their cargo in the safety of the port environment whereas fishing vessels load their cargo in the open sea exposed to all the dangerous weather elements[131]. In consideration of all these safety concerns about fishing vessels, in the formulation of the Torremolinos Convention (1977), specific safety requirements for new decked fishing vessels from an overall length (LOA) of 24 meters and more, including vessels that were able to process their catches at sea, and construction standards and equipment were incorporated. Safety of fishing vessels is an essential matter for the SADC region and the continent of Africa's fishing sector to consider, research and report on, but outside the scope of this study. Safety as it is covered in question 62 (a-d) is addressed from MCS operations' point of view. Question 62(a) sought to establish compliance with effort controlled fisheries, but the other side of the question was to get information about living conditions of the crew and the risk that they may be exposed to due to overloading or overcrowding in the vessel.

The same formulation was used in question 62(b) where the focus is the application of conversion rates and the estimation of catches and the operation of the Fisheries Processing Establishment (FPE). The operation of FPE onboard the vessel exposes the operator to the risk of mechanical and electrical equipment. The interest in establishing safety standards onboard fishing vessels leads to further questions about the intensity and frequency of Hazard Identification, and Risk Assessment (HIRA) process onboard fishing vessels. Question 62 (b) also alludes to health and safety standards as prescribed by the FGA, but in South Africa, the Department of Labour is the custodian of the Occupational Health and Safety Act (RSA

[130] http://www.imo.org/en/About/Conventions/ListOfConventions/Pages/The-Torremolinos-International-Convention-for-the-Safety-of-Fishing-Vessels.aspx - Accessed 20 April 2019
[131] http://www.imo.org/en/About/Conventions/ListOfConventions/Pages/The-Torremolinos-International-Convention-for-the-Safety-of-Fishing-Vessels.aspx -Accessed 20 April 2019

(Republic of South Africa), 1993). The long title of the Act states that it is an Act that seeks to, *"provide for the health and safety of persons at work and the health and safety of persons in connection with the use of plant and machinery; the protection of persons other than persons at work against hazards to health and safety arising out of or in connection with the activities of persons at work; to establish an advisory council for occupational health and safety; and to provide for matters connected therewith."*

In Section 43(1)(b) of the Act it is further stated that, 1) *The Minister may make regulations – b) which in the opinion of the Minister are necessary or expedient in the interest of the health and safety of persons at work or the health and safety of a person in connection with the use of plant or machinery, of the protection of persons other than persons at work against risks to health and safety arising from or connected with the activities of persons at work, including regulations…."* Even though the focus of an FGA is on fisheries governance, there is also an interest in fishers' welfare and health and safety. A difficult balance to maintain because in the South African situation, the mandate of maritime transport regulation is with the Department of Transport (DoT), and health and safety of fishers is the mandate of the Department of Labour (DoL). Fisheries governance mandate resides with the Department of Agriculture, Forestry and Fisheries (DAFF). All these Departments are interested parties in fisheries governance, and that calls upon the FGA to ensure that a formal collaboration arrangement is established between all these parties. Commenting on the importance and positive results of such collaboration, (Flewwelling *et al*., 2002) sums it up by stating that implementation of safety – at-sea regulations under the auspices of collaboration between FGA and the DoT is an excellent measure to reduce at sea fatalities of fishers.

Question 62 (c) sought to solicit responses from the respondents about the procedures for cargo holds inspection of fishing vessels. Furthermore, it sought to get information on the procedures used to verify catches, for both the targeted and by-catch species. Flewwelling (2002) argue that the *during fishing* MCS dimension implementation has proven to be challenging to undertake if fisheries governance strategy is about data collection on harvest or catch and quotas. He further states that the product form, whether in boxes or large cargo holds, mostly becomes a mathematical calculations exercise that the fisheries inspector should perform to provide an independent, accurate estimate of the total catch. That can either be for by-catch, which must be cross-referenced with permit conditions or other relevant prescripts, or for the targeted species. Verification of catches can also be done using logbooks, for which question

62 (c) also sought to establish their existence and the part they play in national and the regional MCS regime of SADC. In support of this approach, Bergh and Davies (2009) state that logbooks are mostly fishery specific and when accurately completed, they provide invaluable information for catch monitoring and scientific assessments. Regarding the health and safety aspects of cargo holds, assessment is on their condition and suitability of adequately storing products that are fit for human consumption. Again, standards that are prescribed by the FGA take precedence, but they must be developed in consultation with other relevant mandated authorities.

(iv) C.3. – During landing / At landing sites

According to Bergh and Davies (2009), the landing phase provides an ample opportunity to fisheries inspectors to inspect fishing vessels, where logbooks and other sourcebooks can be thoroughly scrutinised and utilised and landed marine species identified and weighed. Furthermore, during landing inspection these controls are inexpensive and flexible as they can be modified to suit any landing location (Bergh & Davies, 2009). However, this MCS dimension's downside is that transshipped fish or discarded fish cannot be detected (Bergh & Davies, 2009). The European Union Parliament (EUP) responded to such inadequacy in the MCS processes by calling for the development of new policy directives focusing on tightening landings compliance. In Article 15 (13) of the Common Fisheries Policy (CFP) of the EUP, which is for monitoring levels of fishermen compliance through institutionalised landing obligations, Member States are required to ensure that there are detailed and accurate records of all fishing expeditions[132].

Also, Member States are required to provide all essential resources to undertake this responsibility, for example, observers; closed-circuit televisions (CCTVs), etc. Plet-Hansen et al. (2017) argue that public demand coupled with environmental Non-Governmental Organisations (NGOs) put sustained pressure on the European Union (EU) to bring to an end the fish discarding practice as it leads to unsustainable fish stocks, and the CFP was developed accordingly. One of the CFP's prime objectives is to bring to an end fish discarding practices

[132] http://www.europarl.europa.eu/RegData/etudes/STUD/2015/563381/IPOL_STU(2015)563381_EN.pdf – The Landing Obligations and Its Implications on the Control of Fisheries Study – Accessed 21 April 2019

in the EU region by 2019, and the starting point is its acceptance by all stakeholders and the implementation of compliance verification tools like the Remote Electronic Monitoring (REM) through CCTV. All fishing regions in the world may aspire for a similar situation in the management of their marine living resources, at the time when this study has formulated the assumption was that the SADC region may not be at that point of development yet. Hence questions 63 to 67 were only focusing on the state of inspectors' readiness to undertake fish landing inspections, the tools they use, and the environment they operate in. Question 63 was about investigating the state of inspectors' readiness to carry out their responsibilities at the landing sites in line with their respective national MCS programs. Emphasis was, therefore, on-field equipment that is available and utilised on inspecting and recording fish landing activities in line with the national MCS program. Inspectors' well-being and safety were also dealt with in question 63 by investigating whether they are offered with any Personal Protective Equipment (PPE) when they are on duty.

Ownership and operation of ports and harbours where landings take place were investigated through question 64. According to Yoshimura et al. (2016), landing sites can be grouped into three categories, i.e. privately owned, those that are owned by the state and the ones owned by the local government. He further states that both unique and common characteristics have an impact on commercial fisheries operations and MCS processes alike within these three categories. In South Africa, and both Namibia and Mozambique, ownership and operation of landing sites had to be investigated through question 64, to determine the level of impact that the availability, access and control of infrastructure could have to the national MCS program. Alternatively, to determine gaps in the national MCS program regarding the landing phase of MCS that can harm the regional MCS collaborative effort. For this study State ownership and operation of these landing sites, which may be fishing harbours or commercial harbours, was also translated to mean unlimited access to the facilities and the lengths to which the state may implement all aspects of MCS. In general, question 65 followed a similar pattern to that of questions 53, 54, 59 and 60, where the existence and composition of an SOP were at the centre of an investigation, although questions 65 was more explicit on MCS compliance requirements.

In question 65, additional to the enquiry about the existence and the extent of the range of issues that the SOP covered concerning *during the landing* phase of MCS, the detail was compliance with a range of MCS requirements. The detail ranged from confirmation of adherence to notification periods; verification of data and inspection of logbooks and functionality of VMS equipment; by-catch landed with targeted species; FPE operations and

fishing gear details. Information collected and recorded by inspectors must also be confirmed by the Skipper of the fishing vessel to avoid subsequent conflicting reports, especially in disputes. Through question 65, information to that effect was sought from the respondent to determine the level of efficiency and effectiveness of their respective national MCS program. Flewwelling *et al.* (2002) point out that any national MCS efforts should focus on responding to illegal and foreign fishing activities. However, it must be equally resolute in attending to domestic fishing activities as they pose the greatest threat to marine living resources if there is insufficient MCS effort in place. Questions 66 and 67 were developed to investigate the inbuilt systems of cross-checking between the different components of MCS to ascertain effectiveness and uniformity of the program (Flewwelling & Cullinan, 2001;Flewwelling *et al*., 2002). The investigation was on the applied methods of inspection as stipulated in the SOPs or MCS implementation and work plans utilised, which would serve as a basis for cross-referencing work of inspectors for before fishing at-sea inspections, during landing and post-landing inspections.

(v) C.3.1. – Inspection of foreign fishing vessels

Inspection of foreign fishing vessels, an inherent part of MCS, can both be a tedious and very complicated exercise, but port States have a responsibility to do the inspections. The roles and responsibilities of port States regarding standards for interventions, inspections and violations are stated in Articles 218 to 220 of the United Nations Convention on the Law of the Sea of 10 December 1982 (UNCLOS). In these Articles ports are acknowledged to be part of internal waters thereby declaring them to be subject to the sovereignty of the coastal State[133]. In the implementation of that responsibility, several international law prescripts can be utilised. Examples of such international law prescripts are the United Nations Agreement Fish Stocks Agreement (UNFSA) 1995 (UN Division for Ocean Affairs and the Law of the Sea, 2010), Article 23; FAO Compliance Agreement of 1993, Article V (2), and the Code of Conduct for Responsible Fishing, Article 8.3., and they are all articulating the undisputed role of port States in the inspection of foreign vessels. However, they also emphasise that it must be without discrimination in any form or fact against foreign vessels. Question 68 was developed to

[133] http://www.fao.org/3/a-y8387e.pdf - FAO Fisheries Circular No. 987: PORT STATE CONTROL OF FOREIGN FISHING VESSELS - 2. JUSTIFICATION FOR A HARMONIZED SYSTEM, p9 - Accessed 24 April 2019

determine the state of readiness and preparedness of inspectors to inspect foreign vessels. In addition to how inspectors would present themselves and field tools that they will be carrying, Questions 68 also sought to establish the level of understanding that inspectors have regarding international obligations that their respective countries would be having with regards to Regional Fisheries Management Organizations (RFMOs) different systems of inspections or Conservation Measures. That was necessary to establish as it would have indicated the level of domestication of global MCS tools into the national MCS program and the training level that each country is prepared to institute for its MCS inspectorate.

Question 69 focused on the proficiency levels of inspectors in foreign languages, especially those dominant in foreign fishing fleets that frequent the SADC region, for example, Spanish and Chinese languages, i.e. Mandarin and Cantonese. This question was also meant to determine if different pre-determined groups of inspectors are assigned certain specific duties and whether those particular inspectors are trained appropriately for their respective duties, for example, an inspection of foreign vessels. Question 70 is closely linked to question 69, but it went further to determine alternative methods of communication at the disposal of inspectors if none of the inspectors can communicate in the language used by the crew of the vessel they are inspecting. Flewwelling *et al*. (2002) assert that language difference between the crew of a foreign fishing vessel and a boarding party of a port or coastal state may be a significant obstacle to a successful inspection. They further state that requesting logbooks that are completed in the language of the coastal state, or a coastal State that translates logbooks and other relevant documents for their use are two solutions to the language problem currently utilised by different coastal States. Alternatively, utilising a handbook with a list of written questions in foreign languages and in a sequence that conveys a clear message to the Master of the foreign ship tends to solve the language problem. However, ensuring that foreign language written documents are translated into the language of the coastal state lies with the foreign vessel itself (Flewwelling *et al*., 2002).

Question 71 was set to investigate the coastal state's responsibility in conducting pre-checks and screening of vessels that are requesting entry into its EEZ and subsequent use of its port facilities. In Article 17 of UNCLOS, it is stated that "*Subject to this Convention, ships of all States, whether coastal or land-locked, enjoy the right of innocent passage through the territorial sea."* The article implies that all vessels, including fishing vessels, should enjoy the right of passage granted to it by the coastal state that it is sailing through its waters. However, there are conditions and limitations to this right. According to Article 19(2) (i), it is stated that

"passage of a foreign ship shall be considered to be prejudicial to the peace, good order or security of the coastal State if in the territorial sea it engages in any of the following activities… (i) any fishing activities." If a foreign ship that has not been authorised to fish engages in fishing activities in the territorial waters, (Bardin, 2002; Flewwelling *et al*., 2002) argue that it loses its right of innocent passage. A direct consequence of that is a coastal State using its powers to ensure compliance with its laws and international obligations, and that can be implemented through MCS processes that include inspections, which may result in an arrest (Flewwelling & Cullinan, 2001).

(vi) C.4. – Post landing inspection

Questions 72 and 73 were set to investigate whether there is a post-landing MCS regime in the national MCS program and if it exists to determine its level of implementation. In line with the approach that was adopted in the other components of MCS, i.e. before fishing; at sea and during landing dimensions, the existence of a detailed and specific SOP that covers the format of inspections in FPEs; the point of sale; warehouses; airports and other ports of entry for exports and imports, Cochrane & Garcia (2009) suggest that through post-landing inspections, valuable information that can be utilised for both biological and economical cross-checks is generated. Another dimension in appreciating an effective post landing MCS effort is that it also contributes towards traceability of fish and fish products. Traceability is defined by Olsen and Borit (2013) as, "*the ability to access any or all information relating to that which is under consideration, throughout its entire life cycle, through recorded identifications*." With fisheries, traceability is a process that involves cross-checking of information about fish products from where it was caught, the vessel that was used to catch it, fishing gear and methods that were used, and the reefer that was used to transport it if at sea trans-shipment took place, the port where it was landed and the FPE or FPEs that processed the fish, and details of trucks that ferried it to various point of sales institutions. Hosch and Blaha (2017) argue that for all legally caught fish they must, within processes of MCS at the beginning of the supply chain, be meticulously identified and quantified as that deters filtering of illegally caught fish.

Therefore, a well-designed early detection system for traceability that focusses intensely in all nodal points of fishing activity from harvesting to landings and trade, for example, a Catch

Documentation Scheme (CDS) is necessary (Hosch & Blaha, 2017). CDS is defined as, "*a system with the primary purpose of helping determine throughout the supply chain whether fish originate from catches taken consistent with applicable national, regional and international conservation and management measures, established following relevant international obli*gations[134]." Hosch and Blaha (2017) further state that in determining the legality of harvested, landed and traded fish products, all States that are involved in any of the fishing activities should implement comprehensive MCS programs. Although questions 72 and 73 did not explicitly investigate CDS's existence and its implementation, the structure of the questions and the nature of the MCS systems on post-landing inspections that were investigated have many CDS attributes. Question 73 (a) sought to determine procedures in place to validate fish sources that would be processed in FPEs, i.e. the fishing grounds it was fished from, where it was landed and the validity and status of permit holders that are supplying the FPEs. Additionally, information was sought on their respective allocations and the remaining fish that each permit holder is still to fish.

5.3.2.4. Part D: Evaluation of an MCS process and its effectiveness – The proactive approach

(i) Introduction

All State efforts that are aimed at maintaining stability, order, security and the protection of human rights of its citizens are collectively referred to as the security sector where the police services are central role players (United Nations Office on Drugs and Crime, 2020; Varghese, 2012). Crime fighting is but a fraction of policing, or law enforcement responsibilities of the police sector, which is an inexorably complex undertaking (Plant & Scott, 2009). The complex nature of policing emanates from the fact that on a daily basis, police are compelled to respond to a multiplicity of vastly different public safety problems, and that requires for police to be appropriately equipped for them to respond in a professional manner (Plant & Scott, 2009; United Nations Office on Drugs and Crime, 2020). These are some of the underlying reasons for the different policing systems or models.

[134] http://www.fao.org/3/a-i8076e.pdf - Voluntary Guidelines for Catch Documentation Schemes –p2 – Accessed on 26 April 2019

The exisiting different policing models are predominantly based on the socio-cultural and historic background of a particular country, where they can be categorized as either policing by consent or policing by law (Varghese, 2012). Furthemore, these categories lead to vastly different policing models the world over, and are further delineated into command architecture which may either be single or singular command, or multiple command (Varghese, 2012).

The different policing models include Reactive (traditional); Predictive (Proactive); Problem Oriented Policing (POP); Community Oriented Policing (COP); Reassurance Policing; the Scanning, Analysis, Response and Assessment (SARA) Policing and the Intelligence-led Policing (ILP)[135]. Traditional policing is about the response of police to a crime scene which is triggered by complaints from complainants or community members, whereas Community policing refers to a policing model that relies on the relationship that police establish with the communities that are under their area of jurisdiction[136].

For the purposes of this study it was observed that maybe due to the vulnerability of inshore fisheries, a phenomenon discussed in Chapter 3 of this study, the South African MCS programme has implemented the proactive approach policing model or a hybrid of that model. Proactive policing is defined as a strategic approach to reduce or prevent criminal activities, effectively attending to ongoing criminal activities and ensuring timeous mobilisation of appropriate resources targeting drivers of crime (Sullivan & O'Keeffe, 2017; Weisburd *et al*., 2019). Therefore, Part D of the questionnare has two subparts which are (a) **D.1**. – Stakeholder engagement / collective approach, and (b) **D.2**. Risk Identification, Analysis and Management. **Part D** is further divided into (i) **D.2.1**. Personnel, and (ii) **D.2.2.** Mapping and Monitoring of Activities in Hotspots and was developed to focus on an MCS program's proactive aspect. (Crank, 1998) defines a proactive approach in policing as a situation where police officers out of their own volition will gather information about a particular criminal activity or even more importantly proceed to develop strategies to quell it. An extensive form of proactive policing that is equally applicable to MCS operations is referred to as intelligence-led policing. Intelligence-led policing is said not to be an intelligence-gathering process, but rather an information synthesising process that enables law enforcement agencies better to understand criminal activities in their area of operation so that they develop and implement inhibition or

[135] https://saint-claire.org/wp-content/uploads/2016/01/Policing-Models.pdf. Policing Models. Accessed 30 June 2021

[136] https://saint-claire.org/wp-content/uploads/2016/01/Policing-Models.pdf. Policing Models. Accessed 30 June 2021

enforcement strategies utilising all the equipment at their disposal (Baker, 2008; Ratcliffe & Guidetti, 2008; Verfaillie & Vander Beken, 2008). Furthermore, intelligence-led policing is the basis for proactive policing in the sense that through it decision-makers are informed timeously of emerging high risks and threatening criminal activities in advance, and that enables them to design, plan and implement preventative and combative actions with the greatest of precisions (Verfaillie & Vander Beken, 2008). Implications of this discussion are that law enforcement agencies, a component that MCS program should have, can develop a proactive or future-oriented law enforcement action characterised by the development of resources that assist decision-makers in analysing criminal activities (Verfaillie & Vander Beken, 2008).

There are different forms of illegal activities in the fisheries sector, all with varying degrees of impact and severity where a well-structured proactive approach, as defined in the policing context but applied in MCS programs may yield positive results. Boister and Currie (2014) and Williams and Godson (2002) argue that for almost all efforts directed at combating organised criminal activities, the notion of proactive or anticipatory decision-making does benefit immensely from various sources of information. Referring to IUU fishing briefly as it has been covered in detail in this study, it is one such an activity in global fisheries which in numerous publications has been described as a phenomenon that displays all characteristics of organised crime (Österblom & Sumaila, 2011). As IUU fishing has been described, in some instances, to conform to the broader definition of organised crime, Van Calster (2006), argues that the complex dynamics of organised crime requires a different approach if it is to be significantly understood to develop appropriate combative measures that cannot be achieved utilising the existing natural laws.

Therefore, with these observations, fundamental questions are to be asked about developing new approaches to predict or anticipate all risks posed by organised crime (Verfaillie & Vander Beken, 2008). Whilst it may seem an impossible task to develop proactive approach law enforcement interventions, given the preceding discussion, Williams and Godson (2002) points out that focus should not be on a prediction but rather on anticipation of organised crime. Anticipation leads to the effective use of available information about high-risk activities generated through intelligence-led policing or a proactive approach (Verfaillie & Vander Beken, 2008). The connotations of all these arguments are that for the law enforcement aspect of an MCS program to succeed there needs be a trustworthy collection of information or data, that is verifiable and must be received timeously if the decision-makers are to develop and implement meaningful and effective interventions. To further compound an already

challenging situation as is the case with fisheries governance, Furlong (1991) reasons that fisheries are common property and their management are complicated due to discordancy of individual inducements with collective benefits. However, this does not imply that FGAs must not plan and implement MCS programs leaning more towards strong advocacy for a collective approach in fisheries governance, and thorough identification and inclusion of all the relevant stakeholders.

(ii) D.1 – Stakeholder engagement / Collective approach

Current predominant observations are that it is not the prerogative of any organisation to choose whether to engage with its stakeholders. Instead, it is the prevailing societal changes that force upon organisations only two options regarding stakeholder engagement, and that is when and how to engage (Jeffery, 2009). Secondly, in responding to the question about the identity of a stakeholder, stakeholders can be defined as all individuals, communities and organisations that can impact or who can be impacted upon by the operations and success of a particular organisation (Hester & Adams, 2017; Jeffery, 2009; Mitchell *et al.*, 1997) . Also, these identified different groupings should at regular or irregular intervals, depending on the understanding of formal arrangements between themselves and a particular organisation, be allowed to give inputs or their views on the decisions and all other developments that affect them (Jeffery, 2009). Identification, understanding and engagement of stakeholders are the fundamental reasons for developing questions 74 to 76 in ***Part D (D.1)*** of the questionnaire.

FGAs, as an example of organisations broadly, are prudent to the societal changes and their response to that can either be mitigation of risk through the stakeholder management process or exploitation of emerging trends through the stakeholder engagement process. Although stakeholder management is also mentioned in this discussion, henceforth focus will only be on the stakeholder engagement process since it is the subject of discussion in this study, not the stakeholder management process. Jeffery (2009) defines stakeholder engagement as *"an iterative process allowing engagement to benefit from diligent planning, thorough reporting and the application of learning as a result of appropriate evaluation and monitoring."* Putting Jeffery's definition of stakeholder engagement process into perspective, Grayson & Hodges (2004) state that organisations should always manage the stakeholder engagement process like

any business process would be managed. Therefore, for questions 74 to 76, the main focus was to establish whether as part of the MCS strategy, an institutionalised stakeholder identification process, stakeholder databases, and any form of funding between FGAs and its stakeholder's engagements. That would partially satisfy some aspects of the stakeholder engagement process and the law enforcement proactive approach facet. Information that was sought from the respondents was whether they recognise the role of different stakeholders in fisheries governance. Not only that but to ascertain whether various MCS programs at the national level and in the region at large are prepared to go further in ensuring institutionalised participation of their various stakeholders. At a primary level, a collectively developed MCS strategic plan may ideally be the first step in the government's concerted efforts to include the views and suggestions of all relevant stakeholders in the fisheries sector and community-based institutions. A collective policy development process would be the next step.

Policy development is a process that requires all relevant stakeholders if its acceptance when implemented, is to be guaranteed. Taljaard et al. (2019), when analysing the South African Coastal policy, argue that a policy that is about human development is possible through an institutionalised participatory approach that has its foundations firmly rooted on sustainable livelihoods, instead of a rigid bureaucratic approach that only focuses on biophysical sentiments. That illustrates the central role that stakeholders play in the policy development process as led by the government, which is more desirable in all fisheries' governance efforts. In practical terms and aligned with this argument is the notion of fisheries co-management. Carlsson & Berkes (2005) define co-management as the joint management of marine living resources between government and affected resources users, where there is a form of power-sharing.

However, they also state that due to wide-ranging interests that often lead to inclusion in different government departments and agencies' power arrangement, co-management must never be misunderstood as a simple arrangement between a unitary State and homogenous community. According to Evans et al. (2011), co-management and a host of other similar collective management archetypes have been institutionalised through national environmental laws and policies in numerous countries. The primary purpose of co-management is not only to strengthen existing management regimes in the protection of marine living resources and the rights of the benefitting or affected communities but to improve and clarify the role of the State in the all-inclusive decision-making process (Berkes, 2009; R. Pomeroy *et al*., 2007). Evans *et al*. (2011) point out that the all-inclusive approach, where all relevant stakeholders are part of

the overall decision-making process bodes well for effective collective action in conflict resolution and improvement of compliance across the board. Quite importantly, of the effects of co-management regarding MCS programs in reducing enforcement costs (Evans *et al*., 2011). To further emphasise the importance of a collective approach in fisheries governance, Flewwelling & Cullinan, (2001) state that, the development of legislative and control mechanisms in fisheries governance should be done through an all-inclusive participatory process, where discussion platforms are created to enable that kind of dialogue. A complete dialogue where all aspects of fisheries governance are discussed is preceded by a thorough stakeholder identification and engagement process. That results in the cataloguing and categorisation of stakeholders into the central databases of the FGA, a process and a product that the questionnaire sought to determine and ascertain about the countries that were part of this study from the respondents through questions 74 to 78. Furthermore, this approach was influenced by the provisions of MLRA, Chapter 2 (5) on the establishment by the Minister of the Consultative Advisory Forum (CAF) for the Marine Living Resources, which has potential to be utilised as a discussion platform. Fucntions of the CAF are inclusive of all aspects of management and development of the fisheries sector, as well as recommendations and directives on multi-disciplinary research to be implemented in the sector to mention but a few (RSA (Republic of South Africa), 1998a).

(iii) D2: Risk identification, analysis and management

D.2., i.e. the risk identification, analysis and management is divided into two separate, but interrelated areas. The first area of focus was covered under subpart ***D.2.1***., which addresses the internal risk that can mostly be posed by the FGA to the MCS program. Such a concern is based on the fact that inspectors in MCS operations are susceptible to corrupt and fraudulent activities, which is precipitated by a variety of reasons, such as low salaries that can lead to inspectors being involved in corrupt activities (Kelleher, 2002). Morse (2006) state that corruption impacts negatively on the more comprehensive public benefits and economic growth of any country because of the diversion of resources to private or individual consumption instead of communities that were identified as beneficiaries. Although corruption's negative impact is always about social and economic development, it goes beyond that to negatively affect the sustainability of the environment (Morse, 2006; Welsch, 2003).

Clarity on the adverse impact of corruption to the environment is further provided by Robbins, (2000) and Damania *et al.*(2003) that such an impact is caused by poor governance, inadequate management structures and poor enforcement capability.

In South Africa, there are practical experiences of such incidents, for example, the much publicised Hout Bay Fishing over-harvesting of rock lobster and other marine living species between 1987 and 2001. In this case, where the south coast rock lobster (*Palinurus gilchristi*) was severely impacted, 18 Fishery Control Officers (FCOs) were arrested and charged with fraud and corruption, and they were also ordered to pay-back all the bribe money they received (Hauck & Kroese, 2006). More recently, in March 2018, nine FCOs from DAFF were arrested on allegations of assisting an abalone (*Haliotis midae*) poaching syndicate where it is alleged that, among other things, they would sell back to poachers the abalone that had been confiscated earlier by members of the DAFF fisheries inspectorate[137]. These incidents were some of the reasons for the inclusion in the questionnaire of questions that served to evaluate the strength of control systems designed to safeguard the FGAs recruitment and selection processes.

According to Standing (2008), there has been an increasing concern about levels of corruption in the extractive industries, and unfortunately, that also had a bearing in the governance of the fishing industry in developing countries. That includes all the African continent countries, and that is underpinned by the escalating global fish and fish products' demand (Standing, 2008). Due to Africa's rising geopolitical importance, pressure on its natural resources followed, in particular fisheries. Pressure applied by foreign governments to the governance of Africa's fisheries is but one example, which has since led to the proliferation of corrupt activities all under the banner of *"captured state"* (Standing, 2008). In 2004 a fisheries patrol conducted by Tanzanians within their EEZ led to the discovery of 25 European fishing vessels fishing illegally in Tanzania. Subsequently, a delegation from the European Community's Directorate-General for Maritime Affairs and Fisheries visited Tanzania, and details of fines issued were never made public. Instead, this was a further cause for concern regarding political influence (Standing, 2008). In Angola, it is reported that the Ministry of Fisheries and senior government managers in general own and operate fishing vessels. A situation that leads not only to low morale to officials and fisheries inspectors but it undermines their efforts to diligently carry out their responsibilities (Sjöstedt & Sundström, 2013; Standing, 2008). The direct result of that is

[137] https://www.news24.com/SouthAfrica/News/marine-inspectors-bust-for-allegedly-aiding-abalone-syndicate-20180306 . Accessed 15 March 2019

fisheries compliance and law enforcement that is kept at its lowest, with ardent inspectors marginalised and skills development to improve on their abilities not attended to. Therefore, given the high risk that is likely to be posed to FGAs by their employees, i.e. from the most junior to the most senior, screening should be implemented. The risk may be of corrupt activities that employees may engage in, and interference to the FGA because of the political or administrative powers that they are wielding (Sjöstedt & Sundström, 2013; Standing, 2008). Therefore, 79 to 81 had to be included in the questionnaire, where a particular focus was given on screening and security vetting of incumbents.

There is always a likelihood of incumbents falsifying their qualifications to meet the minimum qualifications that are needed for the job. The other possibility is hiding a previous criminal record, which may prove to impede getting a job. Health status is often used to get into specific job categories, especially jobs that are strenuous like law enforcement positions that are at the operational level of the organisation, for example, junior and senior inspectors in an MCS program. Therefore, a thorough medical assessment procedure is often prescribed for all incumbents, and as such, it becomes a top priority for those specific job categories. Unfortunately, incumbents can still choose to hide their actual health status to get the job, and most likely due to high unemployment levels and poverty. These are the additional reasons for having questions 79 to 81, as they were also developed to test various MCS programs about processes that are in place to detect and deal with these internal risks, as well as external risks that are people or staff oriented which can negatively affect the organisation's operational capabilities and expectations.

This process does not start and end with the selection and recruitment process of new incumbents, but it should extend to those already or have long been in the employ of the FGA. An additional reason for this statement which led to the development of questions 81 and 82, is best explained by Flewwelling & Cullinan (2001) where they state that security and confidentiality of information should be among top priorities of any MCS program. Their statement is informed that through the use of technologies like the VMS, real-time data may contain confidential and sensitive commercial information about the fishing grounds and the rate of catches of fishing companies. They further argue that this information should not fall in the *"wrong hands",* a point that must be taken seriously in an MCS environment where there are different forms of confidential information, hence questions 81 and 82.

The last part of the questionnaire, i.e. ***subpart D.2.2 of Part D,*** was about mapping and monitoring activities in areas defined as fisheries crime hotspots. Two issues were considered to be of utmost importance in developing an appropriate tactic in dealing with the content of this part of the questionnaire, and they were *(a) fisheries crimes*, and *(b) environmental intelligence*. The term *"fisheries crimes"* is legally speaking a poorly defined concept as it refers to a wide range of illegal activities which may be transnational [138]. de Coning & Witbooi (2015), argue that fisheries crime involves a multitude of persons in the fisheries value chain, and that may include goverments; fishers and financiers, and it occurs in all facets and stages of the capture and utilization of fish. They further state that, a prevalent form of illegality in the fisheries sector emanates from the practice of registering fishing vessels in flag States that are different from the country of residence of vessel owners. This practice can lead to transnational illegal fishing activities that are highly profitable, where detection of transgressions is easily avoided, of which at the centre of it all are transnational organized criminal networks (de Coning & Witbooi, 2015; Witbooi *et al.*, 2020).

On the other hand, environmental intelligence is defined as a process of both collection and collation of data or information about a particular area to assist decision-makers in planning and making a decision that is about appropriate and timeous interventions[139]. For this study, hotspots are those areas where there are likely to be fisheries infarctions or incidents of non-compliance. In explaining fishermen's behaviour, Bergh & Davies (2009) state that, mostly fishers conduct the fishing activity in desolate albeit highly regulated areas where there are no fisheries control officers.That behavioural pattern leads to violation of regulations, which can be interpreted as a concerted effort on their part to render standing regulations ineffective (Bergh & Davies, 2009). Furlong (1991) crafted a theoretical framework on this kind of behaviour where he states that before conducting a criminal offence an assumption is that fishers do weigh their options with regards to potential gains and potential losses that may arise if they are caught or succeeded. That puts FGAs in a difficult position, and the assumptions that proactive planning might yield positive returns for them needs further consideration. Questions 83 to 84 were designed to understand better the respondents' level of awareness on the part of the FGA about the risk attributed to fisheries crimes hotspots and the contributing factors to those particular crimes. However, to minimise this risk, consideration was given to a

[138] https://www.unodc.org/unodc/about-unodc/campaigns/fisheriescrime.html - assessed 15 March 2019
[139] https://www.iarpccollaborations.org/news/7704 - assessed 15 March 2019

two-pronged approach, i.e. intelligence gathering and appropriate interventions that may take the form of compliance or law enforcement.

Cost is always a significant concern and constraint in fisheries compliance and law enforcement. Flewwelling and Cullinan (2001) argue that in most instance, MCS programs are devoid of the essential resources to implement an effective strategy to ensure compliance with all fishing regulations. This situation has led to the evolution of many creative and mostly accepted interventions that include various stakeholders to ensure sustainable planning and implementation of reasonably acceptable MCS plans. An example of interventions or strategies was mentioned by Kelleher (2002) that as a form of a minimal cost but highly effective strategy numerous countries appoint village chiefs or honorary fisheries inspectors, or even highly skilled respected fishermen as foot soldiers in the collection and collation of local fishing activities intelligence. The importance of these interventions was for information to be drawn from the respondents through question 85 about measures in place and their respective MCS programs' effectiveness. Questions 87 to 89 were designed to both fall within the scope of ***subpart D.2.2***., whilst simultaneously being more specific about getting a more direct response from the respondents about the responsiveness and readiness of the FGAs in dealing with by-catch targeting, high grading and practical measures in identifying and acting on IUU fishing.

The three countries that are part of this study are all developing nations, and information about their strength in confronting the risk posed by IUU fishing had to be determined. The functional role that Regional Fisheries Management Organizations (RFMOs) could play in being MCS force multipliers in under-resourced developing countries that are prone to IUU fishing activities cannot be undervalued. That scenario applies to both contracting parties and non-contracting but cooperating parties. Therefore, question 89 was for determining the relationship that each of the countries has with RFMOs that are either adjacent to their respective Exclusive Economic Zones (EEZs), or those they are party to or both. Furthermore, to determine the extent to which that relationship go with regards to effective measures that are in place against IUU fishing.

5.4. Data collection process

Questionnaires were distributed both physically and via e-mail. A combination of physical distribution and electronic distribution in the Republic of South Africa was mainly to the Department of Agriculture, Forestry and Fisheries (DAFF), now Department of Environment, Forestry and Fisheries (DEFF) offices in Cape Town, Gansbaai; Hermanus, Saldanha; Port Elizabeth and East London. Some were also distributed to non-governmental offices, particularly to CAPFISH in Cape Town, an independent consulting company with extensive MCS experience. In Mozambique, distribution was initially done electronically via e-mail in November 2015, but there was a subsequent visit to Maputo by the researcher in April 2016. The visit was to the Ministry of Fisheries and the offices of the state-owned fishing company at the Port of Maputo. Due to language differences between the researcher and some respondents from the Republic of Mozambique, interviews about explaining the study, and the contents and structure of the questionnaire were arranged and conducted. Distribution of questionnaires in the Republic of Namibia was also done via e-mail in November 2015, followed by numerous telephone calls to Walvis Bay and Windhoek Ministry of Fisheries offices. Other questionnaires were given to the Namibian delegation to the Commission for the Conservation of Marine Living Resources (CCAMLR) in October 2016, and one was completed during the proceedings of the CCAMLR annual meeting of 2016.

5.5. Statistical analysis

Necessary statistical tests were applied in analysing data collected from the South African respondents. The South African respondents, i.e. DEFF Inspectors and Managers, and the South African Fisheries Industry and Related Non-Governmental Organisation henceforth referred to as the (SAFIR) respondents, were divided into three groups, i.e. the Inspectors, Managers (DEFF respondents) and the SAFIR group.

Background information questions about MCS were asked under Section A of the questionnaire, and the response for each question was either *"yes"* or *"no"*, and the proportions of correct answers, as determined by the author of this thesis, out of 21 questions asked was calculated for each DEFF respondent. These were easy questions designed to encourage

respondents to complete the questionnaire and factual to get direct answers. An example would be whether there is a Fisheries Scientific Advisory Body (FSAB) in South Africa or not, or the number of MCS stations along the South African coastline. Out of the 21 questions asked the proportion of the correct responses per respondent could be modelled as proportions ranging from 0 to 1 as further explained in hereunder.

Version 3.6.2 of the R statistical analysis software was utilised to analyse all the data, starting with developing a specific code that was utilised in the analysis of data. Most importantly, four broad statistical methods were deemed applicable to the data depending on the question that was being answered, and these are outlined as follows:

(i) The total number of correctly answered responses was divided by the number of questions asked, which gives a number between 0 and 100% or 0 and 1. Such data could then be analysed utilising logistic regression or beta regression. Sperandei (2014) state that logistic regression is similar to multiple regression and the only difference is the binomial response variable. The logistic regression is utilised to determine the odd ratio where there is more than one exploratory variable. With regards to the beta regression model, Carrasco *et al.* (2014) argue that "beta regression models provide an adequate approach for modelling continuous outcomes limited to the interval (0, 1), or more generally, limited to any open interval (a, b) as long as the limits are known." Therefore, the Generalised Linear Models (GLMs) with beta error model for modelling the proportions of responses per DEFF respondent of the background information was then performed. The proportions which ranged between 0 and 1 were modelled using this modelling framework. Considering the inappropriateness of observed proportions, if they include zero or one, these frameworks could not have been applied, but since observed responses ranged between 0.6 and 0.95, this framework is appropriate.

(ii) For responses to questions in parts B, C and D, non-parametric Kruskal-Wallis and Wilcoxon tests were used to investigate the differences between the South African respondents, i.e. Inspectors, Managers and the SAFIR group, as well as only between the Managers and Inspectors in the instances where question warranted responses only from the DEFF respondents. The tests were also used to investigate

differences between the three case study countries, i.e. South Africa, Mozambique and Namibia.

(iii) A parametric test using the Analysis of Variance (ANOVA) was also done, but only for comparison purposes without any intention of using the analysis for further discussions in this study. Reason for doing the ANOVA test was that while assumptions are common that parametric statistic tests, for example, the (ANOVA) test, cannot be used where sample sizes are small or if there is no certainty on the distribution of data being normal, Norman (2010) encourages and argues for its use irrespective of this assumption, given its comprehensiveness and robustness. Therefore, for comparison purposes the ANOVA test was used together with its associated posthoc test (Tukey test), to investigate the mean differences in the responses of all the South African respondents (Inspectors, Managers and the SAFIR group) per Section of the MCS assessment framework. This test was further applied to test the difference in responses between the three countries (South Africa, Mozambique and Namibia).

Table 5. 3: The generic models used to investigate perceptions as outlined in i-iii. Definitions of terms are provided in Table 5.2.

Method	Model
a) One-way ANOVA	$Res_R = \mu + \beta_R + \varepsilon_R$
b) Modelling proportional response	$PR = \mu + \alpha_{rank} + \beta_{qua} + \rho Y^{age} + \theta_{gender} + \sigma X^{exp} + \varepsilon_b$

Table 5. 4: Terms used in model data given in Table 5.1 above

Factor	Description	Levels of factors
μ	Intercept or overall mean	
β_R	The differential effect of the respondent group	$R = \{Inspector, Manager, Industry\}$ OR $R = \{South\ Africa, Mozambique, Namibia\}$
Res_R	Responses were given by R group per section	
PR	The proportion of the correct answers by a respondent to a background question (see explanation on modelling background information)	
α_{rank}	The factor for rank effect	$rank = \{Manager, Ispector\}$
β_{qua}	The factor for qualification effect	$qua = \{dip, deg, posD\}$
θ_{gender}	The factor for the gender effect	$gender = \{female, male\}$
ρY^{age}	Variable for age effect	ρ estimate parameter with the age of the respondent
σX^{exp}	Variable for experience effect	σ estimate parameter with experience of the respondent
ε_b	Error term for beta model	

Regarding the goodness of fit, it was investigated utilising models that ranged from one-factor models to four-factor models utilising the Akaike Information Criterion (AIC); and the Adjusted R^2. The AIC is defined as a way of comparing different models on a particular outcome (Snipes & Taylor, 2014). The Adjusted R^2 model indicates how well the data points fit in a curve or line, and it is also amenable to adjustments for several terms that are in that particular model[140].

[140] https://www.statisticshowto.datasciencecentral.com/adjusted-r2/, accessed on 18 March 2020

6. PRESENTATION AND ANALYSIS OF RESULTS FROM THE SURVEY ON THE SOUTH AFRICAN NATIONAL MCS PROGRAM

6.1. Introduction: The framework for evaluating the effectiveness of an MCS system

The questionnaire described in Chapter 5 was developed as a primary tool for collecting data used to analyse the status and effectiveness of Monitoring, Control and Surveillance (MCS) in South Africa and its relevance to the other Southern African States. In South Africa a total of 18 (51.43%) responses were received from the 35 individuals who were sent the questionnaire: 6 (50%) DEFF Managers out of a total of 12; 6 (4.84%) DEFF Inspectors out of 124 MCS FCOs along the South African coastline, and four from the members of the South African Fishing Industry and two from Non-Governmental Organisations (NGOs). In the analysis of results, the NGOs and the South African Fishing Industry were combined into what is referred to as the South African Fisheries and Industry Respondents (SAFIR) group, i.e. six respondents. Noteworthy is that sample sizes for this analysis were relatively small. However, the experience, expertise and extensive knowledge of fisheries governance by the selected respondents were of prime importance. Whilst receiving responses from all the stakeholders that were sent would have been beneficial to the study, responses that were received are considered to provide adequate overall information about all questions asked.

The questionnaire had four parts, Part A: Background information; Part B: Evaluation of the MCS enablers; Part C: Evaluation of an MCS system process and its effectiveness – the reactive approach, and Part D: Evaluation of an MCS system process and its effectiveness – the proactive approach (Chapter 5). The DEFF respondents were asked to answer all questions, while the SAFIR group were not asked to respond to questions about internal government processes as it was considered unlikely that they would have been explicitly exposed to these processes and therefore may have only limited knowledge. Questions that the SAFIR group were not requested to respond to were Part A and Part C, i.e. the background information, and the evaluation of the MCS reactive approach, except those under C.2.1. which was covering safety and catch inspection.

6.2. Responses and respondents

6.2.1. Results presentation and analysis for Part A

Questions in Part A were focussing on the background information which presents a subset of factual data or information that should be known by both managers and inspectors in order to carry out their respective daily MCS duties well effectively. The accuracy of the responses to these questions by the respondents was analysed against a set of factors reflecting some personal attributes. The factors used to analyse results from Part A include rank, which has two levels, one for inspector and the other for a manager. The qualification factor has three levels, the National Diploma (Diploma), the First Degree (Degree), and the Post Graduate Degrees, i.e. Honours and Masters degrees. Gender was another factor that had two levels, female and male. Age was a factor that considered the respondent's actual age when data was collected, and the experience was a factor that considered the years in service of each respondent at the time data was collected.

Data and results of the background data of the respondents (Part A) are given in Tables 6.1, 6.2 and 6.3. Table 6.1 presents a summary of the background data showing total responses by each respondent, the number of correct answers given by each respondent, a proportion of the correct answers and different characteristics of each respondent. Tables 6.2 and 6.3 include only results where factors that were included in the beta regression were statistically significant at 5 % level of significance. Both rank and qualifications are statistically significant factors, and the experience was a covariate that was also statistically significant. Gender and age were also investigated and found not to be significant.

Table 6. 1: The impact of each respondent's characteristics in the background data analysis.

Sex	Qualification	Rank	Experience (yrs)	Age (yrs)	Correct Response	Incorrect Response	Total responses	Proportion Of Correct Responses
M	Diploma	Inspector	17	43	20	1	21	0.9524
M	Diploma	Inspector	12	48	19	2	21	0.9048
F	Diploma	Inspector	10	40	18	3	21	0.8571
F	Post Graduate	Inspector	12	41	19	2	21	0.9048
M	Post Graduate	Inspector	10	38	17	4	21	0.8095
M	Diploma	Inspector	17	42	18	3	21	0.8571
M	Post Graduate	Manager	9	43	14	7	21	0.6667
F	Degree	Manager	10	52	16	5	21	0.7619
M	Diploma	Manager	14	49	15	6	21	0.7143
M	Diploma	Manager	16	48	18	7	25	0.7200
M	Degree	Manager	15	41	19	2	21	0.9048
M	Degree	Manager	8	40	17	4	21	0.8095

Results of fitting a Generalised Linear Model (GLM) to data in Table 6.1 using Equation 1 below are given in Table 6.2, which shows the estimates and associated standard errors of rank, qualification and experience characteristics which were identified as essential characteristics (i.e. statistically significant at 5% level) in the responses given for the background. Estimates with positive numbers indicate that a particular factor has a positive effect on the scores, i.e. it leads to generally higher scores in their responses whereas a pessimistic estimate indicates a tendency of leading to lower overall responses.

$$\eta_i = \mu + \alpha_{i,rank} + \beta_{i,qua} + \rho Y_i^{age} + \theta_{i,gender} + \sigma X_i^{exp} + \varepsilon_{i,b} \quad \text{Equation 1}$$

$$PR = \frac{1}{1+e^{-(\eta_i)}} \quad \text{Equation 2}$$

The parameters and variables in these equations were explained in Table 5.2 of Chapter 5.

Table 6. 2: Estimates of factors and their associated standard errors when fitting of the model given in Equation 1 above and explained in Table 5.2 (part (b) of Chapter 5, to the background information.

Factor	**Level**	**Estimate**	**Standard Error**	**P-value**
Intercept		1.98	0.47	<0.0001
Rank	Inspector			
	Manager	-1.26	0.20	<0.0001
Qualification	Diploma	-0.99	0.27	<0.0001
	First Degree			
	Postgraduate	-0.88	0.26	<0.0002
Experience	Experience	0.077	0.037	<0.040

The model predicted responses obtained using estimates from Table 6.2 are given in Table 6.3 (the last column) calculated using Equation 2 above, which was explained in Table 5.2 of Chapter 5. Table 6.3 provides an insight into how each combination contributes to the overall response. For example, on average a respondent who is an Inspector with ten years of experience and a Post Graduate qualification tended to score higher (0.87) on average compared to a Manager with ten years of experience and a First Degree (0.82). That indicates that rank on its own was not important; instead, the first-degree education improved the level of understanding and how the respondents answered questions. Furthermore, on average, the proportion correct for managers was considerably lower than for inspectors. That is clear from Table 6.2 and Figure 6.1. Also, the experience had a positive effect of respondents' responses as can be seen in the model estimates in Table 6.2.

Table 6. 3: Expected responses with different characteristics using estimates given in Table 6.2

Qualification	Rank	Experience	Estimate of Qualification	Estimate of Rank	Model of Responses
Diploma	Inspector	17	-0.99	0.00	0.91
Diploma	Inspector	12	-0.99	0.00	0.87
Diploma	Inspector	10	-0.99	0.00	0.85
Post Graduate	Inspector	12	-0.88	0.00	0.88
Post Graduate	Inspector	10	-0.88	0.00	0.87
Diploma	Inspector	17	-0.99	0.00	0.91
Post Graduate	Manager	9	-0.88	-1.26	0.63
Degree	Manager	10	0.00	-1.26	0.82
Diploma	Manager	14	-0.99	-1.26	0.69
Diploma	Manager	16	-0.99	-1.26	0.72
Degree	Manager	15	0.00	-1.26	0.87
Degree	Manager	8	0.00	-1.26	0.79

Figure 6.1, part (a), relates to individual responses to experience measured in years, and the variable is treated as a continuous variable. Part (b) relates to age in years, and it is also treated as a continuous variable, Parts (c), (d) and (e) are factor variables for qualification, rank and gender respectively. In essence, a higher proportion of correct responses seems to be correlated with higher numbers of years of experience for most respondents, which is consistent with the results shown in Table 6.3.

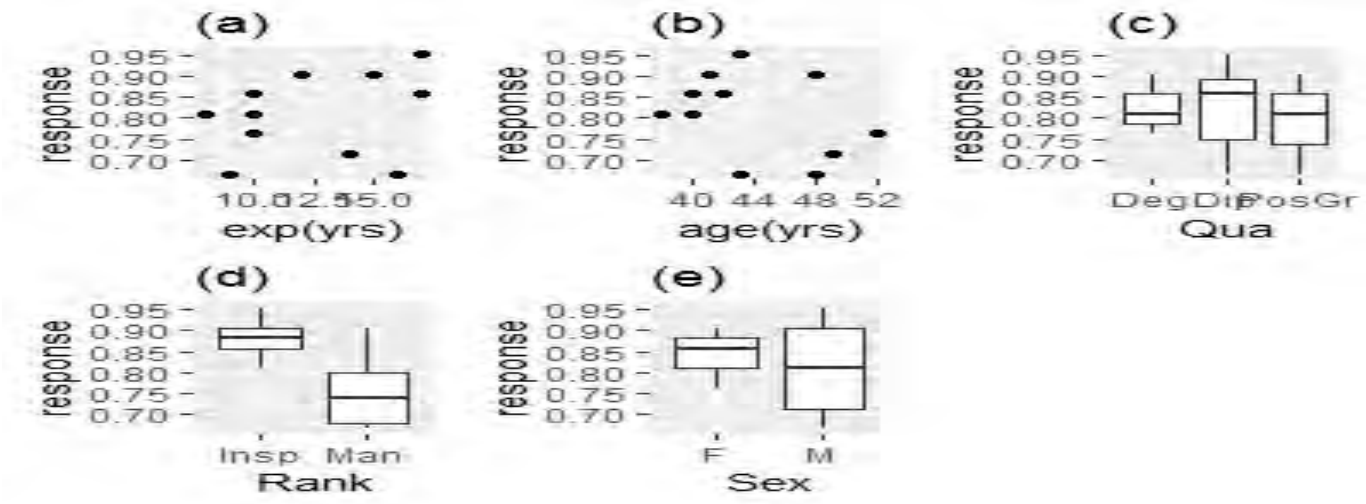


Figure 6. 1: Plots of a proportion of correct responses for each characteristic of the background data with (a) years of experience; (b) age; (c) qualification; (d) rank; and (e) gender.

6.2.2. Comparison of responses from different respondents

As discussed in Chapter 5, comparisons of responses for the DAFF Managers, Inspectors and the South African Industry and other NGOs (SAFIR Group) were conducted using non-parametric statistics. In this case, the Kruskal- Wallis and the Wilcoxon test on pairs but parametric statistics using the Analysis of Variance (ANOVA) and the posthoc test (Tukey test) were also conducted for comparison purposes. Greater emphasis in the discussion of the results is placed on the non-parametric test results, which are considered likely to be more reliable.

All results generated from the tests, among the three groups are given in Table 6.1. From these, the following sections show statistically significant differences amongst the three groups, and the differences are statistically significant on both of the tests used:

B.1.1. (Management/Strategic Level Assessment and Institutional Arrangement)
B.2 (Legislative Framework and Administrative Measures),
C.2.1 (Safety and Catch Inspection)
D.1 (Stakeholder Engagement / Collective Approach)
D.2.1 (Risk Identification, Analysis and Management: Personnel)
D.2.2 (Mapping and Monitoring of Activities in Hotspots).

Table 6. 4: Summary statistics for analyses of results for those sections of the questionnaire that were sent to all three groups of respondents. Kruskal-Wallis and ANOVA results are for pairwise comparisons across the three groups (Manager, Inspectors and SAFIR). The Wilcoxon and Tukey tests indicate which pairs account for differences in the three-way comparisons and are only shown where probabilities were 5% or less.

Section	**Kruskal-Wallis**		**Wilcoxon on pairs**		**ANOVA**		**Tukey**	
	χ^2	p	Pair	p	F value	p	Pair	p
B.1.1	7.1067	0.02863	Managers-SAFIR Group	0.01437	5.623	0.00633	Managers-SAFIR Group Inspectors – SAFIR Group	0.00695 0.034589
B.1.2	3.8192	0.1481			1.488	0.236		
B.2	5.782	0.05552	Managers-SAFIR Group	0.02593	3.287	0.041	Managers - Inspectors	0.03709
B.3	5.152	0.07608	Inspectors-Managers	0.02673	2.609	0.0757	Managers - Inspectors	
C.2.1	8.4888	0.01434	Managers – SAFIR Group	0.003227	4.395	0.0163	Managers - Inspectors	0.01355
D.1	9.7553	0.007615	Managers-SAFIR Group Inspectors – SAFIR Group	0.00422 0.01551	5.623	0.00633	Managers-SAFIR Group Inspectors – SAFIR Group	0.00695 0.03459
D.2.1	10.669	0.004821	Managers-SAFIR Group Inspectors – SAFIR Group	0.001458 0.01417	6.403	0.00357	Managers-SAFIR Group Inspectors – SAFIR Group	0.00278 0.03254
D.2.2	3.2407	0.1978			1.533	0.226		

Also, analyses of responses for the Managers and Inspectors only, i.e. between two groups from DEFF were conducted for all the Sections in the questionnaire using the Wilcoxon test, and the results are given hereunder in Table 6.5, showing the probability that the responses from the two groups are different.

Table 6. 5: Summary statistics for the Wilcoxon tests for testing differences between Managers and Inspectors for all sections of the questionnaire

Section	Wilcoxon test	
	W	**p**
B11	1888	0.5013
B12	144.5	0.5712
B2	960	0.449
B3	5435.5	0.02673
C1	607	0.01405
C2	384.5	0.03971
C21	424	0.003227
C3	3545	0.06336
C31	339	0.2812
C4	598	0.0199
D1	472	0.737
D21	319.5	0.4994
D22	1146.5	0.01462

Responses for the following sections showed statistically different scores between the two groups:

B.3 (Infrastructure and physical resources);

C.1 (Before / Prior Fishing – At Port Inspection);

C.2 (During Fishing / At Sea Boarding);

C.2.1 (Safety and Catch Inspection);

C.4 (Post Landing Inspections); and

D.2.2 (Mapping and Monitoring of Activities in Hotspots)

In Sections B.1.1 (Management / Strategic Level Assessment and National Institutional Arrangement); B.1.2 (Regional and International Integration); B.2 (Legislative Framework and Administrative Measures); C.3 (During Landing Inspections); C.3.1 (Inspection of Foreign Fishing Vessels); D.1 (Stakeholder Engagement / Collective Approach); and D21 (Risk Identification, Analysis and Management: Personnel), there appeared to be no statistically significant differences between Managers and Inspectors.

6.3. Evaluation of the MCS system enablers or enabling environment

Part B of the questionnaire (the enabling environment) as is the case with Part C (evaluation of an MCS system process and its effectiveness – the reactive approach), and Part D (evaluation of an MCS system process and its effectiveness – the proactive approach), and their respective sub-parts, had criteria that had a score range of 1 to 5 which each respondent had to allocate. These criteria, in their broad state and in the quest of determining the meaning of the allocated scores were considered to be, 1 (Poor); 2 (Adequate /Developing); 3 (Average); 4 (Good), and 5 (Excellent). Further discussion on the analysis of results from Part B to Part D are given hereunder.

6.3.1. Part B: Evaluation of the MCS system enablers or enabling environment

Questions under Part B were about assessing the status of enablers or the MCS enabling environment, and they were divided into four categories:

- Management / Strategic level assess and national institutional arrangement.
- Regional and international integration
- Legislative framework and administrative measures
- Evaluation of infrastructure and physical resources.

In these broad categories there were specific questions, of which some had sub-questions, and both the questions and sub-question as addressing specific functions and areas of an MCS

program were scored as explained under Section 6.3. Further discussion on the analysis of results from Part B is covered from Section 6.3.2 to Section 6.3.5 hereunder.

6.3.2. Management / Strategic level assessment and national institutional arrangements (B.1.1)

On investigating the South African national MCS program's effectiveness through the strategic level assessment and national institutional arrangements, a set of nine criteria were developed, i.e. criteria Q22 to Q31 (Appendix A). Figure 6.2 hereunder shows the boxplots of the combined South African respondents for criteria Q22 to Q23.

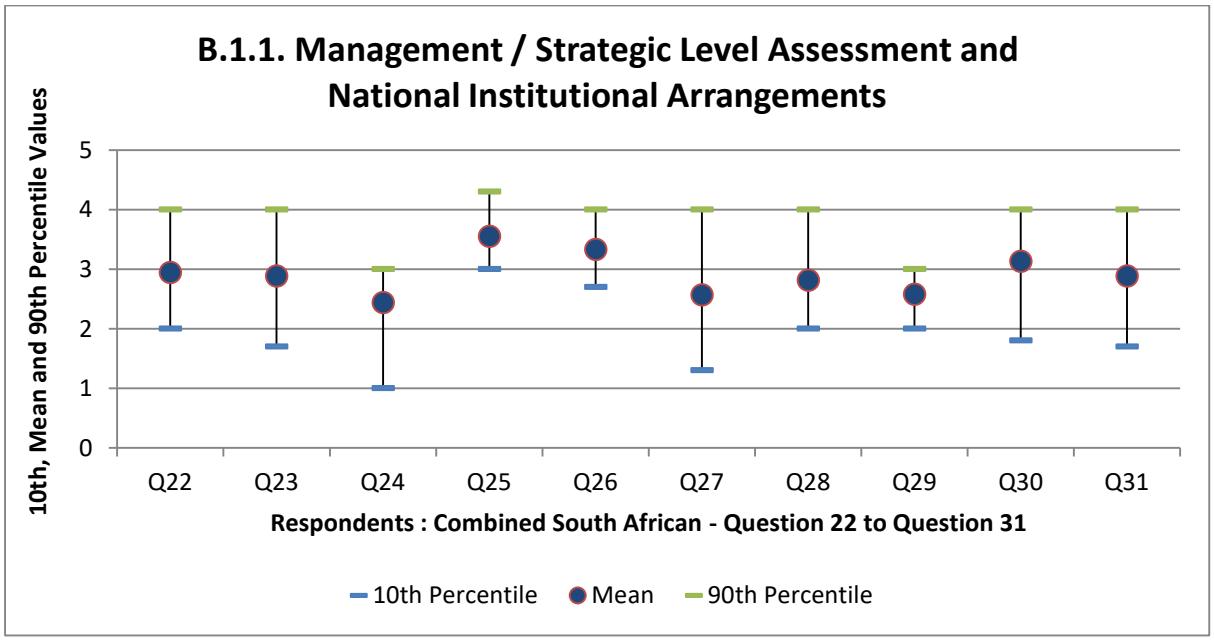


Figure 6.2: Boxplots of combined South African respondents for criteria Q22 to Q31 illustrating 10th, Mean and 90th percentile values in their assessment of the South African MCS Management or strategic national institutional arrangement

The mean responses for this part of the questionnaire did not include the extremes of the scale. Mostly plots had a mean value of between 2.5 and 3.5, where 2.5 can be translated to denote adequate and 3.5 moderate. It can also be noted that the maximum value of the inter-percentile range (IPR) is four in most of the criteria, particularly criterion Q22 (rating the Fisheries Governance Authority (FGA) or Fisheries Ministry in discharging its responsibilities); Q23 (if the strategic management component of the FGA is properly structured); criterion Q24

(assessing the effectiveness of the operational aspect of the FGA in the implementation of the National MCS strategy); Q27 (source of funding for both the operational and capital expenditure budgets); Q28 (impact of the budgeting process and the line of authority if part of the funding is from foreign or donor sources and the remainder from the central government); Q29 (if the National MCS program is funded by different government departments and the impact of such institutional arrangements) and Q30 (the effectiveness of the FGA in coordinating the national MCS efforts with other government departments and institutions and is 4.3 for criterion Q25. However, these same criteria also have a reasonably high inter-percentile range (IPR) of 2 or more. An IPR of 2 or more signifies a considerable difference in opinion, and this can be attributed to either the difference in opinion between the three groups, within the three groups, or both. Criterion Q27 has the highest range at 2.7, indicating a high difference of opinion on meeting this criterion. It is also noteworthy that criteria Q24 and Q27 show the IP lowest values, approaching 1 in both cases.

In the individual scores, DEFF managers in criterion Q24 scored an average of 4, denoting good, and it is much higher than the combined group mean score for all groups is 2.44, and that signifies adequate. Criterion Q24 considers whether the fisheries inspectorate's organisational structure has led to effective implementation of the National MCS program or not. Notable is the low group mean score of the SAFIR respondents of 1.83, which denotes poor but leaning towards adequate. The DEFF inspectors mean score is 2.5, and that signifies adequate opinion to this criterion. Therefore, it becomes evident that criterion Q24 is a criterion where perceptions are vastly different among the groups. The reasons and implications of these differences in opinion will be further investigated under the discussion Section. Similarly, for criterion Q31, a criterion that seeks to evaluate existing formal institutional arrangements for the level of cooperation and coordination of MCS activities, the SAFIR group had a more pessimistic view, with a mean score of 2.17, compared to the other two groups.

The differences in opinion for the Section as a whole among the three groups were further investigated using the Kruskal-Wallis test and the Wilcoxon test (Table 6.4). The box plots in Figure 6.3 hereunder compare responses given by DEFF Managers, DEFF Inspectors and the SAFIR Group for the criteria under Sections B.1.1. The medians are the same for Managers and SAFIR, but the quartile ranges are very different, which is why the Wilcoxon test shows these two groups to be very different. The Kruskal-Wallis test supports this view of differences (χ^2 = 7.1067; p = 0.02863) with two degrees of freedom and the Wilcoxon test on pairs (p =0.01437) further points out that the pair which has led to the statistically significant

observation under Section B.1.1. is the DEFF Managers and the SAFIR Group, with the latter being more pessimistic than the former.

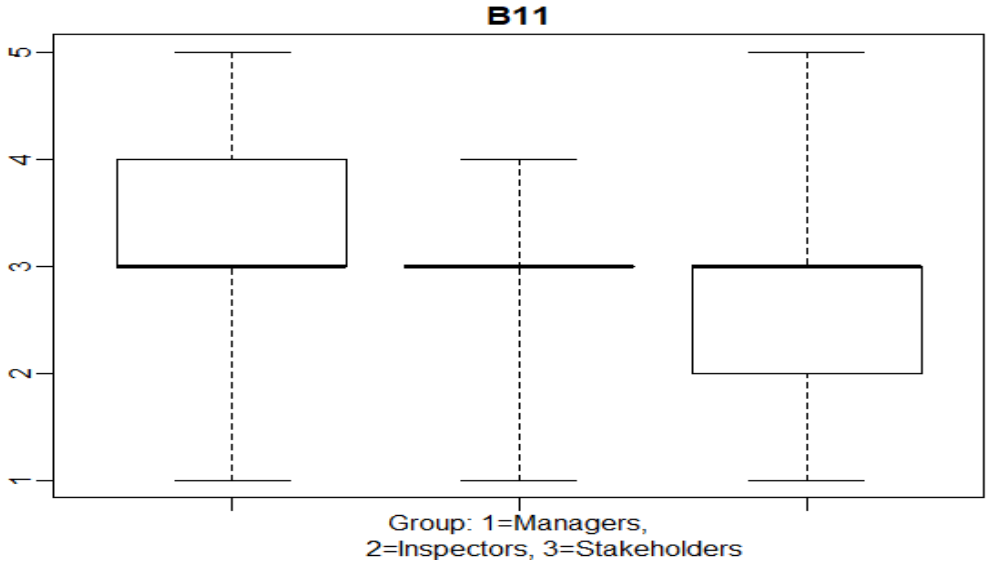


Figure 6.3: Box plots comparing responses of DEFF Managers, DEFF Inspectors, and the SAFIR Group for Section B.1.1 Bold line indicates the median, boxes 25% and 75% quartiles and dotted lines show ranges.

6.3.3. Regional and international integration (B.1.2.)

In the assessment of regional and international integration three criteria were developed, i.e. criterion Q32 which is about the existence and the effectiveness of regional cooperation; Q33 the existence of regional Memorandum of Agreements (MOA) or Memorandums of Understanding (MOU) that detail the scope of regional MCS information sharing and development and planning of regional MCS joint efforts, and criterion Q34 which is for assessing the level and effectiveness of regional MCS cooperation with foreign countries where regional fish products are exported to. Criteria used in this part of the questionnaire sought to determine the existence and level of utilisation of such instruments by the Republic of South Africa to expedite its MCS regional cooperation and the base case plots results are presented in Figure 6.4.

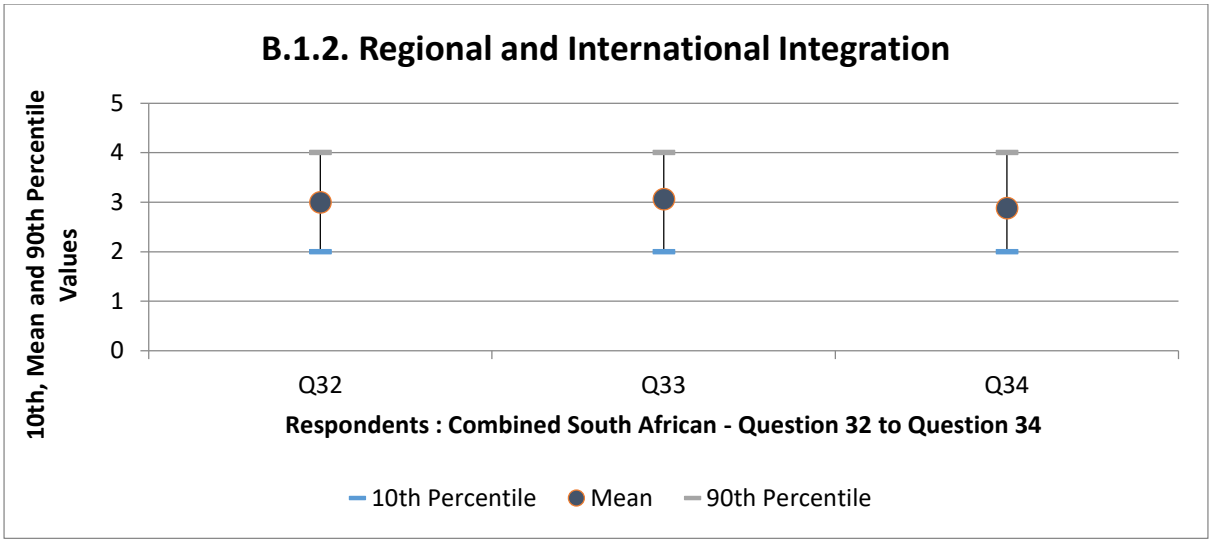


Figure 6.4: Box plots of Combined South African respondents for criteria Q32 to Q34 illustrating 10th, Mean and 90th percentile values in their assessment of the Regional and International Integration

Responses for these criteria did not show any extreme values as average values were about 3 except for criterion Q34 which was just below 3 at 2.88, all indicating adequate to moderate performance, and the IPR in all three criteria was 2, which indicates considerable differences in opinion. While the individual scores from the different groups showed some differences in means and IPR, the Kruskal-Wallis test and the Wilcoxon test showed no statistically significant difference indicating that overall these three groups had similar views.

6.3.3. Legislative framework and administrative measures assessment (B.2.)

On investigating the effectiveness of the South African national MCS program utilising the legislative framework and administrative measures aspect, a set of seven criteria was developed, i.e. criterion Q35 for determining the implementation and impact of mandatory international obligations; criterion Q36 for evaluating harmonisation of national or domestic laws with regional and international laws and agreements; criterion Q37 to establish whether the national legislative framework creates an enabling environment for the national MCS program to effectively deliver on the national, regional and international MCS related mandatory obligations; criterion Q38 which seeks to determine the existence of a 3 or 5 year national MCS strategy that details the strategic objectives of various aspects and units of MCS,

and to elaborate on crucial responsible areas and key performance areas and activities of each MCS unit; Q39 which seeks to determine the existence of a monitoring and evaluation tool or processes to continually assess the performance of a national MCS program; criterion Q40 to determine the existence and effectiveness of administrative processes for the Fisheries Governance Authority (FGA) to effectively control and coordinate for a national MCS program, and criterion Q41 to determine the effectiveness of a national MCS program in the event that there is devolution of duties and command from the national level to regional and local level structures. The combined group assessment results of the criteria are presented in Figure 6.5 hereunder.

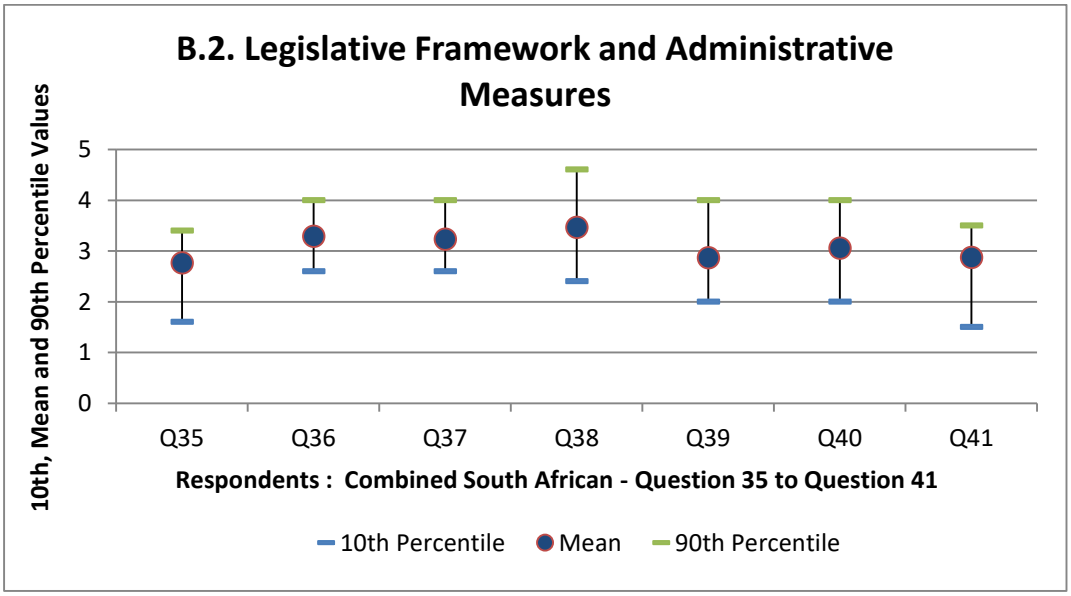


Figure 6.5: Box plots of Combined South African respondents for criteria Q35 to Q41 illustrating 10th, Mean and 90th percentile values in their assessment of synchronisation and harmonisation of South African legislative framework and administrative measures with regional and international laws and agreements.

Results on this part of the questionnaire did not indicate any responses on the scale's extremes. Mostly, plots had a mean value ranging between 2.76 and 3.47, ranging from adequate to average. It can also be noted that the IP highest value in most of the criteria, particularly criteria Q36; Q37; Q39 and Q40, is 4, while Q38 had the highest mean score (3.47) and a 90 percentile score of 4.6, approaching excellent. Criteria Q35, Q36 and Q37 have IPRs that are less than 2, whereas criteria Q38, Q39; Q40 and Q41 have IPRs that ranges from 2 to 2.2. The reasons and implications of these considerable differences in opinion among the groups will be further elaborated on in the discussion chapter.

Q38, on the existence and strength of a 3 or 5 year national MCS strategy, achieved the highest mean score and had the highest at IPR at 2.2 indicating a considerable difference of opinion on meeting this criterion. The SAFIR group scored this criterion lower than the Managers and Inspectors, but even in the SAFIR group the IP lowest value for Q38 was 2.2, the mean value was 3, and the IP highest value was 3.8. Overall, these results indicate a general agreement that this criterion is being met adequately and probably well, but with some differences in opinion between the different groups.

The differences in opinion among the three groups for B.2 as a whole were further investigated utilising the Kruskal-Wallis test and the Wilcoxon test (Table 6.4) and in the box plots in Figure 6. 6.

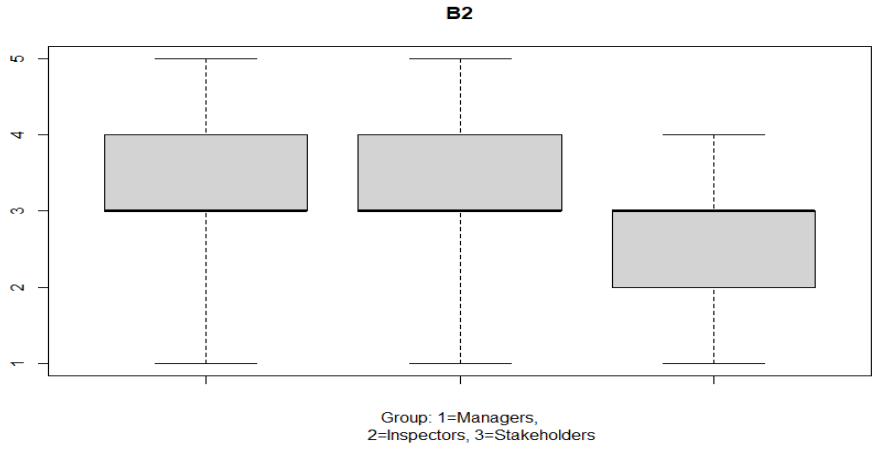


Figure 6.6: Box plots comparing responses of DEFF Managers, DEFF Inspectors and the SAFIR Group for Section B.2. The bold line indicates median, boxes 25% and 75% quartiles and dotted lines show ranges.

Managers and Inspectors groups have similar median values and spreads, and it appears as if they agree with each other, but the SAFIR group appears to have a different opinion compared to the other two groups and to be less optimistic. The Kruskal-Wallis test supports this view (χ^2 = 5.782 ; p =0.05552) with two degrees of freedom, and the Wilcoxon test on pairs also supports this observation (p =0.02593), and it further points out that the pair which has led to the statistically significant observation under Section B2 is the SAFIR group and the DEFF Managers.

6.3.5. Evaluation of infrastructure and physical resources (B.3.)

A set of 11 criteria for investigating the existence and functional level of the infrastructure and physical resources was developed, i.e. criteria Q42 to Q52. Some of the criteria were further divided into sub-criteria, and those are Q46 (a-c); Q49 (a-c) and Q50 (a-b). Criteria used in this part of the questionnaire were used to investigate the availability and status of the South African MCS infrastructure and related physical resources, and the combined group assessment results of the criteria are presented in Figure 6.7 hereunder.

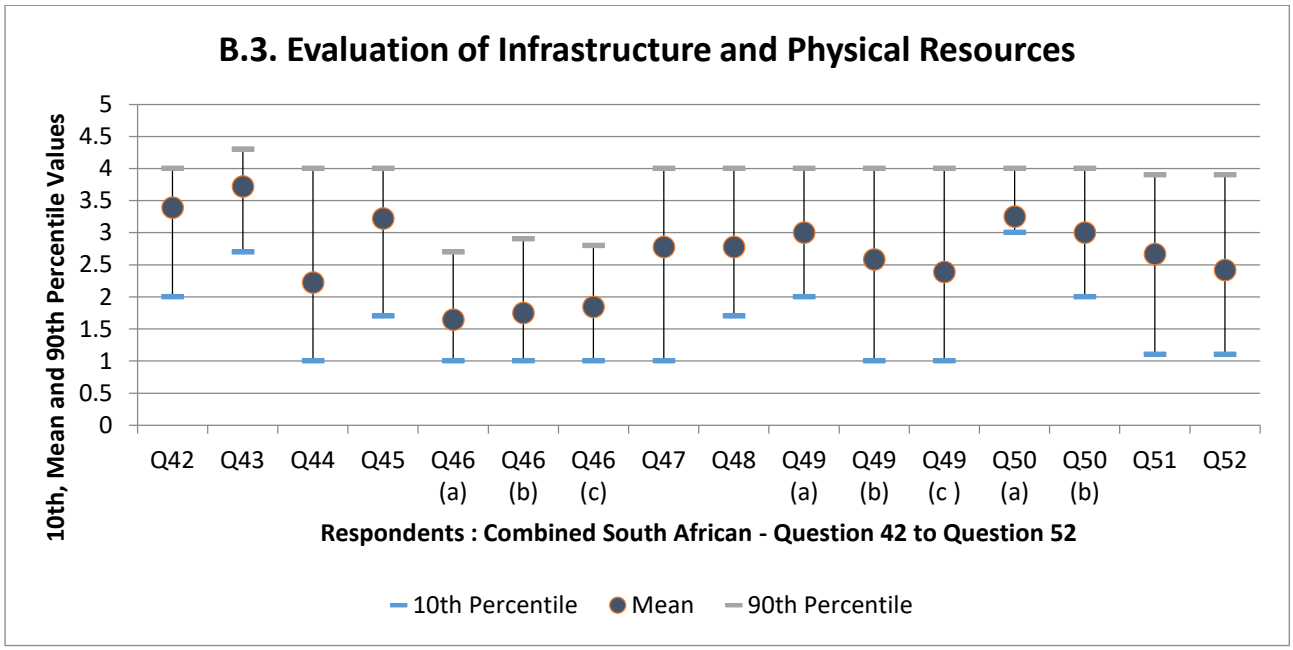


Figure 6. 7: Box plots of combined South African respondents for criteria Q42 to Q52 illustrating 10th, Mean and 90th percentile values in their assessment of MCS related infrastructure and physical resources.

Responses in this part of the questionnaire presented very different views in specific criteria and a certain level of agreement among the groups in specific criteria. This group's results also include mean scores of less than 2, indicating below adequate and tending towards poor for the three sub-criteria of Q46, which investigates aerial surveillance infrastructure and related resources. Criterion Q46 has three sub-criteria, which have mean values of less than 2, i.e. 1.64, 1.75 and 1.85, respectively. However, the three sub-criteria have similar IP lowest values of 1 and IP highest values of less than 3 of which the highest IP lowest value is for Q46 (b) at 2.9. The IPR for all three sub-criteria is less than 2, an indication that there were not many

differing opinions among the groups on the South African MCS program to rank it as poor to adequate. In the individual group's box plots, the DEFF inspectors have similar mean values to DEFF managers for criteria 46 (a-b), which is 2.5 signifying adequate. Notably, the mean values of criteria Q46 (a) and Q46(c) for the SAFIR group is 1, which signifies poor. However, the mean values of DEFF inspectors for criterion Q46 (a) is 1.7, and for the DEFF managers, it is 1.8. Both are less than 2, and they denote poor even though they are both closer to 2. Therefore, in essence, the mean values of all three groups denote poor. The IPR for both the DEFF managers and DEFF inspectors is 1.5, which implies a high level of agreement between the two groups in the poor to adequate assessment in meeting this criterion. That is also the case with criterion Q46(c), where for the DEFF managers and DEFF inspectors, have mean values of 2 and 1.8 respectively. Their IP lowest values are both 1, and the IP highest value for the DEFF managers is 3.5, and for the DEFF inspectors, it is 2.5. Therefore, the IPR value for the DEFF managers is considerably high at 2.5, which is not the case with the DEFF inspectors at 1.5 as with the SAFIR group, which is 0. Criterion Q44 was used to determine how widespread is the installation and utilisation of FGA approved VMS in the South African fishing fleet, particularly fishing vessels that are mandated to do so. For this criterion, i.e. Q44, there was a low mean value of 2.22, the lowest IP value of 1 and an IP highest value of 4. The IPR value of 3 for Q44 was an indication of a considerable difference in opinion.

The other criteria under Section B 3, are. Q42; Q43; Q45; Q47; Q48, Q49 (a-c); Q50(a-b); Q51 and Q52 all their mean values fall between 2.5 and 3.5 which denotes adequate and approaching good. Criterion Q42 was about determining whether a VMS Operations Centre in South Africa allows different communication protocols, including it being linked to an international satellite system like the International Maritime Satellite C (Inmarsat-C). Criterion 43 was set to determine how widespread is the installation and utilisation of government-approved VMS in the domestic fishing fleet of South Africa. Criterion 45 was to evaluate the overall compliance of fishing vessels with all permit conditions about utilising VMS within the South African national waters. Criterion Q47 sought to establish the availability of sufficient and fully operational small crafts and sea-going vessels that are optimally utilised throughout the year to deliver on the objectives of the National MCS implementation plan.

Criterion Q48 was for determining the availability and sufficiency of storage and holding facilities for confiscated marine living resources and detained vessels, cars and other crafts that may have been used in committing a crime in the fisheries sectors. Sub-criterion Q49(a) was for rating the MCS unit's structural arrangement in the FGA, and sub-criterion Q49 (b) was to

determine if the senior management organisational structure of the FGA conforms to a pyramid-shaped management structure. Sub-criterion Q49 (c) was for scoring on the efficiency and effectiveness of the FGA management structure in the execution of its responsibilities. Criterion Q50 was for determining whether the division of labour within the organisation, i.e. appropriate structure for a set of MCS interrelated operational functions, was yielding any positive results according to design. Criterion Q51 was for determining the level of training and competency of its inspectors regarding all relevant MCS policies and legislation, and Q52 for investigating the existence of setting minimum standards for formal education and training of inspectors in line with international standards. In all these criteria, as briefly explained above, their mean values ranged between 2.5 and 3.5. However, for criteria Q44; Q47; Q49 (b); Q49 (c); Q51 and Q52, their IPRs are 3 or close to 3 indicating much disagreement. Overall opinions show much diversity in this Section.

The differences in opinion among the three groups for Section B.3. as a whole was further investigated utilising the Kruskal-Wallis test and the Wilcoxon test (Table 6.5) and in the box plots in Figure 6.8. The three groups had similar median values, which is 3, and spreads are different for all three, although it appears as if they agree with each other.

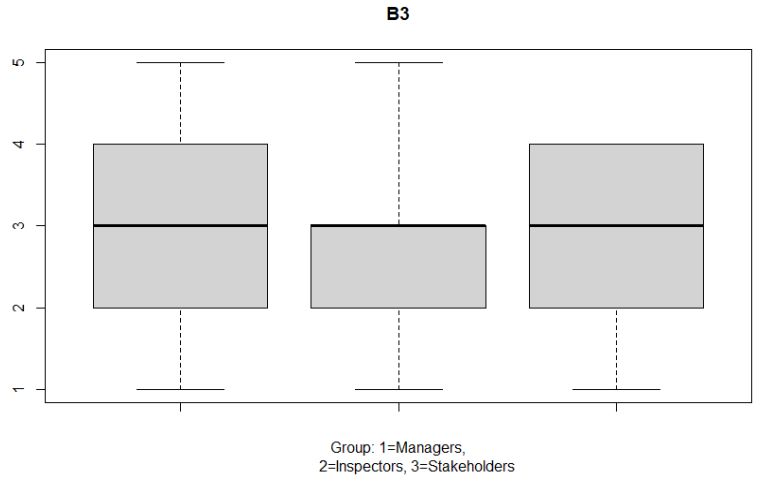


Figure 6.8: Box plots comparing responses of DEFF Managers, DEFF Inspectors and the SAFIR Group for Section B.3. The bold line indicates median, boxes 25% and 75% quartiles and dotted lines show ranges.

To a large extent, the tests show no statistical differences between the three groups, which is also apparent from the boxplots. The Kruskal-Wallis test supports this view (χ^2 = 5.152; p

=0.07608) with two degrees of freedom, but the Wilcoxon test on pairs indicates a significant difference between Managers and Inspectors (p =0.02673, Table 6.5).

6.4. Part C: Evaluation of an MCS system process and its effectiveness – The reactive approach

6.4.1. Effectiveness of before / Prior fishing – At Port inspections (C.1.)

The South African national MCS program's effectiveness was further investigated through assessing port inspections before or prior to fishing, where a set of five assessment criteria were developed, i.e. Q53 to Q57. Questionnaires given to the South African Fishing Industry and other stakeholders did not cover this area given its confidential nature and sensitivity. Law enforcement aspects of an MCS program, with regards to planning and implementation, are mostly contained in the System of Procedure (SOP), in which the SAFIR group are not privy nor exposed to the processes that are followed in their development and utilisation. Hence they were not asked to evaluate the development and utilisation of SOPs. Therefore, plots for this part of the questionnaire show the combined answers of DEFF Managers and DEFF Inspectors only (Figure 6.9).

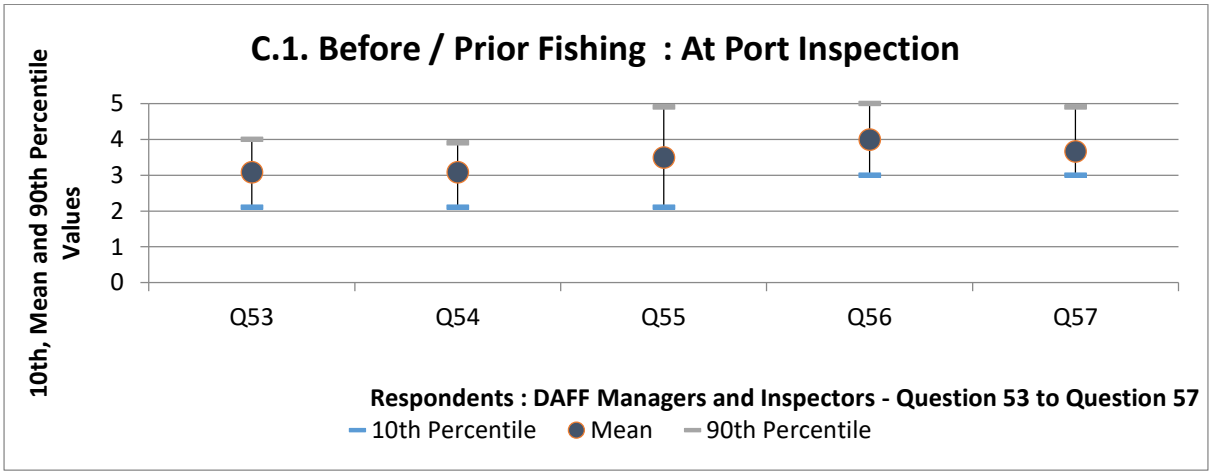


Figure 6. 9: Box plots of Combined DEFF Managers and Inspectors for criteria Q53 to Q57 illustrating 10th, Mean and 90th percentile values in their assessment of before or prior fishing port inspections

Results for this part of the questionnaire did not indicate any responses on the scale's extremes, and most responses gave scores of adequate or higher. All the plots had a mean value of more than 3, ranging from 3.08 to 4, i.e. average and good. The IP lowest values of criteria Q53 which is about the System of Procedure, to Q55, which seeks to determine the state of preparedness for inspections, was 2.1. Their respective IQ highest values were close to or above 4. The IPR for criteria Q53 and Q54, which were about determining the existence of different systems of procedure, were less than 2. That implies that there was a reasonably low difference in opinion between the groups in meeting these criteria. However, it was different for criterion Q55 which had an IPR of 2.8, showing that opinions differed in meeting this criterion. The results of the Wilcoxon test showed a difference, significant at 0.05 probability, between the opinions of the two groups (W=607, p=0.01405, Table 6.5) and the box plots in Figure 6.10 show that the Managers scored this more positively (median = 4) than the Inspectors (median = 3).

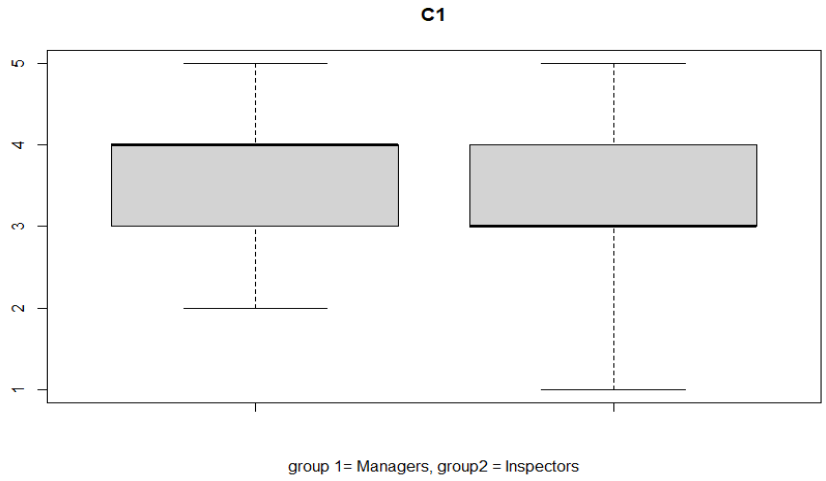


Figure 6. 10: Box plots comparing responses of DEFF Managers and DEFF Inspectors for Section C1. The bold line indicates median, boxes 25% and 75% quartiles and dotted lines show ranges.

6.4.2. Effectiveness of during fishing / At sea boarding inspections (C.2)

The South African national MCS program's effectiveness was investigated through during fishing or at sea inspection assessments, where a set of four assessment criteria were developed, i.e. Q58 to Q61. Due to the sensitivity regarding government security protocols around MCS

processes, questions on this aspect of MCS were only asked to the government FGA and not the South African Fishing Industry and other stakeholders. Law enforcement and compliance activities are only developed and implemented by a mandated government department. Therefore, the SAFIR group, and other relevant stakeholders, do not participate in such a process, nor are they well informed of such processes' nuances. Hence they were not given questions in this part of the questionnaire Figure 6.11 hereunder shows boxplots of the combined DEFF managers and DEFF inspectors respondents for criteria Q58 to Q61.

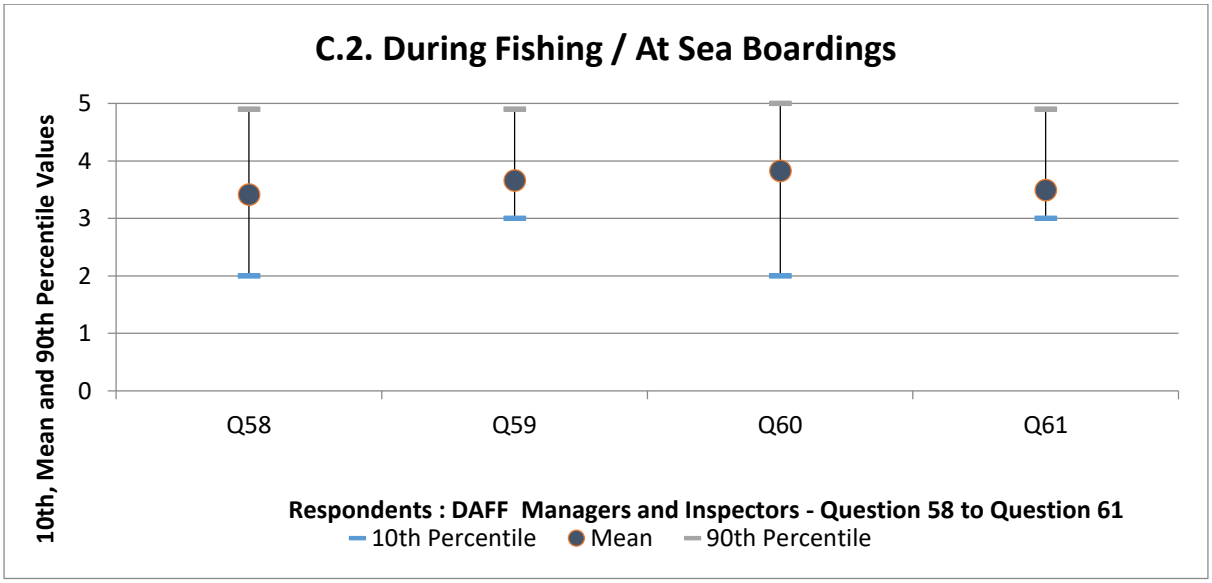


Figure 6. 11: Box plots of combined DEFF Managers and Inspectors for criteria Q58 to Q61 illustrating 10th, Mean and 90th percentile values in their assessment of during fishing or at-sea boarding inspection.

In this part of the questionnaire results, all the plots had a mean value of more than 3, ranging from 3.42 to 3.8 denoting average and leaning more towards good. The IPRs were just less than 2 for Q59 and Q61 but close to 3 for the other two questions. Q59 seeks to establish if there are alternative specific SOPs for at sea MCS activities and Q61 if there is a comprehensive checklist that the responsible inspector must complete for verification and approval by the supervisor after each boarding. For the DEFF managers' criterion Q59 has a mean value of 3.8 and an IPR value of 2.5, which is relatively high. For the same criterion, i.e. Q59, DEFF inspectors have a mean value of 3.5 and IPR value of only 1. For Q61, the combined group boxplots results are similar to those of criterion Q59, but there is a difference in the individual groups' results, with the Managers being generally more positive than the Inspectors. In the

DEFF managers group, the IPR value is 2, which is high, where the IPR lowest and highest values are 3 and 5 with a mean value of 4, which denotes good. For the DEFF inspectors, the IPR highest and lowest values are 2 and 4, respectively, with a mean value of 3, which signifies average.

Further statistical analysis to investigate the different opinions of these two groups was conducted utilising the Wilcoxon test, which indicated a significant difference of opinion between the two groups (W=384.5, p=0.03971, Table 6.5). The box plots in Figure 6.12 also show marked differences between the two groups, with the median value for Managers of 4, and for Inspectors of 3. Also, for Managers, upper and lower quartiles are distributed between 3 and 5, whereas for Inspectors, most responses are between 3 (average) and 4 (good).

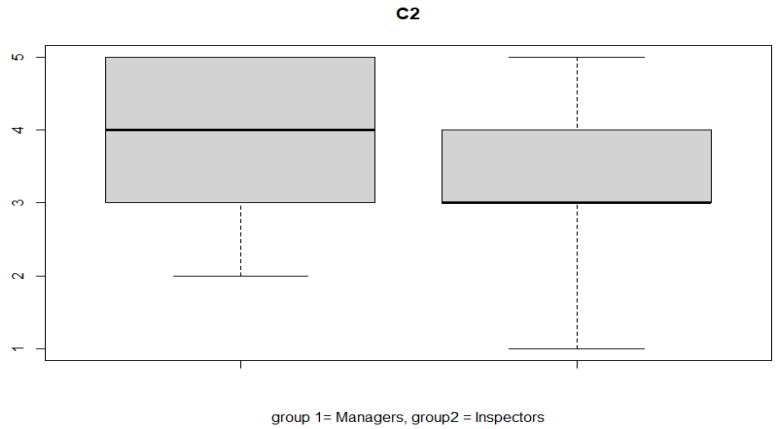


Figure 6. 12: Box plots comparing responses of DEFF Managers and DEFF Inspectors for Section C2. The bold line indicates median, boxes 25% and 75% quartiles and dotted lines show ranges.

6.4.2.1. Safety and catch inspection procedures (C.2.1.)

A set of four criteria for investigating the South African national MCS program's effectiveness through safety and catch inspection assessment was developed, i.e. criteria Q62 (a) to Q62 (d). All three groups were asked to respond to these questions. Figure 5.13 hereunder shows boxplots of the combined South African respondents for criteria 62 (a) to 62 (d). That shows that the mean scores for all questions were above 3, with narrow IQRs for criteria Q62 (b) and (c), but broader ranges for the other two, 62(a) and (d).

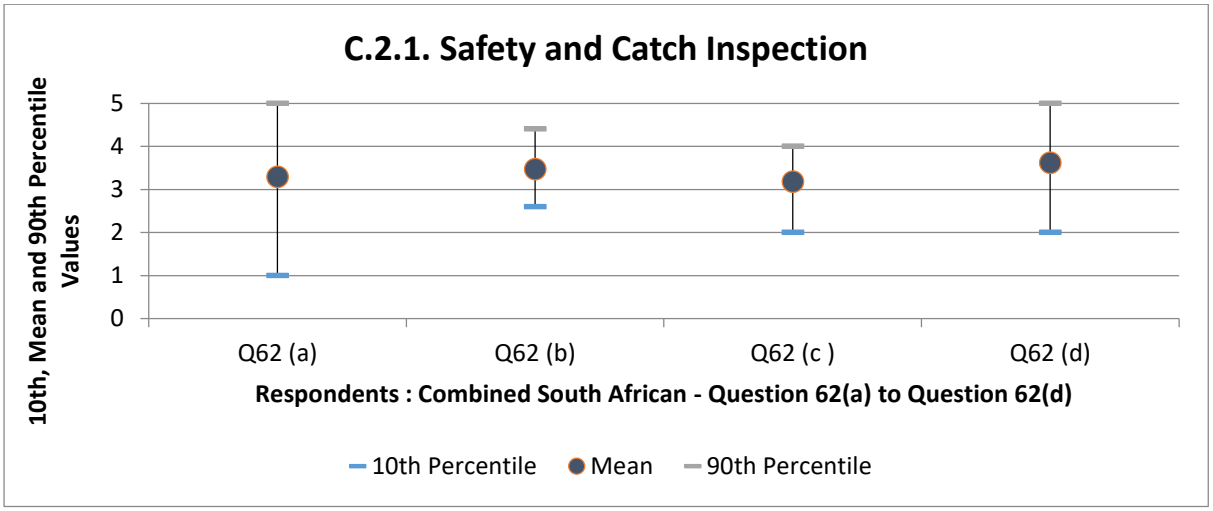


Figure 6. 13: Box plots of Combined South African respondents for Q 62(a) to Q 62(d) illustrating 10th, Mean and 90th percentile values in their assessment of safety and catch inspection.

For criterion Q62 (a) the IP lowest value is 1, and the IP highest value is 5. The IPR value is 4, which is very high, implying a large difference of opinion in meeting this criterion. A closer look in the individual group plots for criteria Q62 (a) shows that the significant difference among these groups is with the minimum value which is 3.5 for the DEFF managers; 2 for DEFF inspectors and 1 for the SAFIR group.

Criteria Q62 (d) also shows a relatively high IPR value in the combined South African respondents group of 3, given the IP lowest value of 2, mean value of 3.63 and the IP highest value of 5. The difference in opinion among the three groups was further investigated utilising the Kruskal-Wallis test (Table 6.4) and the Wilcoxon test (Table 6.5). The box plots in Figure 6.14 show that the Managers group has a median value of 4 that appears to be more optimistic than the other two groups regarding the efficiency of the South African MCS system in safety and catch inspections. The Kruskal-Wallis test supports this observation (χ^2 = 8.4888 ; p =0.01434), and the Wilcoxon test on pairs also seems to support this observation (p = 0.003227), collectively demonstrating that the pair which has led to the statistically significant observation under Section C.2.1. is the DEFF Managers and the DEFF Inspectors, with the latter scoring lower than the Managers.

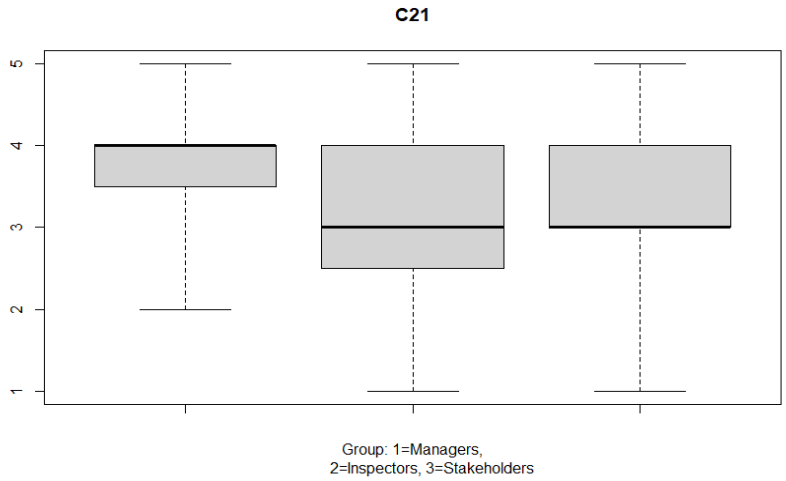


Figure 6.14: Box plots comparing responses of DEFF Managers, DEFF Inspectors and the SAFIR Group for Section C2.1. The bold line indicates median, boxes 25% and 75% quartiles and dotted lines show ranges.

6.4.3. Effectiveness of during landing inspection – At landing sites, declared fishing harbours and commercial ports (C.3.)

A set of four criteria for investigating the effectiveness of the South African national MCS program through an assessment of the landing inspections at all the declared landing sites was developed, i.e. criteria Q63, which sought to determine the state of readiness of inspectors to undertake inspections at landing sites, to Q67 for evaluating the effectiveness of the operations system of procedure for the different units of the national MCS program. Criteria Q64 addressed the effectiveness of an in-built evaluation program or a monitoring and evaluation tool of the FGA in assessing its ability to keep track of all fish landing activities in all landing sites any time of the day. That was further divided into four sub-criteria, i.e. Q64 (a-d). Criterion Q65 is about the availability and use of an SOP that may be general, or fishery specific, utilised during fish landings. This criterion was further divided into six sub-criteria, i.e. Q65 (a-f). The SAFIR group was not included in this section's assessment because, as explained in the previous two parts of the questionnaire, the SAFIR group does not have an intimate knowledge of such processes. Figure 6.15 hereunder shows boxplots of the combined South African respondents for criteria Q63 to Q67.

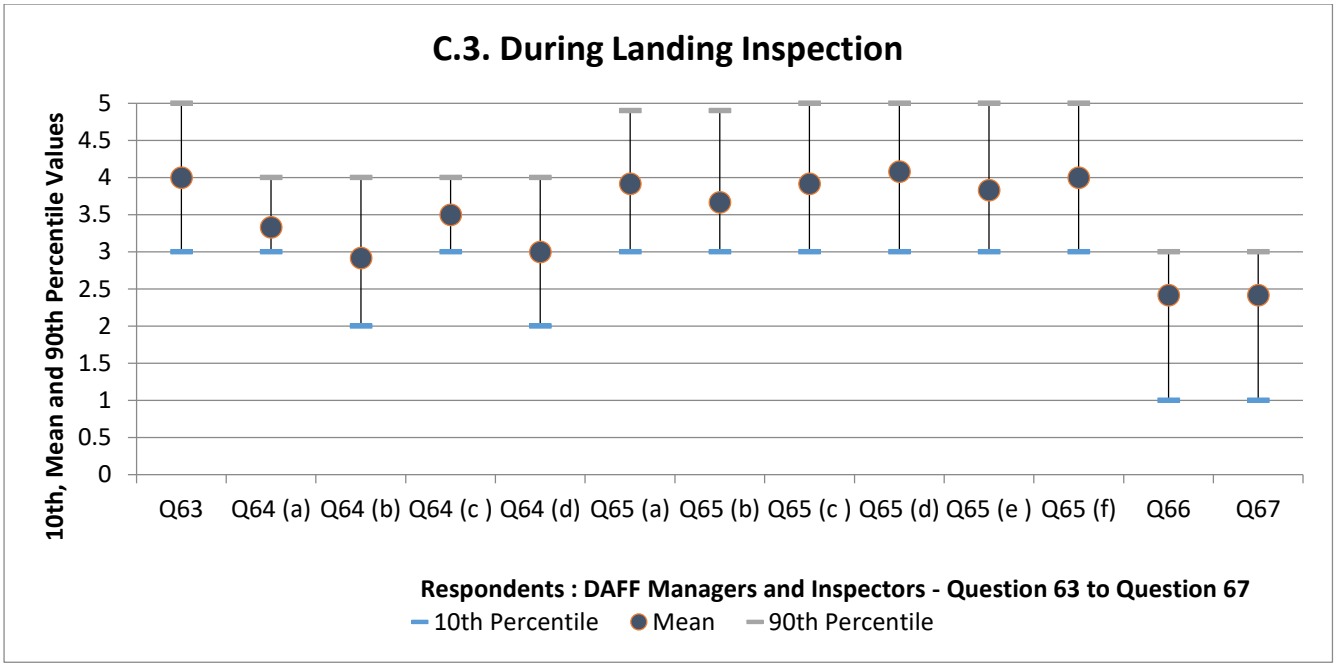


Figure 6.15: Box plots of Combined DEFF Managers and Inspectors for criteria Q63 to Q67 illustrating 10th, Mean and 90th percentile values in their assessment of during landing inspections

Mostly, these criteria' responses did not show any extreme values as mean values ranged from 3 to 4.08, except for criteria Q64 (d) which is 2.92 and for criteria Q66 and Q67 which were 2.42 for both. The mean values of these three criteria fall in the category of adequate or just below. For criteria Q65, Q65 (a), which is about the notification to land which must be sent to the FGA 24 hours before landing; Q65 (b) inspection procedures for trawlers, reefer vessels and FPEs at sea; Q65(c) an inspection record which must be completed by the responsible inspector and countersigned by the skipper of the inspected vessel; Q65 (d), Q65 (e), i.e. confirmation of the fishing vessel details, and Q65 (f), determination of the by-catch amount concerning the landed fish, all have mean values that are above 3. The IP lowest values are 3 with the IP highest values ranging from 4 to 5. These indicate that there is a consensus that the criteria are being met at a more than adequate level. Criteria Q64 (b), which seeks to establish if there is easy access for inspectors and officials any time of the day in the landing sites that are not under the direct control of the FGA, and Q64 (d), ability to determine the possibility of illegal activities in the landing sites during landings, have mean values of 2.92 and 3 respectively. Both sub-criteria have an IPR value of 2.

Criteria Q66, for determining if there is cross-referencing of work between various units of MCS, i.e. before fishing; at sea boarding; landing and post-landing inspections, and Q67 which

is about testing the effectiveness and efficiency of the operational system of procedure in observing linkages between the functional units of the MCS program are of concern. The mean value is 2.4 for both, which connotes adequate but the IP lowest and highest values in both these criteria were 1 and 3 respectively, which implies that several respondents viewed them to be less than adequate, indicating that there may be shortcomings in linking and cross-referencing information from the inspections of the three MCS units. Simultaneously, the scores of the Managers and the Inspectors for Q66 were broadly similar in medians and upper and lower percentiles, as they were for Q67.

The box plots in Figure 6.16 indicate a similar dispersion pattern between the two groups, but the median value for Managers was 4, and for Inspectors, it was 3. The difference between the two was not statistically significantly different at the 5% confidence level (W=3545; p = 0.06336, Table 6.5) and both groups seem optimistic about the efficiency of the South African MCS performance during landing inspections.

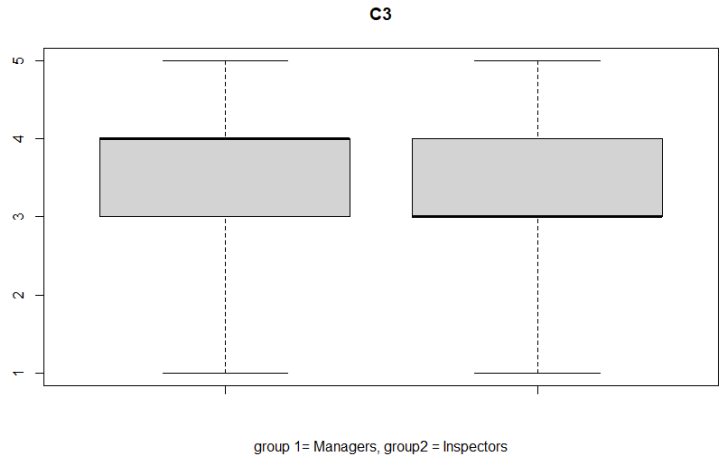


Figure 6.16: Box plots comparing responses of DEFF Managers and DEFF Inspectors for Section C3. The bold line indicates median, boxes 25% and 75% quartiles and dotted lines show ranges.

6.4.3.1. Inspection of foreign fishing vessels (C.3.1.)

A set of four criteria for investigating the South African national MCS program's effectiveness through an assessment of the system of inspection of foreign fishing vessels was developed, i.e. criteria Q68 to Q71. Again, questionnaires given to the South African Fishing Industry and

other stakeholders did not cover this area as it has aspects of law enforcement planning and implementation processes they are not familiar with.

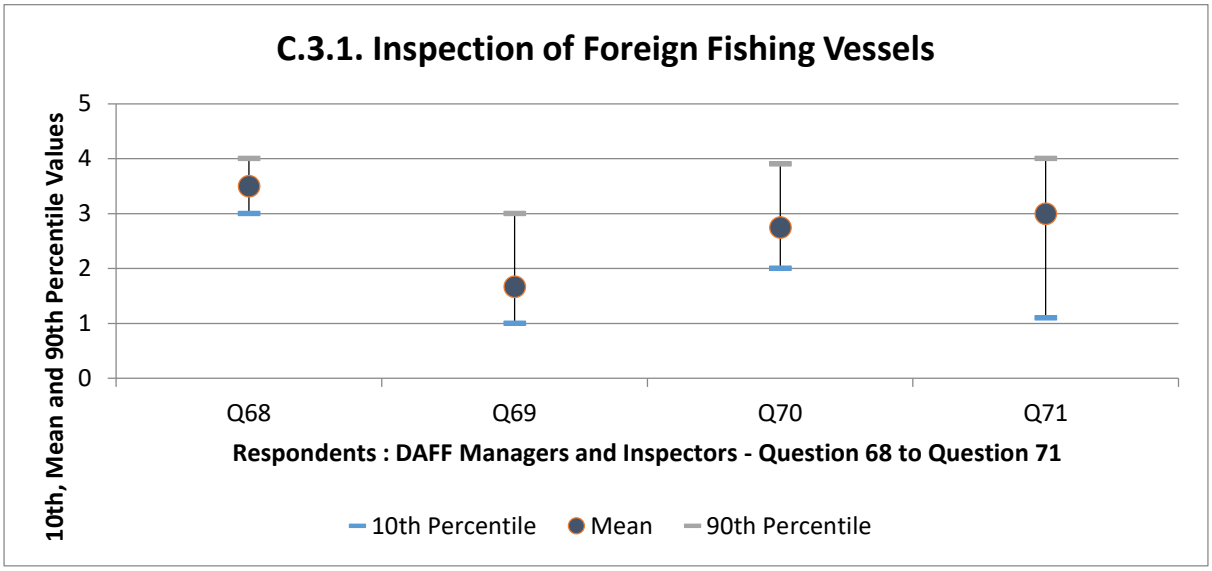


Figure 6. 17: Box plots of Combined DEFF Managers and Inspectors for criteria Q68 to Q71 illustrating 10th, Mean and 90th percentile values in their assessment of the South African MCS program in the inspection of foreign fishing vessels

There were mixed results for these criteria, as the mean scores of criteria Q68, which was for determining the state of readiness and preparedness of inspectors to inspect foreign vessels, and Q71, which was for investigating the responsibility of the coastal State in conducting pre-checks and screening of vessels that are requesting entry into its EEZ and subsequent use of its port facilities, were 3.5 and 3 respectively. However, for criterion Q69, which was set for determining foreign language proficiency levels, especially those that are dominant in foreign fishing fleets that frequent the SADC region, for example, Spanish and Chinese languages, i.e. Mandarin and Cantonese, the score was 1.67. That was a clear indication that inspectors were not trained in any foreign languages that are common in the foreign fishing vessels that fishing, offloading or generally traversing our waters or even utilising our port facilities for a variety of services. That poses a problem for an inspection or a two-way communication process when an issue requires such an action. For criterion Q70, which was for determining the existence of alternative communication methods provided to the inspectors if none of the inspectors can communicate in the language used by the crew of the vessel they would be inspecting on, the lower score was 2.75. Worth noting is that the IPR in criteria Q69 and Q70 is 2, which denotes a considerable difference in opinion between the two groups, i.e. managers and inspectors.

Furthermore, criterion Q71 had an IP lowest value of 1.1, a mean value of 3, which is average and an IP highest value of 4, which signifies good. The Wilcoxon test on pairs was also done, and it shows no significant difference between the two groups (W = 339; p = 0.2812, Table 6.5).

6.4.4. Post landing inspections assessment (C.4.)

For the investigation of the effectiveness of the South African national MCS program through an assessment of the system of post-landing inspections a set of four criteria was developed, i.e. criteria Q72, to assess the state of readiness of the national MCS program to undertake inspections at various points of sale and land-based FPEs, to Q73, which is on determining the existence and effectiveness of an SOP that focuses on post landing MCS interventions. Criterion Q73 was further divided into four sub-criteria, i.e. Q73 (a) validation process of FPE operating licences as issued by FGA; Q73 (b) inspection processes and documentation of trucks that transport landed fish to predetermined FPEs; Q73 (c) effectiveness of monitoring points of sale with regards to invoices, species of fish they are licenced to acquire and redistribute, and Q73 (d) existence and effectiveness of airport and all other ports of entry inspection regime for verification and validation of import and export permits. These questions were only put to the DEFF Managers and Inspectors for the same reason as the previous criteria. Figure 6.18 hereunder shows the combined South African respondents' boxplots for criteria Q72 to Q73 (a-d).

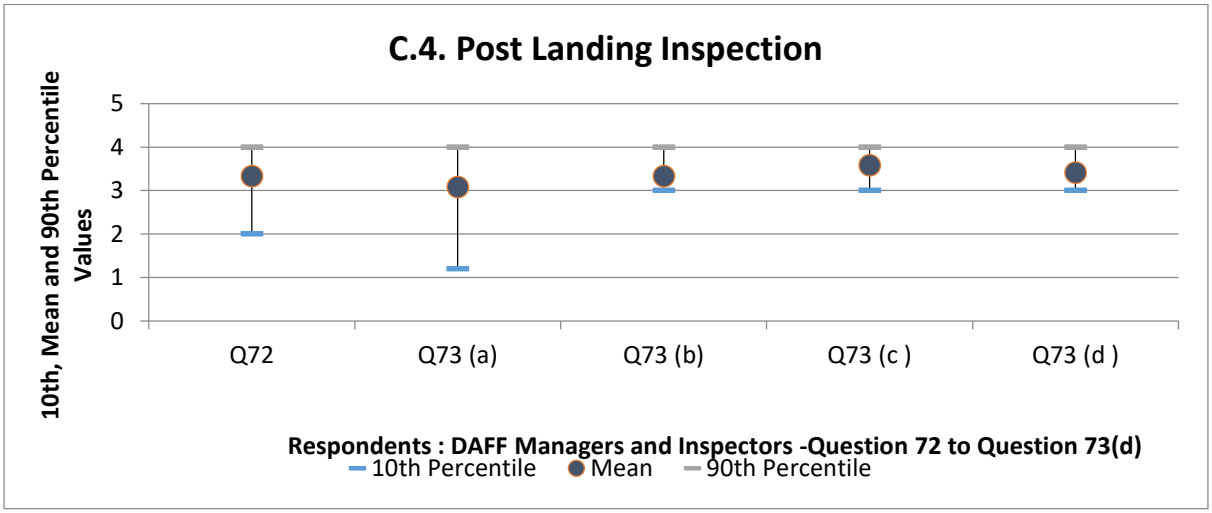


Figure 6.18: Box plots of Combined DEFF Managers and Inspectors for criteria Q72 to Q73 (a-d) illustrating 10th, Mean and 90th percentile values in their assessment of post-landing inspection

Results for this part of the questionnaire did not indicate any responses on the extremes of the scale. All the plots in the combined South African respondents' boxplots have a mean value of between 3.3 and 3.58, and an IPR value of 1 except for criterion Q72 and sub-criterion Q73 (a). The IPR values for criterion Q72 which is 2, and for sub-criterion 73 (a) which is 2.8, can be viewed as reasonably high.

The box plots in Figure 6.19 indicate that most responses lie between 3 and 4 for both groups. However, the median value for Managers is 4 and is 3 for Inspectors. Although both groups seem optimistic about the South African MCS system regarding post-landing inspections, Inspectors seem less optimistic than Managers. That is reflected in the statistically significant difference in opinion between the two groups in the Wilcoxon test on pairs (W=598, p = 0.0199).

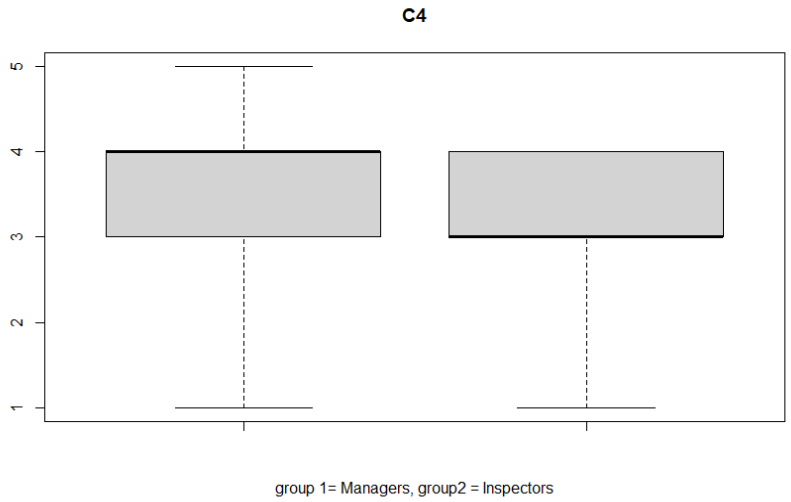


Figure 6.19: Box plots comparing responses of DEFF Managers and DEFF Inspectors for Section C4. The bold line indicates median, boxes 25% and 75% quartiles and dotted lines show ranges.

6.5. Part: D: Evaluation of an MCS system process and its effectiveness – proactive approach

6.5.1. Stakeholder engagement / Collective approach (D.1.)

A set of five criteria for investigating the South African national MCS program's effectiveness through an assessment of the stakeholder engagement or collective approach processes was developed, i.e. criterion Q74 to Q78. Apart from Q76, these questions were put to all three groups: the DEFF managers, DEFF inspectors, and the SAFIR groups. Figure 6-20 hereunder shows base boxplots for the combined South African respondents for criteria Q74 to Q78.

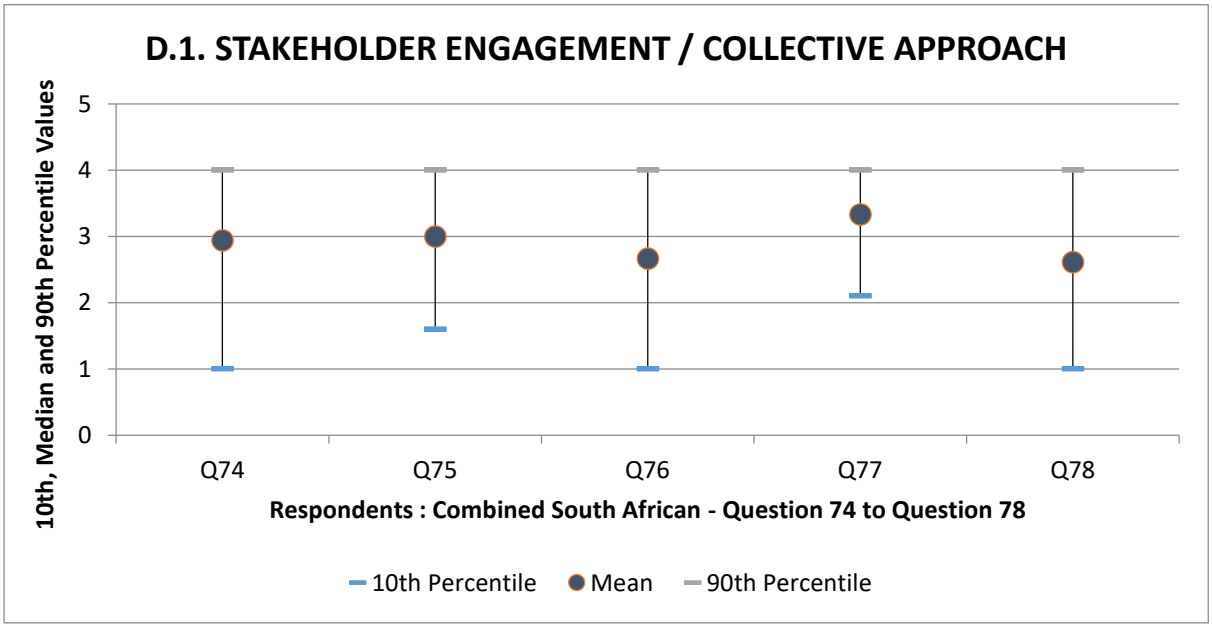


Figure 6.20: Box plots of Combined South African respondents for criteria Q74 to Q78 illustrating 10th, Mean and 90th percentile values in their assessment of the effectiveness of the MCS proactive approach utilising the stakeholder engagement or collective approach.

Results for this part of the questionnaire showed mean values of above 2.5 for all questions but with some degree of variation shown as high IQRs particularly for criteria Q74, determination of an institutionalised stakeholder identification and classification process as an integral part of the national MCS strategy; Q76, the existence of a database of other fisheries interested parties or forums that are funded by the commercial fishing industry and have direct access to the FGA database for promotion of fisheries compliance and awareness programs, and Q78, the existence of an active stakeholder forum which is a platform for regular stakeholder discussion that can be audited for its operations. In the individual groups there are varying

opinions as well, for example in criterion Q74 the DEFF managers' mean score was 3.3, for Inspectors, it was 3, and for the SAFIR group, the mean was 2.4. That indicates that consulted stakeholders are less satisfied than both the DEFF managers and inspectors with the stakeholder identification process.

Figure 6-21 shows that the responses from Managers and Inspectors groups had similar spreads, and they seem to agree with each other, but the SAFIR group has some difference in opinion with the other two groups. Although DEFF respondents were optimistic about South Africa's performance regarding the collective approach and stakeholder engagement in the South African MCS system, the SAFIR group was less optimistic. The Kruskal-Wallis supports this observation (χ^2 = 9.7553; p = 0.007615) and the Wilcoxon shows a statistically significant difference between the SAFIR group and both Managers (p = 0.00422) and Inspectors (p = 0.01551) (Table 6.4).

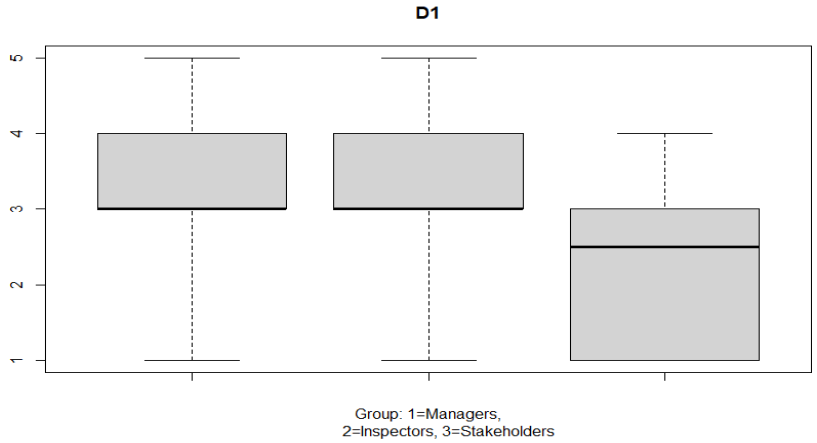


Figure 6. 21: Box plots comparing responses of DEFF Managers, DEFF Inspectors and the SAFIR Group for Section D.1. The bold line indicates median, boxes 25% and 75% quartiles and dotted lines show ranges.

6.5.2. Risk identification, analysis and management: Personnel (D.2.1)

A set of four criteria was applied for investigating the South African national MCS program's effectiveness through an assessment of risk identification, analysis and management, with a focus on personnel as a subset of a risk identification process. Criteria developed were Q79, the existence of a regime for thoroughly screening candidates for employment to the MCS unit, i.e. for their health status; criminal records and verification of qualifications; Q80, determining the existence and effectiveness of corruption and fraud mitigating measures; Q81, an

assessment of the impact of fraud and corruption, if it has occurred, on the image and confidence of the public to the integrity of the FGA, and Q82, to determine if annual or infrequent lifestyle audits are conducted on all employees of the FGA. These questions were put to the DEFF managers, the DEFF inspectors and the SAFIR group. Figure 6-22 hereunder shows boxplots of the combined South African respondents for criteria Q79 to Q82.

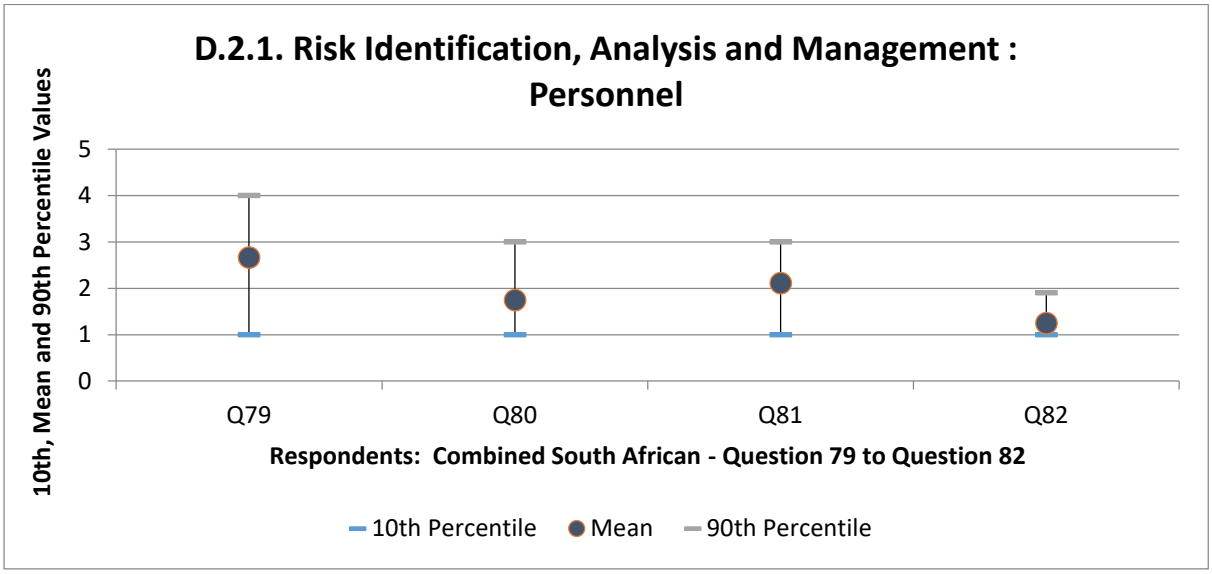


Figure 6.22: Box plots of Combined South African respondents for criteria Q79 to Q82 illustrating 10th, Mean and 90th percentile values in their assessment of the effectiveness of the Southern African MCS in personnel-related matters in risk identification, analysis and management

Results on this part of the questionnaire indicate some degree of contrast in the opinions of the various groups but collectively indicated that the risks of corruption and fraud are considerably high. The IPR of 3 for criterion Q79 is high, implying that there are vastly different opinions about a thorough screening regime of MCS employment candidates. In the individual group's box plots, the scores of criteria Q79 are almost similar in all the groups, except for the IP highest value of the DEFF managers which is 4, signifying good. It is evident that for criterion Q82 perceptions show little difference among the groups,

The Managers and Inspectors groups have similar spreads, and they seem to agree with each other, but the SAFIR group seems to have a different opinion to the other two groups (Figure 5.23). Even though DEFF respondents appear to be neutral about South Africa's MCS performance regarding risk identification and management on matters about its personnel, the SAFIR groups seem to be more negative. The median values of both DEFF Managers and Inspectors are 2 (adequate), but the SAFIR Group's median value is 1 (poor). Statistical

analyses (Table 6.4) utilising the Kruskal-Wallis test supported these observed differences between the groups (χ^2 = 10.669; p = 0.004821) and the Wilcoxon test on pairs showed a statistically significant difference between Managers and the SAFIR group (p = 0.001458) and between the Inspectors and SAFIR group (p = 0.01417).

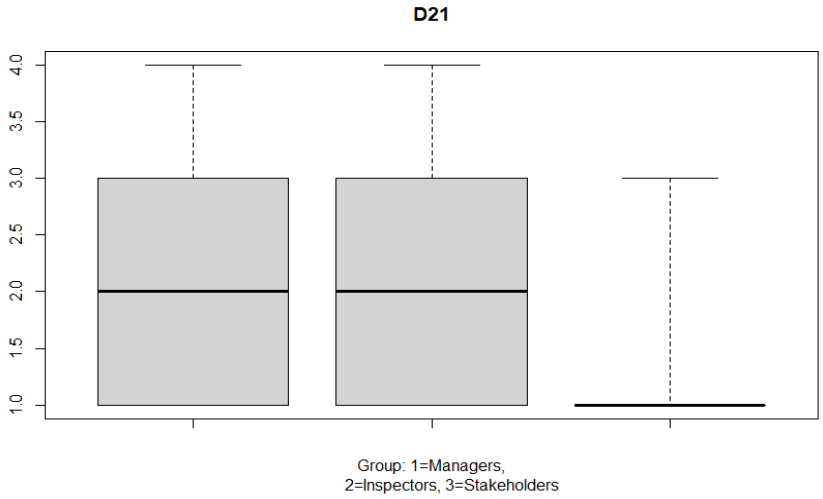


Figure 6.23: Box plots comparing responses of DEFF Managers, DEFF Inspectors and the SAFIR Group for Section D.2.1. The bold line indicates median, boxes 25% and 75% quartiles and dotted lines show ranges.

6.5.3. Risk identification, analysis and management: Mapping and monitoring of activities in hotspots (D.2.2)

On investigating the South African national MCS program's effectiveness through the assessment of mapping and monitoring of activities in hotspots, which is the second subset of risk identification, analysis and management, a set of seven criteria were developed: Q83 to Q89. This part of the questionnaire was sent to all three groups: the DEFF managers, DEFF inspectors and the SAFIR groups, but with some questions omitted for the SAFIR respondents. Figure 6-24 hereunder shows boxplots of the combined South African respondents for criteria Q83 to Q89.

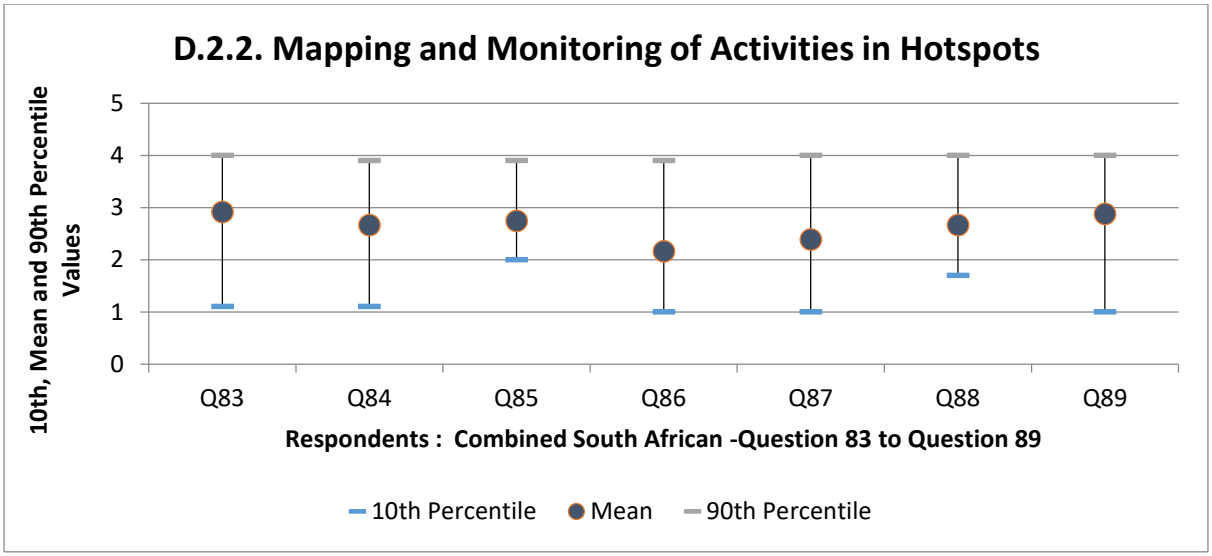


Figure 6.24: Box plots of Combined South African respondents for criteria Q83 to Q89 illustrating 10th, Mean and 90th percentile values in their assessment of the effectiveness of MCS proactive approach utilising the mapping and monitoring of activities in hotspots

In this part of the questionnaire, all groups had to respond to all criteria, except the SAFIR group, which was not given criteria Q83 to Q86 as they were about internal DEFF processes. Results on this part of the questionnaire indicate that the mean score was less than 3 in the combined group in all the criteria. That indicates a less than average performance, but with considerable variation in the scores from individual groups, with IPRs of three or nearly three for all the questions apart from Q85 and Q88, where the ranges were approximately two. The lowest mean value in the group was for criteria Q86, which seeks to determine if the FGA has highly effective and efficient strike teams that are always ready for mobilisation in emergencies, at 2.17, with its IP lowest and highest values at 1 and 3.9 respectively. The highest mean value is for criteria Q83, which seeks to determine the existence and utilisation of environmental intelligence teams to keep track of all marine-related criminal activities and that are an integral part of the national MCS program, at 2.92, also with an IPR of close to three. The mean value for criterion Q86 by the DEFF inspectors was 1.8, which denotes poor, while the DEFF managers' mean value was 2.5.

Criteria Q87 is about determining if there is a strategy within the national MCS program that seeks to predict and prevent high-grading and by-catch targeting incidents from the prior occurrence, and Q87 seeks to determine the effectiveness of the national MCS program in determining the prevalence of IUU fishing activities in particular fisheries. Q89 seeks to

determine the national MCS program's efficiency in collaboration with some or most RFMOs in blacklisting all those involved in IUU fishing. For criteria Q87; Q88 and Q89, respondents' opinions were that the South African MCS program's effectiveness ranges from poor to good. In the individual groups, for criterion Q86 the DEFF inspectors' mean value was 1.8 and for DEFF managers was 2.5. That indicates that the managers have a more positive assessment of the use of highly effective and efficient strike teams for MCS than the inspectors. For criterion Q89, DEFF managers had a mean score of 3.2, DEFF inspectors allocated scores with a mean value of 2.7, and the SAFIR group allocated a mean value of 2.8, all of which are similar and suggest average performance.

The box plots in Figure 6-25 hereunder compare responses given by DEFF Managers, DEFF Inspectors and the SAFIR Group for the criteria under Sections D.2.2. The SAFIR group and the DEFF Inspectors group have similar dispersion patterns except for their respective median values of two for DEFF Inspectors and three for the SAFIR Group. The DEFF Managers' median value is 3, and therefore similar to that of the SAFIR Group. This observation seems to imply an agreement between these two groups, even though the DEFF Management group seems to be more optimistic than the SAFIR group about the South African MCS system's performance in mapping and monitoring activities in hotspot areas. The Kruskal-Wallis test yielded no statistically significant differences in opinion between the three groups ($\chi^2 = 3.2407$; p =0.1978, Table 6.4) but the Wilcoxon comparison between Managers and Inspectors only indicated a statistical difference with a probability of 0.015 (Table 6.5).

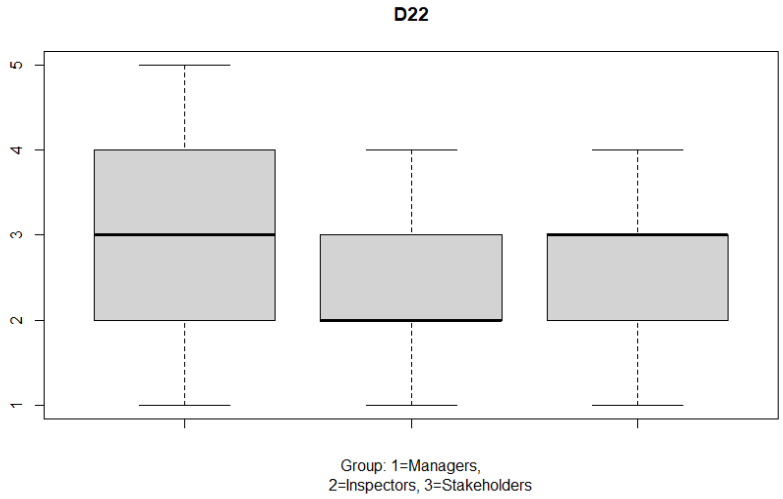


Figure 6. 25: Box plots comparing responses of DEFF Managers, DEFF Inspectors and the SAFIR Group for Section D.2.2. The bold line indicates median, boxes 25% and 75% quartiles and dotted lines show ranges.

6.6. Discussion

6.6.1. Introduction

As presented in Table 6.6 below, the average mean scores per group under each Section of the questionnaire, ranged from adequate (below 3) to average (3 and above) but less than good (4). The government officials' groups, i.e. the MCS Managers and MCS Inspectors, were mostly of the view that the overall effectiveness of the South African MCS program is average (3), with a few exceptions of adequate (2), which were B.3 (Infrastructure and Physical Resources) and D.2.1. (Risk Identification, Analysis and Management: Personnel). For the SAFIR group, the dominant view was that the South African MCS's effectiveness is generally adequate, i.e. less than average as scored by the other two groups. The exception was on the infrastructure and physical resources (B.3.) where all groups agreed on the effectiveness of the South African MCS program to be adequate (scores of less than 3), and for the safety and catch inspection assessment where they agreed with the other two groups on it being average. Interestingly, for D.2.1. (Risk Identification, Analysis and Management: Personnel) MCS Managers and Inspectors agreed that the South African MCS program's effectiveness was adequate (2.3 and 2, respectively). However, the SAFIR Group's views were that it was poor (1.4) In general differences between the Managers and the Inspectors were small. However, there were some statistically significant differences between the two groups in some areas, particularly in areas where the MCS inspectors lead the MCS effort. Further discussion on the differences and agreements between the three groups is given under specific parts of the questionnaire. Table 6.6 gives a summary of the average mean scores per part of the questionnaire.

Table 6. 6: Average mean scores of each group per part of the questionnaire. The column Statistically significant differences shows cases in which there was a statistically significant difference, with 95% confidence or higher, between any of the groups (from Tables 6.4 and 6.5)

SECTION	MCS MANAGEMENT MEAN SCORE	MCS INSPECTORS MEAN SCORE	SAFIR GROUP MEAN SCORE	Statistically significant differences
B.1.1. Management / Strategic Assessment and	3.1	3.0	2.7	Managers- SAFIR Group (Table 5.4)

National Institutional Arrangements				Inspectors - SAFIR Group (Table 5.4)
B.2. Legislative Framework and Administrative Measures	3.3	3.1	2.7	Managers- SAFIR Group (Table 5.4) Managers – Inspectors (Table 5.4)
B.3. Infrastructure and Physical Resources	2.9	2.5	2.4	Managers – Inspectors (Table 5.4)
C1. Before / Prior Fishing – At Port Inspection	3.8	3.2	-	Managers – Inspectors (Table 5.5)
C.2. During Fishing – At Sea Boarding	3.9	3.3	-	Managers – Inspectors (Table 5.5)
C.2.1. Safety and Catch Inspection	3.9	3	3.3	Managers – SAFIR Group (Table 5.4) Managers – Inspectors (Table 5.5)
C.3. During Landing / At Landing Sites	3.6	2.6	-	Managers – Inspectors (Table 5.5)
C.4. Post Landing	3.6	2.8	-	Managers – Inspectors (Table 5.5)
D.1. Stakeholder Engagement / Collective Approach	3.1	3.1	2.3	Managers – SAFIR Group (Table 5.4) Inspectors - SAFIR Group (Table 5.4)
D.2.1. Risk Identification, Analysis and Management: Personnel	2.3	2.0	1.4	Managers- SAFIR Group (Table 5.4) Inspectors – SAFIR Group (Table 5.4)
D.2.2. Mapping and Monitoring of Activities in Hotspots	3.0	2.3	2.7	Managers- Inspectors (Table 5.5)

6.6.2. Part A: Background information discussion

Part A, as explained in Chapter 4, was about the background information of a National MCS program, and the structure and content of questions is taken from the FAO questionnaire development guidelines where it is advised that a researcher should identify and define target respondents that are to suit the needs of his or her research[141]. Furthermore, Part A was comprised of a total of 21 questions. Questions one to 13 were operational questions, and questions 14 to 21 were strategic questions. There were no numerical score attributes attached to them. The statistical significance of rank and qualifications identified in the analyses illustrated the importance of those characteristics in the level of awareness of respondents and the requisite skill and meeting the overall strategic and operational needs for an effective MCS program. Experience as a statistically significant covariate implies that experience, as a function of a good employee retention strategy, is a vital aspect of an effective MCS program relating to institutional memory and the strategic and technical aspects of the South African MCS program. These results revealed that continuity and postgraduate training were important components for an effective MCS program. Staff retention and well-structured internal processes for career pathing and promotion opportunities are crucial towards an effective MCS program.

Further consideration on the age of inspectors, which was an average of 42 years for inspectors who responded to the questionnaire, showed that this might be a problem in the MCS unit's operations. Although no scientific studies on the matter could be found, practical experience suggests a certain level of fitness and agility is needed to conduct inspections. An example would be boarding at sea, coupled with high-speed boat chases that are common at sea, particularly when responding to abalone poaching incidents. Therefore, whilst the average age of 42 years may be beneficial to the inspectorate regarding planning and oversight of MCS activities, it can be a simmering risk in the active implementation of the same MCS activities out in the field. That requires balanced recruitment and staff retention strategy in the Department to ensure that recruits are introduced into the system, whilst ensuring that experience and institutional memory are not eroded through resignations or similar actions. The underlying reason for this risk is that the last intake of Fishery Control Officers (FCOs)

[141] www.fao.org/3/w3241e/w3241e05.htm - Questionnaire Design - Define the target respondent, Chapter 4 page 3, assessed on the 26 March 2019

was during the 2010/2011 financial year. Also, for all those FCOs who retired; resigned; were dismissed or deceased after that last intake, positions that they left vacant were never filled, and there are no plans in the DEFF for filling the vacancies anytime soon.

This weakness is cutting both ways, as it leaves those who have been long in the system with little prospects of promotion and that can lead to despondency which is currently rife in the establishment as the researcher witnessed first-hand in his interviews with various FCOs across the three coastal Provinces. Furthermore, failure to promote FCOs results in another weakness of the South African MCS system contributing to weak operations planning ability. Ordinarily, promoted inspectors would guide this process utilising their practical experience of tried and tested methods that yield good results for the MCS program, whilst honing junior inspectors' skills through an in-house mentoring program. Currently, all operations planning is mostly led by Directors and Deputy Directors, and most of them lack the practical experience that is critically important in the planning and implementation of MCS operations as shown by the results which indicated significantly weaker responses to questions in Part A from Managers than from Inspectors (Table 6-3, Figure 6-1).

6.6.3. Part B: Evaluation of the MCS system enablers or enabling environment

Enablers are defined by the United Nations Development Program (UNDP), as a function of activities that are at the centre of both efficiency and effectiveness in any program[142]. For MCS program enablers, institutional arrangements were found to be one of the critical drivers of excellence and effectiveness regarding performance (Hill & Lynn, 2005). However, a common view is that in Africa, it is relatively common for Fisheries Governance Authorities (FGA), through their MCS programs to underperform (Hersoug & Paulsen, 1996; Sjöstedt & Sundström, 2013). The overall expert opinion in the South African situation for Part B (Evaluation of MCS system enablers or enabling environment) was that the organisation's effectiveness was average, i.e. a mean score of 3. However, there were specific areas under Part B, where the opinions varied between the three groups. Notable were different views expressed under the criterion that sought to determine if the MCS unit's organisational structure

[142] www.unaids.org/files/media_asset/2... Understanding and acting on critical enablers and development synergies… accessed on the 11 March 2019.

could be viewed as appropriate and whether it had led to a progressive and an effective South African MCS system or not (B.3).

Views of the SAFIR group were that due to the current MCS structure, the MCS program had yielded less than adequate results (2.4), DEFF Inspectors also felt that results were just adequate (2.5). Both groups had a slightly different view from the DEFF managers group, which felt that the current South African MCS organisational structure yielded results closer to average (2.9). Views like this could be attributed to several factors of which the most prominent may be that presently the MCS Head Office is in Cape Town (Chapter 3) and that all regional offices are managed from the Head Office. Interviews with some inspectors from other coastal Provinces, i.e. outside of the Western Cape, particularly the Eastern Cape, were of the view that there was inadequate supervision from Cape Town especially to the individuals charged with the responsibility of oversight in the regional and sub-regional offices. Frequency of visits by Senior Managers from the Western Cape, i.e. Cape Town head office, to other coastal provinces was said to have dropped substantially over the few years, such that quarterly meetings that used to be platforms for discussing the implementation of regional and sub-regional MCS plans were non-existent.

Whilst the overall score of Section B.1.1. was 3 or above for both Managers and Inspectors, and 2.7 for the SAFIR Group (Table 6.4), the mean value of criterion Q24 is under Section B.1.1. was 2.44 (Figure 6-16). Criterion Q24 results suggested that the South African MCS program's operational ability or effectiveness was negatively affected by the structure of the Fisheries Governance Authority (FGA). This view may be influenced by the consideration that the CD: MCS enforces the Marine Living Resources Act (MLRA), and it does that through monitoring and reacting to its contravention. However, contravention of the MLRA is mainly through illegal fishing activities, and in South Africa, those are classified as criminal offences. The major problem in this arrangement seems to be that criminal offences, including transgression of the MLRA, are investigated and managed by the South African Police Service (SAPS). Investigations are one of the responsibilities of the Monitoring and Surveillance Directorate of the FGA (DEFF), which is perceived as a source of operational difficulties for this Directorate. MCS does not have a mandate and capacity for investigations. CD: MCS officials can only be complainants; hence they are only entitled to write complainant statements (A1 statements) when a case docket is opened, not the investigation statements (IO statements).

Furthermore, and linking it with criterion Q31, which was about assessing existing formal institutional arrangements between the South African law enforcement agencies towards the protection of marine living resources, seems to complicate the problem. The combined view for criterion Q31 was that the South African MCS program was 2.89 (Figure 6-16), 3.0 for the Inspectors and 3.5 Managers, whereas it was 2.17 for the SAFIR Group. Similarly, in criterion Q24 as further elaborated in the comments section of the questionnaire, some DEFF Managers felt that the lack of understanding of the concept of sustainable utilisation of resources in the South African criminal justice cluster, i.e. SAPS; the National Prosecuting Authority (NPA) and the Judiciary, leads to the trivialisation of the MLRA transgressions. Hence it was reported to be a common occurrence that SAPS deploys fewer resources towards curbing illegal fishing activities. The sentiments expressed by DEFF Managers are shared by Norton & Jarre (2020) when they commented on the hearing of abalone poaching cases, that the present situation is such that environmental crimes of which fisheries transgressions are part are being consigned to the lowest rungs of the criminal justice system because of a dominant view that they are not urgent[143]. That implies that MCS program, whilst without a full mandate of investigating and prosecuting all transgressors of the MLRA, is still expected to deliver to the fullest. At this stage, redress of mandates to upgrade and to align with function is not attended to.

Therefore, considering that a change with regards to mandates and institutional arrangements is unlikely in the near future, a change in planning and internal arrangements seems to be the only viable option to improve on the effectiveness of the South African MCS program. Over the years, several programs for enhancing collaboration and cooperation between law enforcement agencies to improve the South African MCS capacity were implemented, for example, Operation Orca, but they were relatively short-lived (Chapter 4, Minnaar *et al*., 2018; Hauck and Kroese, 2006). There is currently Operation Phakisa Initiative 5, a collaborative effort of all the South African law enforcement agencies bolstering the country's fisheries governance effort, but it also has a timeline of five years (Marine Protection Services and Governance, 2020).

Another dimension of this challenge, as revealed by the results, i.e., institutional arrangements and functioning of the MCS program, is internal. Some Inspectors expressed concerns that existing institutional arrangements between the Head Office in Cape Town and Provincial MCS offices or stations seem to be challenging to manage and monitor. The current DEFF

[143] https://www.bizcommunity.com/Article/196/628/184658.html. First steps to tackling South Africa's abalone poaching, by Marieke Norton (23 November 2018). Accessed on the 30 November 2020.

MCS model is a central command structure instead of a decentralised structure where Provinces are autonomous or semi-autonomous. Whilst it is practical to have MCS Head Offices, for all administrative work, alongside an operations room, the nature and length of the coastline where there is a variety of activities common to coastal communities make it extremely difficult for a one-dimensional approach in the structure and implementation of an MCS program[144]. As explained in chapter 4, South Africa has a coastline of about 3 200 kilometres and 22 commercial fisheries, not to mention a small scale fishery; recreational fishery; traditional practices, and an array of other activities which collectively present an enormous task to the FGA as an MCS program planning and implementing authority. Therefore, that lack of an appropriate plan to manage internal institutional arrangements and insufficient resources that are part of the enablers seems to be at the centre of rendering the South African MCS program less effective, as also covered in B3 as discussed hereunder.

Public attitudes to the law is another important consideration with regards to enablers. Starting from the time the first fishing regulations were passed by Jan van Riebeeck in 1657/8, through the era of dispossession as characterised by the exclusion of the majority in fishing activities, to the present era of the MLRA, the South African fisheries regulations can be thought of as having been stable (Clarke, 2006; Hersoug, 1998). Moreover, whilst it can mostly be argued that the situation has improved under the democratic rule that South Africa is under, views are still rife that the damage was done by colonial and the apartheid repressive laws in fisheries and it has not yet been rectified (Hauck & Sweijd, 1999; Lambrechts & Goga, 2016; Minnaar *et al.*, 2018). That in many ways led into a phenomenon called rebellion fishing, a disregard of any fishing regulations as was the case with thousands of fishers in Kalk Bay and Hout Bay who vouched to defy all the regulations in 2003 claiming that to be for their survival[145]. Poaching activities in abalone also increased exponentially from the early 1990s to the early 2000s, disregarding existing laws (Brick *et al.*, 2009).

The inshore fisheries sector is characterised by proximity to the coastline, easy access, and high susceptibility to all forms of illegal fishing activities and less observation of existing fisheries laws (Cochrane *et al.*, 2020; Minnaar et al., 2018), including rebellion fishing, in the form of poaching and aggressive illegal harvesting by community members who come in large numbers

[144] http://www.fao.org/3/Y4411E/y4411e0a.htm#TopOfPage. Chapter 6 (6.7.1.) Operational Infrastructure for MCS and Chapter 8 (8.2) Challenges facing fisheries Administrators in coastal areas. Accessed 13 October 2020
[145] https://www.iol.co.za/news/south-africa/fishing-quotas-cause-rising-tide-of-rebellion-110264. Fishing quotas cause a rising tide of rebellion. Published on the 24 July 2003, and accessed on the 02 December 2020

to intimidate and overwhelm the few inspectors that would be on-site (Norton & Jarre, 2020). That is the case even though a dominant view is that the South African fisheries legislative framework in the post-apartheid South Africa is mainly socio-politically focused rather than predominantly environmental or economic (van Sittert *et al*., 2006). Arguably, that is the best legislative framework for South Africa to redress imbalances of the past whilst ensuring that the country still maintains a good handle on its regulatory functions.

For Section B.2, Legislative Framework and Administrative Measures, the overall score was above 3 for Managers and Inspectors, and 2.7 for the SAFIR Group (Table 6.6). Most important to note is the mean value of criterion Q40, which was 3 (Figure: 6.5). Criterion Q40 sought to establish the overall view on the implementation and coordination of MCS programs' general administration in South Africa. Government employees, i.e. Managers and Inspectors, agreed that the current administrative system is working well as their mean values were 3.5 and 3.2, respectively. However, the SAFIR Group had a different view as its mean value for criterion Q40 was 2.0, which is the lowest under Section B.2. This observation implies that the service recipients, SAFIR Group, disagree that the government is giving them satisfactory service. These results do raise a bit of concern as there have been numerous indications in the past that even though CD: MCS is critical in fisheries good governance, in most instances personnel from this the Chief Directorate do not take part in the formulation of the Departmental policies (Hauck, 2009; Norton & Jarre, 2020; Okes *et al.*, 2012). Although there is a high possibility that DEFF is performing above average on this matter, the generally low mean scores of the SAFIR Group cannot be ignored as it may be an area that must be addressed by DEFF Senior Management.

Infrastructure and physical resources are some of the enablers of MCS; hence they were also investigated under Part B, and Section B3 in particular. A wide range of views was raised under the various categories that address MCS structural and operational needs. Section B3 received the lowest mean scores in Part B, for example, criterion Q46 which investigated aerial surveillance infrastructure and related sources. Criterion Q46 had three sub-criteria, which have mean values of less than 2, i.e. 1.64, 1.75 and 1.85 (Figure:6.7) respectively, all indicating poor. Responses were only received from the Managers and Inspectors as the SAFIR Group was not requested to respond to this criterion, and the scores of two groups were generally similar. That seems to be an accurate reflection of the current situation as DEFF does not own aircraft nor have a long-term contract with a private company or owners. Therefore, sustained aerial surveillance is not possible for the South African MCS program. Air patrols are essential when

there is no reliable fisheries intelligence regarding potential contraventions (Flewwelling *et al.,* 2002). Furthermore, in general, fisheries governance aerial patrols are highly effective in detecting and preventing foreign vessels' incursions, mainly if the aircraft is linked to the VMS system to cross-reference with its radar (Flewwelling *et al*., 2002).

In the absence of an aircraft, the South African MCS program falls short in this regard, and the available budgets are also not sufficient to sustain a long term contract with other service providers (Section 3.5). There are concerns that severe under-expenditure or somewhat limited financial resources harm the state of preparedness and delivery of the MCS program's compliance and law enforcement products. Operation Phakisa will address this and includes a budget for aircraft chartering services example, for the next financial year, the budget is R200 000.00. However, there are no guarantees of sustainability in Operation Phakisa as it is a 5-year government intervention, as explained in Chapter 4. Also, R200 000.00 seems very low. Hence, Branch Fisheries Management needs to start to craft strategies that will ensure better cash-flow for its operations, particularly from the private sector and other organisations that can make donations towards the MCS program's operations.

6.6.4. Part C: Evaluation of an MCS system process and its effectiveness – The reactive approach

Core components of an MCS program's operational side are the before fishing, during fishing, during landing and post landing (Bergh & Davies, 2009). All these components must be included in the designing phase of an MCS program so that all the monitoring and surveillance attributes are distributed evenly across all of them to ensure efficiency and effectiveness[146]. The South African MCS program has all these components, of which their effectiveness was investigated with only two groups, i.e. DEFF Managers and DEFF inspectors, as it involves internal government processes that the SAFIR group would not be exposed to as explained earlier in this chapter. The overall view is that in these components (C.1, C.2, C3 and C.4), the South African MCS program's effectiveness was evaluated as having mean scores between 2.8 and 3.9. However, the managers scored consistently higher than the inspectors in all four

[146] http://www.fao.org/3/y3427e/y3427e0a.htm - CHAPTER 8: FISHERY MONITORING, CONTROL AND SURVEILLANCE -2.2.6 MCS dimensions - by Per Erik BERGH[12] and Sandy DAVIES[13] – accessed 19 April 2019

sections, and the differences were statistically significant for C.1 (at port), C.2 (during fishing) (Table 6.5), C.3. (during landing) and C4 (post-landing) (Table 6.6). Information that was presented to the researcher by Inspectors was that Standard Operating Procedures (SOPs) that are currently in use are long-standing and they have not been reviewed in the past eight years, i.e. they were last reviewed in the 2011/2012 financial year, and the Managers also confirmed that observation.

A common view is that they are no longer sufficient, as they are mostly outdated. Furthermore, there is no primary or central SOP where different and specific SOPs, for example, Post Landing SOP, will fit into. Instead, each Directorate of the three MCS Directorates developed their own SOPs which are independent of each other. Although there may be an overlap, for example, between port inspection (C1) and at sea-boarding (C2), there are no SOPs designed to attend to those overlaps. A situation that would have been beneficial for each of the Directorates was to cross-reference work and isolated incidents and map patterns that may be of interest in MCS. Unfortunately, the current approach leads to a silo approach in MCS, as each Directorate tends to do its own *"mini-MCS program"*, with its targets and no integrated approach. Implications of the current approach, as indicated by the DAFF Strategic Plan for 2013/14 to 2017/18, are that focus is on the number of ships to be boarded at sea, and preferably a high number of fines issued instead of ensuring that there is compliance with fisheries regulations.

Some inspectors in the Directorate Fisheries Protection Vessels indicated that due to the current approach to MCS activities, they do not carry measuring devices that they are supposed to carry with them when boarding vessels anymore as that does not add value to the set targets that they are chasing. It was suggested that presently, vessels at sea are mainly boarded to get a vessel skipper's signature and collect those for their monthly boarding statistics. This approach could be attributed to how the Department of Agriculture, Forestry and Fisheries (DAFF) compiled its strategic plan for 2013/14 – 2017/2018. In the first year of planning for Program 6 (Fisheries Management), the plan was for each Directorate, not the Chief Directorate. That approach, where the basis for such targets is not given, undermines the MCS integrated approach objective. For example, under Strategic goal 2 which is sustained management of natural resources, with enforcement and compliance measures to combat poaching improved as a

performance indicator, there is no baseline[147]. Instead for the Monitoring and Surveillance Directorate, there is an annual target of 275 investigations conducted on rights holders in four key fisheries sectors, divided into quarterly targets. There was a similar arrangement for the Fisheries Protection Vessels Directorate where there is an annual target of 601 sea-based inspections of vessels conducted in four priority fisheries. There is an annual target of conducting 800 inspections on vessel landings in four key fisheries for the Compliance Directorate. In both cases, these targets are further divided into quarterly targets. There is no baseline figure in all these cases, and the Strategic Plan does not indicate any coordination or joint planning between the three Directorates. Instead, individually they pursue their respective quarterly and annual targets as explained above. Despite these problems and areas that need more attention from the planning and operational point of view to improve the South African MCS program's overall effectiveness, the general view of the two groups for all the components of the reactive approach was that it showed average effectiveness.

It is often stated that there are high fatal accident rates at sea, which ordinarily could have been prevented (Remolà & Gudmundsson, 2018). Although questions that were asked under C.2.1. did not address the full spectrum of safety at sea and catch inspections, important issues were raised. For all four criteria of C.2.1, mean values were more than 3, (Table 6.6), which signifies a general agreement that the South African MCS is performing above average in the four criteria. That is further emphasised in Table 6-6, with Managers (3.9); Inspectors (3), and SAFIR Group (3.3), all in agreement of average effectiveness of the MCS program even though there were significant differences between them. Although it seems as if the organisation is performing well in this aspect of MCS, scrutiny of criterion Q62(a) divulged a different view. Criterion Q62(a), which sought to determine the existence of a regime for monitoring the number of crew onboard fishing vessels, especially in the effort controlled fisheries, revealed a relatively high incidence of polarised views. That is an important issue in, for example, the squid (*Loligo reynaudii*) fishery. The squid is a total allowable effort (TAE) controlled fishery, where the resource is protected from over-exploitation through capping of effort (Department of Agriculture Forestry and Fisheries (DAFF), 2016). While there have been no reported incidents of that nature in this case, in TAE controlled fisheries in general, crew numbers may be exceeded from the numbers stipulated in permit conditions, especially during lean times in

[147] https://www.gov.za/sites/default/files/gcis_document/201501/daff-strategic-plan-2013-2014-2017-2018.pdf. Annexure 1: Annual Performance Plan - Program 6 (Fisheries Management), pages 76 -77. Accessed 24 October 2020

the industry. Therefore, to ensure that operations' sustainability is guaranteed, a structured approach is key to an MCS intervention for a fishery like this.

6.6.5. Part: D: Evaluation of an MCS process and its effectiveness – The proactive approach

A proactive approach in MCS is defined as a situation where the law enforcement and compliance officers will out of their own volition either gather information about certain criminal activities, i.e. an intelligence processes approach or develop strategies to combat it (Crank: 1998). Intelligence processes applicable in this case are not necessarily just intelligence gathering processes, but rather information synthesising processes that enable compliance and law enforcement agencies better to understand criminal activities in their area of operation to enable them to develop more effective enforcement strategies utilising all the equipment at their disposal (Ratcliffe & Guidetti, 2008; Verfaillie & Vander Beken, 2008). The evaluation of the effectiveness of the South African MCS program proactive approach was done utilising Part D of the questionnaire. Part D has two subparts which are (a) Part D.1. – Stakeholder engagement / collective approach, and (b) Part D.2. Risk Identification, Analysis and Management. Part D is further divided into (i) D.2.1. Personnel, and (ii) Mapping and Monitoring of Activities in Hotspots. Stakeholders are defined as all individuals, communities, and organisations that can impact or who can be impacted by a particular organisation's operations and success (Jeffery, 2009). Furthermore, constructive interaction between the organisation and its stakeholders is not the prerogative of that particular organisation, but it is somewhat informed and guided by prevailing societal changes (Jeffery, 2009; Mitchell *et al.*, 1997). However, a recommendation is that they must be allowed to give inputs or views on the decisions and all other developments that affect them at regular or irregular intervals. There were different views on the South African MCS program's performance in this regard, as revealed by results in this chapter.

The results displayed a general agreement between the MCS Managers and the Inspectors on the effectiveness of the stakeholder processes by the South African FGA to support and enhance the MCS program (Section D.1), with both giving mean scores of 3.1 (Table 6.6). The government respondents' optimism was not shared by the SAFIR group, as their mean score was 2.3 (Table 6.6), which is less than average. Criterion Q78 considered the existence of an active stakeholder forum that provides a platform for regular discussions and consultations with

stakeholders. In this regard, results for criterion Q78 revealed that the strength of the South African FGA on stakeholder engagement was instead on Working Groups. These are platforms that are utilised by the FGA to engage with almost all of its stakeholders. Whilst that may seem to be working well, the fisheries Scientific Working Groups' main focus is on determining the Total Allowable Catch (TAC) and other management measures in various commercially exploited fisheries, and relevant scientific work to a particular fishery. There are also Management Working Groups (WG-MAN), which have as their primary responsibility implementation of management measures, for example, to oversee the process of dividing the TAC among rights holders or permit holders. The WG-MAN is also responsible for developing regulations for each fishery, including determining dates on which permits would be issued. Therefore, from the process point of view, i.e. processes for scientific and management of resources, it can be stated that South African is doing well. However, when permits are handed over to the industry, the question is whether permit holders adhere to permit conditions or not, which relates to MCS. Interviews with some MCS managers and one DEFF fisheries scientist indicated that this is an area of significant weakness. Their views are that because most of the time the FGA does not follow up appropriately, i.e. there seems to be an insufficient effort from MCS to ensure that the industry or the fishers are abiding by the rules. Unfortunately, that is not as simple as it may sound as indicated from responses to other relevant questions. Complicating the matter further, is that in many instances vessel owners and permit holders can be different individuals.

Corruption is another area of concern, and among other things it is defined as misappropriation of office resources for self-enrichment, and it is one of the significant risks in MCS (Cochrane *et al.*, 2020; Sundström, 2015; Treisman, 2000). It was covered under risk identification, analysis and management, which is in part D.2.1 of the questionnaire, and results showed some degree of contrast in the opinions of the three groups. Most importantly, Section D.2.1. received the lowest mean scores of all Sections from all three groups, with Managers (2.3); Inspectors (2), and the SAFIR Group (1.4) (Table 6.6), all in agreement that the effectiveness of the South African MCS program is less than average. For example, for criteria Q79 and Q80, MCS inspectors and the SAFIR agreed that the risk of corruption in the South African MCS program is high. In support of that view is the documented history of corruption within the South African MCS program where MCS inspectors were involved, and that ranges from the Bengis case in the early 2000s to the Mossel Bay case as explained in Chapter 3 (Attwood, 2016; Cochrane *et al.*, 2020; Hauck & Kroese, 2006). Therefore, as results have revealed, there are insufficient

measures taken by the FGA to monitor actions or work ethics of inspectors when they are in the employ of DEFF. That is beyond the screening of individuals which is part of the recruitment and selection process.

Among alternative approaches that could be considered to improve the South African MCS program's effectiveness is technology, as explained in Chapter 2. For example, at present, there is no use of body cameras by inspectors to monitor their actions and thus be a deterrent to them to get involved in corrupt activities, as it may equally be for their protection if they find themselves in a confrontational situation[148]. Confrontational situations are reported to be a common occurrence between FCOs and members of various coastal communities that often state that they were either deposed of their rights to have free access to marine living resources or that they are part of the majority that is affected by the mass socio-economic marginalisation which is viewed as high in our country (de Greef, 2016; Lambrechts & Goga, 2016; Minnaar *et al*., 2018; Pinnock, 2016). Therefore, this indicates that personnel management is one of the high-risk areas of MCS that needs to be addressed as an urgent intervention, as seen in the overall results of Section D.2.1. Hotspots identification, crafting and implementation of effective MCS interventions to address illicit fishing related activities in hotspots is another.

Hotspots are defined as those areas where there is a prevalence of fisheries transgressions by fishers, where through their violation of regulations they render the MCS program ineffective (Bergh & Davies, 2009; Furlong, 1991). Regarding mapping and monitoring activities in hotspots (D.2.2.), there were contrasting views between the three groups. However, there were similarities in the overall dispersion of the MCS Inspectors' responses and those of the SAFIR group, except their mean values of 2.3 and 2.7, respectively (Table 6.6). However, the mean value of the SAFIR group was similar to that of the MCS Managers, both expressing a view of average performance on the effectiveness of the MCS program in delivering on this objective. Therefore, the results revealed some agreement between the three groups with regards to the effectiveness of the South African MCS program in mapping and monitoring of hotspots, with mean scores ranging from 2.3 to 3.0, but the managers and inspectors' scores were nevertheless significantly different ($p = 0.01462$) in Table 6.5. Whilst there may be a general agreement on the effectiveness of the South African MCS program on the mapping of hotspots, there seems to be a challenge with responding to emergencies (Q86), and predicting and responding to high grading of catches transgressions (Q87). The further explanation provided by some MCS

[148] https://www.procon.org/headlines/police-body-cameras-top-3-pros-and-cons/. Police Body Cameras: Top 3 Pros and Cons. Accessed on 03 December 2020

managers during subsequent interviews indicated that this was mainly caused by insufficient and inadequate resources at their disposal, as well as the abolishment of vacancies in their respective Directorates' organisational structures.

In support of the views as expressed by the MCS managers, with a particular focus on the small pelagic fishery, lack of appropriate infrastructure and staff shortages in DEFF were identified as the underlying problems in the inability of DEFF to implement the MLRA and its related policies as effectively as required (Attwood, 2016; Cochrane *et al*., 2020). The agreement on the state of affairs regarding criterion Q87 among the three groups should be concerning considering that they all come in at different angles to the problem at hand. The MCS managers responsible for planning and general oversight, MCS inspectors as frontline implementers and the SAFIR group as directly involved in the extraction of the resources. In the small pelagic fishery, previous studies in the matter revealed that high grading of fish, especially in the sardine fishery, is driven by economic factors which are elaborated by canning factories and have been reported to be practised by some fishermen and skippers of fishing vessels (Cochrane *et al.*, 2020; Hara, 2013).

7. A CRITICAL APPRAISAL OF THE RESULTS SET WITHIN A BUSINESS PLANNING FRAMEWORK FOR THE SOUTH AFRICAN MCS PROGRAM CASE STUDY

7.1. Introduction

This study, as outlined in Chapter 1, was about investigating three aspects of the South African MCS program which are, (a) the functioning and performance, and its conformity to international MCS standards; (b) the level of its overall effectiveness, measured through its structure; institutional arrangements; availability of essential primary to tertiary resources for its implementation, and (c) its responsiveness to regional cooperation and collaboration following international fisheries governance frameworks. The investigation was conducted through a literature review and developing and utilising a comprehensive questionnaire as a data collecting tool. The questionnaire structure also provides a framework for considering and assessing an MCS system following current best practices. Information from the questionnaire was supplemented with both structured and unstructured interviews.

The questionnaire, as extensively explained in Chapters 5 and 6 had four distinct but interrelated parts which are, (i) Part A: Background information; (ii) Part B: Evaluation of the MCS Enablers; (iii) Part C: Evaluation of an MCS system process and its effectiveness – the reactive approach, and (iv) Part D: Evaluation of an MCS system process and its effectiveness – the proactive approach. Officials from the Department of Environment, Forestry and Fisheries (DEFF) particularly MCS Chief Directorate charged with the responsibility of fisheries law enforcement for the entire South African coastline were the primarily targeted group. Therefore, as MCS practitioners, they together with other experts and directly affected parties from the fishing industry and Non-Governmental Organisations (NGOs) formed the core respondents group for this study. The main focus was on experience, expertise and extensive knowledge of fisheries governance by the selected respondents, and it is considered the responses have added significant value and insights in this study. However, this study's sample size was relatively small, with a total of 18 from South Africa, as explained in Chapter 4.

Besides, questionnaires were sent to Mozambique and Namibia, but responses were deficient, receiving only three from each of the two countries. There may have been a variety of reasons

for that, but a prominent reason may be the fact that National MCS programs in the three countries work closely with other national enforcement agencies, for example police and the army. For these national cooperative arrangements operational details about law enforcement plans, rules of engagement; equipment and deployment strategies; identified hotspots, their categorization and prioritization; surveillance and observation posts and their duration, tends to be categorized as "classified information" which is not publicly available, especially to foreign nationals. Difficulty in accessing law enforcement related information is what the author experienced in all the three countries, albeit to a lesser extent to South Africa. For South Africa, the fact that the author is a South African national together with his previous work experience as an employee of the Fisheries Governance Authority, where he worked as a Director for Fisheries Protection Vessels (FPVs), helped in being given access to information and getting support from the government departments in South Africa. In Mozambique and Namibia, the other difficulty was to navigate through national bureaucratic processes. An arranged visit to Mozambique where meetings with officials from the erstwhile Ministry of Fisheries at management and operational level, together with former managers of the Ministry, did not yield positive results for the study. It is also recognised that the questionnaire is long and detailed, which could have deterred some people from completing it, but the information requested was considered necessary for this survey.

In the meetings, the research topic was introduced, its scope and benefits for the region was explained, and then questionnaires were handed to the Mozambican respondents or officials to complete. The expectation was for them to return the completed questionnaires to the author through email, but that did not materialise. A similar situation also resulted in the engagement with the Namibian officials from the Ministry of Fisheries. Where during several official trips to Namibia, the author tried to solicit responses or completed questionnaires for this research work. There was also minimal response, as was the case with Mozambique. The assumption for the limited response was that conditions in the Region were not as yet conducive for a study similar to this one at the time this research was concluded. However, what may be of benefit to similar future research work are the developments that have since taken place in the SADC region. Those important regional developments include the adoption of a common MCS strategy by SADC states, and the Operationalisation of the SADC regional Monitoring, Control and Surveillance Coordination Centre (MCSCC).

A common MCS strategy was adopted by SADC States in 2020, where it is envisaged that through it SADC States would be able to achieve food security targets as a direct result of

sustainable fisheries operations[149]. Also, that it will lead to a cost effective management of shared stocks of marine living resources. With regards to the MCS Regional Coordination Centre, SADC States unanimously agreed on its establishment in 2001 when the SADC Protocol on Fisheries was approved, but the agreement on its implementation and operationalisation was only reached in 2017[150]. However, at the time this study was concluded MCSCC was not yet fully operational, but significant strides were made towards that. Expectations are that the MCSCC will utilise cutting edge technology to coordinate and implement all SADC formulated strategies for the sustainable fisheries sector in Southern Africa. On the other hand, the common MCS Strategy can be viewed as an enabler for the MCSCC to deliver on common resource management goals that are a product of a collective decision making process in the region. Furthermore, the common MCS strategy and the MCSCC are products of a strong regional political will, and that is critically important for both a fully embraced and broadly utilised regional MCS strategy, through well supported and sustained operations of the MCSCC. The MCSCC will thus function at two levels, i.e. operational and strategic level, of which regional MCS experts from the SADC countries will be able to participate in the development and implementation of its programs. Through that active participation of regional MCS experts, with different skill sets ranging from inspectors to managers, exchange of information is possible. That will open up an avenue for a more transparent and open dialogue of experts with the aim of improving on the regional MCS capacity and effectiveness, whilst utilising their respective national MCS experiences. In such an environment future research on regional MCS may experience less problems compared to challenges that the author experienced.

7.2. Strengths and weaknesses of the South African MCS program

The South African fisheries legislative and policy framework has proven to be one of the South African MCS program's strengths. The Marine Living Resources Act (MLRA) has proven to be pro-developmental, i.e., ensuring equal distribution and equal access opportunities to

[149] https://www.seafoodsource.com/news/environment-sustainability/sadc-states-developing-joint-strategy-to-combat-iuu. SADC states developing joint strategy to combat IUU. Accessed 13 July 2021.
[150] https://stopillegalfishing.com/news-articles/operationalisation-of-sadc-regional-monitoring-control-and-surveillance-coordination-centre-marks-progress-in-the-fight-against-illegal-fishing/. Operationalisation of SADC Regional Monitoring, Control and Surveillance Coordination Centre marks progress in the fight against illegal fishing. Accessed 13 July 2021.

resources by all South Africans, and the promotion of sustainable utilisation of resources through a well-structured regulatory framework. These sentiments are captured well in the preamble of the MLRA which is, *"to provide for the conservation of the marine ecosystem, the long-term sustainable utilisation of marine living resources and the orderly access to exploitation, utilisation and protection of certain marine living resources; and for these purposes to provide for the exercise of control over marine living resources fairly and equitably to the benefit of all the citizens of South Africa, and to provide for matters connected therewith."* This study has shown that the MLRA has delivered on the establishment of the South African MCS organisational structure, for which the purpose is to ensure the long-term sustainable utilisation of resources (B.2: Legislative Framework and Administrative Measures).

Furthermore, Chapter 6, Section 50 to 57 of the MLRA are about law enforcement, and Chapter 5, Section 44 to 49 are about prohibited fishing activities and stowage of gear, and these two Chapters together with their respective Sections are critical in the establishment and functioning of the MCS program. Participation of South Africa in international and regional fisheries governance bodies leads to obligations that South Africa should honour through domestication into the South African legislation of such obligations, for example, conservation measures of Regional Fisheries Management Organizations (RFMOs) that South Africa is a party to. That is one of South Africa's strengths, and it may have contributed to the various amendments of the MLRA at a legislative development level and the development and implementation of new permit conditions at an operational level. This study also sought to determine the national MCS program's strength or weakness in developing institutional arrangements (B.1.1. Management / Strategic Level Assessment and National Institutional Arrangement).

A focus was the ease with which the South African MCS program can play an active role in the formulation, implementation and coordination of joint MCS activities, and the study revealed that it was another area of strengths. Operation Orca, Operation Neptune and currently Operation Phakisa – Initiative 5, are examples of the South African MCS program's strength as it can be highly effective in establishing cooperation with other law enforcement agencies as extensively discussed in chapter 4 and chapter 5 of this study. It can be pointed out that such an institutional arrangement may not necessarily be through the MLRA only, and can also be attributed to the Intergovernmental Relations Framework Act, 2005 (IRFA). The IRFA, as stated in its preamble serves, "*To establish a framework for the national government,*

provincial governments and local governments to promote and facilitate intergovernmental relations; to provide for mechanisms and procedures to facilitate the settlement of intergovernmental disputes, and to provide for matters connected therewith.," (RSA (Republic of South Africa), 2005). Therefore, all national governments are compelled by this Act to work together with the other tiers of Government. That is the case with their respective agencies, for example, law enforcement agencies as a critical point in this study.

Although the South African MCS program's strengths could well be viewed as sufficient to render it highly effective, i.e. arguing from the institutional and the legislative framework point of view, there are areas where the South African MCS program was viewed to have performed below average. One of those areas is to keep up with the organisational structure requirements, i.e. recruitment and selection of suitably qualified personnel to keep the vacancy rate at the lowest level possible. However, some MCS Managers declared that the vacancy rate in the CD: MCS is very high because there has been no filling of vacancies for inspectors and some assistant director positions who have left the government service since the 2011/2012 financial year. That is said to be due to unavailability of funds to fill vacant positions in the establishment, in other words, the vacancies are in the organisational structure, but they are not funded. Non-funding of vacancies has a direct negative impact on the MCS program's operational side, as there are not enough personnel to deploy to operations in any of the three Directorates. Notable is the general agreement between the MCS Managers and Inspectors that the South African MCS program's reactive approach is average in effectiveness, but there is some weakness within the reactive approach. This weakness permeates all MCS operations under the reactive approach, i.e. at port inspections (C.2), during landing inspections (C.2), an inspection of foreign fishing vessels (C.3.1), et cetera. At the core of this weakness is lack of funds.

Management processes, to ensure that the central command structure is maintained; administrative tools to monitor effectiveness, the accuracy of actions taken by inspectorate are also areas of some of the system's weaknesses that were brought to the fore by the results of this study. Infrequent engagement between management in Cape Town and MCS staff in the other coastal Provinces does compromise the expected high standard of the CD: MCS. Lack of MCS experience and general management at that decision-making level of the organisation also contributes to the MCS program's weakness. Both the inspectors and managers were in agreement that the situation is exacerbated by the lack of in-service training or refresher courses that are for upskilling the management, or general workforce of the MCS program. These

shortcomings are attributed to a lack of funding or insufficient budget allocation from the National Treasury and the minimal amount that is contributed by the Marine Living Resources Fund (MLRF) towards vessel management. Other than those two sources of funding, DEFF does not have any other funding stream. Also, the South African MCS program was deemed weak in utilising environmental intelligence, where its stakeholders can play a significant role in its proactive approach (D.2). There is no database for its MCS stakeholders, nor is DEFF able to adequately determine and respond decisively to hotspots along the South African coast. These weaknesses in the MCS program, as explained above, lead to a general underperformance of the program. Therefore, given the shortcoming in the South African MCS, i.e. budgetary constraints; personnel shortages; gaps in leadership; planning and strategic direction that needs some attention, as revealed by this study, the development of an appropriately structured MCS business plan could help DEFF to develop such a roadmap for achieving technical, economic and financial feasibility.

7.3. Strengths and weaknessess of MCS in the SADC case studies

Together with the other 15 Southern African countries, South Africa is a Member of the Southern African Development Community (SADC). SADC was established after a Declaration, and a Treaty for its establishment was signed by Heads of State or Government in Windhoek, Namibia on the 17 August 1992, as explained in Chapter 1. It is a Regional Economic Community (REC) formed utilising a roadmap that was part of the 1991 Abuja Treaty, which incidentally is one of the African Union (AU) treaties. Furthermore, and concerning the existence of SADC, it is essential to note the thrust of Article 61 (1-5) of the United Nations Convention on the Law of the Sea (UNCLOS), which emphasises cooperation of States at the regional and global level on the management and sustainable utilisation of marine living resources[151]. Regional cooperation and political will are significant strengths in the region. As extensively discussed in Chapter 1, the SADC Protocol on Fisheries, which entered into force in 2003, and the approval of the Protocol's implementation strategy in 2010 are a clear indication of the political commitment in regional cooperation. The signing of the SADC Statement of Commitment by SADC Ministers responsible for Marine Fisheries on

[151] www.un.org/texts/unclos/unclos_e . United Nations Convention on the Law of the Sea (UNCLOS). Accessed on 07/02/2016

Illegal, Unreported and Unregulated Fishing on the 04 July 2008 is another illustration of political will and support in the region. It took collaboration in regional fisheries governance to an even more practical level as it also sought to implement some of the SADC Protocol on Fisheries pronouncements.

Fisheries in Namibia are predominantly commercial, as is the case in South Africa, but in Mozambique, artisanal fisheries are more prominent than commercial fishing. Therefore, the structure of the National MCS program in Namibia (Chapter 4), is similar in many respects to that of South Africa (Chapter 3). Both the MLRA of South Africa and the MRA of Namibia are almost similar in structure and content, making it easier for harmonisation of law and policies in the region, particularly MCS, under Article 8 of the SADC Protocol on Fisheries (2003). In Mozambique, the MCS function, i.e. development and operations, are reflected under Article 3, Chapter IV of Act no 3 of 90, and the General Regulations of Maritime Law which were subsequently approved to close all gaps in fisheries law, particularly law enforcement conflict and licensing (Republic of Mozambique Ministry of Fisheries, 2010) as discussed in Chapter 4. Therefore, whilst there may be differences between Mozambique and the other two States in this study, the fact that each of the three countries has a legislative and policy framework that serves as a foundation of their respective national MCS programs is also a measure of strength for the SADC region MCS effort.

Whilst there is a variety of resources, i.e. ships; boats; aeroplanes, and functional Vessel Monitoring Systems (VMS), in each of the countries presented in chapter 4 and chapter 6, it seems as if there is not much demonstrable operational collaboration in the regional MCS activities. There is no known sharing, or pooling of resources for joint MCS activities between these countries, including jointly crafted regional MCS plans as outlined in both Articles in Article 7 (Management of Shared Resources) and Article 9 (Law Enforcement) of the SADC Protocol on Fisheries. Needless to mention that there is no active engagement between these SADC Party States in the transfer of skills and technologies, nor there are any meaningful programs in place to promote gender equality and address potential inequalities as stipulated in Article 4 (Principles) of the SADC Protocol in Fisheries.

Based on these examples, therefore, it can be concluded that there is a general weakness in the region in the implementation of the SADC Protocol on Fisheries, which is an instrument that seeks to achieve efficiency and effectiveness in the regional fisheries governance framework, of which the regional MCS program is the most central component. It is directly linked to the

lack of recent regional MCS information products, like research papers, which should be produced by the regional MCS managers, experts, and practitioners. That is a significant weakness if the region's objective is to consolidate and build a more cohesive and inclusive regional MCS program. Information is vital, and institutional reforms that the decision-makers should pursue in the FGAs' capacity-building efforts should not focus only on the physical resources. However, it should include upskilling of personnel through formal training and platforms that could be utilised for regional diagnosis of the collective regional MCS effort.

Therefore, the absence of relevant and recent information in research papers and similar products is another major weakness in the region that this study revealed. There are individual bilateral agreements between the three countries, for example, a 2019 Memorandum of Understanding (MOU) between South Africa and Namibia, which has research development and MCS as two areas of cooperation. However, there is nothing much that has come out of it as yet.[152]Therefore, whilst the MOU between these two countries may be lauded as a significant step forward in regional cooperation, non-activity towards its implementation is another measure of weakness in the region. Furthermore, it implies that senior management in the region are falling short in capitalising on the high-level political relationship in the region to consolidate a regional fisheries governance, of which an effective regional MCS effort would be a good measure. Therefore, fitting conclusions could be that individual country MCS institutions may be performing reasonably well, but practical regional MCS institutional arrangements are a significant area of weakness.

7.4. Lessons for South Africa and opportunities for improvement

Throughout this thesis, it became evident that MCS is a government public good and resource intensive exercise without any direct financial returns to the Fisheries Governance Authority (FGA) or the responsible government department (Bergh & Davies, 2009; Flewwelling *et al.*, 2002; Randall, 2004). As a formal institution, Government utilises specific tools to guide, measure and monitor performance, and the South African MCS program is no exception. Governance tools that the South African Government predominantly utilises include strategic

[152] https://www.gov.za/speeches/minister-senzeni-zokwana-signs-memorandum-understanding-namibian-counterpart-minister. Minister Senzeni Zokwana signs Memorandum of Understanding with Namibian counter-part Minister Bernard Esau on fisheries on the 24 January 2019. Accessed on the 28 October 2020

plans and annual performance plans. A strategic plan outlines government policy priorities in general or that of a particular Department, together with associated programs and projects for five years. It is approved by the Minister or Executive Authority of a particular Department, with strict consideration of available resources[153]. The National Treasury further states that, as the period of a strategic plan is at least five years, it is aligned with the first five-year planning cycle that follows general or national elections which in turn is linked to the identified Presidency outcomes.

The focus of a government Department strategic plan as stated by the South African National Treasury[154] is, *"strategic outcomes oriented goals for the institution as a whole, and objectives for each of its main service-delivery areas aligned to its budget programs, and where relevant, also its budget-sub programs."* On the other hand, annual performance plans are for advancing the Department's intentions for an upcoming financial year, and they outline key performance areas; performance indicators and targets for all the respective budget programs in a particular Department. Flowing from the annual plans are annual budgets, of which Section 53 of the Public Finance Management Act (PFMA) gives guidance on the legal requirements for annual budgets, and quarterly performance reports that are regulated through Chapter 5 and 30 of the Treasury regulations.

However, with all these governance tools in place as briefly described in Chapters 3 and 6, what this study revealed is that there are still significant gaps in MCS governance. Considering these gaps, the introduction of business plans to augment the existing governance tools may address governance shortfalls. Business plans are an administrative tool of choice in the private sector, leading to arguments about running public service as the private sector. Several scholars have written about this subject over the years including Henry Mintzberg (2017[155]) who, utilising as an example a failed 1960s Planning-Programming-Budgeting System in the United States of America (USA), firmly argues that Government cannot be run like a business. Mintzberg (2017) further argues that an unfortunate result of this experiment was the scores of soldiers who perished in the Vietnam War. His further arguments are that Government and

[153] www.treasury.gov.za. The Framework for Strategic Plans and Annual Performance Plans. Accessed 05 October 2020

[154] www.treasury.gov.za. The Framework for Strategic Plans and Annual Performance Plans. Accessed 05 October 2020

[155] https://hbr.org/2017/03/the-u-s-cannot-be-run-like-a-business , an article entitled "US Cannot Be Run Like a Business," written by Henry Mintzberg and published in the Harvard Business Review on the 31 March 2017 – accessed on the 02 March 2020.

business are two institutions that should be allowed to co-exist independently of each other as they serve two different purposes. Business is about a competitive marketplace environment, where the main activity is the supply of goods and services. On the hand, the Government is about creating a conducive environment for a responsible and thriving business sector, where all citizens are protected from all forms of threats (Mintzberg, 2017). However, Richard Box (1999) argues on the contrary that it is inevitable for Government to be run like business as importing and utilising private sector concepts in the public sector space is unavoidable, and it is on the rise. Arguments that are propounded by Mitzberg about managing government departments as a business are preferred by the author, considering the decisiveness of some of the tools that are used by businesses to improve on their effectivenss and efficiency, for example business plans. Also, the author is of the view that, there are clear distinctions between the public and private sector but governments can learn some valuable lessons from the private sector, including the appropriate use of business plans.

A business plan is defined as a reflection of a particular business's intentions, how those intentions are formulated and implemented, and that it requires an appropriate amplification of areas where specific support is needed (Ehmke & Akridge, 2010). The sequential aspects of a business plan are that the identification, description and the analysis of a business opportunity are thoroughly scrutinised (Ehmke & Akridge, 2010; Haag, 2013). Although in most instances business plans are viewed as tools that are utilised to raise funds and document business parameters for investors, they are equally crucial as roadmaps towards achieving excellence (Haag, 2013). Therefore, given the shortcoming in the South African MCS system, i.e. budgetary constraints; personnel shortages; gaps in leadership; and planning and strategic direction that needs some attention, as revealed by this study, the development of an appropriately structured MCS business plan could help DEFF to develop such a roadmap for achieving technical and economic feasibility.

There are varying views about the number of components for a good business plan in the vast available literature in the subject of Business Plans, where the number ranges from seven to 10 components. However, because of what these components cover it all amounts to a similar conclusion where they can be outlined as follows (Haag, 2013).:

(a) Executive Summary;
(b) Business Description;
(c) Market Analysis and Strategy;

(d) Marketing and Sales Plan;
(e) Competitive Analysis;
(f) Management and Organisation Description;
(g) Products and Services Description;
(h) Operating plan;
(i) Financial Projection Needs; and
(j) Exhibits and Appendices

In the next section, these components are discussed within a business plan for the South African MCS system.

7.4.1. The proposed structure of the South African MCS business plan

A. The executive summary

The Executive Summary of the business plan would serve as an abstract of the South African MCS program where it succinctly reflects on the program's present and future direction (Haag, 2013). Among other things, reflections of the South African MCS program captured in the Executive Summary should explicitly state the MCS program's key objectives and purpose (Haag, 2013). The DEFF Strategic and Annual Plans inform that coupled with international obligations, it must summarise the basic MCS program concepts and highlight key points in the program's functioning. Furthermore, it must highlight the niche market and the competitive advantage of the South African MCS program (Ehmke & Akridge, 2010; Haag, 2013). Included should be a brief description of the South African MCS program benchmarks with other similar institutions (with regards to its operational targets that may be inclusive of financial targets); a short overview of the South African MCS management structure, and their respective work experience and previous successes (Haag, 2013).

B. Business description

Following the Executive Summary are the Business Description and its objective. That is to give a full description of the South African MCS program, together with explicit reasons for its existence which can be articulated through a mission statement, including how it is managed, and further explanation on the underlying reasons for its future success (Ehmke & Akridge, 2010; Haag, 2013). Therefore, for the business description of the South African MCS program, it can be stated that its purpose is the protection of the integrity of coastal and marine ecosystems, whilst ensuring food security and promoting economic development through regulated access and rational utilisation of the marine living resources (Republic of South Africa), 1998a). However, it should be mentioned that commercial offshore, commercial nearshore and subsistence fisheries have different characteristics, and the business plan needs to include different MCS strategies and approaches for each sector. Therefore, in consideration of different fisheries coupled with the responsibilities of State as outlined above, it can be summarised that the CD: MCS is responsible for the development and implementation of fisheries compliance and law enforcement interventions. To that end, it is recommended that the vision and mission of the CD: MCS could be stated as follows:

Vision: *"Excellence in fisheries governance that balances rational use with conservation."*

Mission**:** *"To ensure sustainable utilisation and equitable access to marine living resources for the benefit of all South Africans and the SADC region through an improved management, regulatory regime and cutting-edge fisheries compliance and law enforcement."*

The organisation's vision and mission provide a more focused approach in the business processes of the CD: MCS, in particular for improving and strengthening its overall MCS governance structures and processes. Enablers for this undertaking, i.e. in contemplation of government processes, are both the strategic plan and the annual plan, of which the business plan should be linked to both. Both documents have the National Government Outcome 10 of the Government's Medium Term Strategic Framework (MTSF) as their mainstay. The role of Outcome 10 as a governance tool is said to, "Protect and enhance our environmental assets and natural resources."[156]. Flowing from Outcome 10 is Strategic Goal 2 and Strategic

[156] https://www.gov.za/sites/default/files/gcis_document/201501/daff-strategic-plan-2013-2014-2017-2018.pdf: Program 6: Fisheries Management - Key outcome 10: Protect and enhance our environmental assets and natural resources, page 86. Accessed 30 October 2020

Objective 1. Strategic Goal 2 is the *"Sustained management of natural resources."* Strategic Objective 1 is to *"Ensure the sustainable management and efficient use of natural resources."* Under the Strategic Objective 1 there are two Key Performance Indicators (KPIs) where the first is, *"depleted fish stocks rebuilt,"* and the second being, *"enforcement and compliance efforts to combat poaching."*

This business plan would significantly strengthen the objectives of KPI: 2 as elucidated above, especially in consideration of the gaps, of which one is to *"facilitate partnerships with law enforcement agencies."* Noteworthy is that focus here is only on law enforcement agencies. They are all government agencies, and it excludes all other critical stakeholders who are inclusive of the Non-Governmental Organisations (NGOs); Community Based Organisations (CBOs), and different fishing industry representatives in a committee and who will be necessary for the improvement of the South African MCS program.

This business plan would seek to build on the two documents as stated above by introducing new KPIs under strategic goal 2, alternatively improving KPI 2 by adding new activities under this KPI. That will serve to garner support for improving the South African MCS organisational structure and acquiring all cardinal and appropriate resources and improving the organisational capacity and planning capabilities. Besides, it will also be to develop and implement a regional MCS integration strategy. The regional MCS strategy will focus on the implementation of the SADC Protocol on fisheries, the Statement of Commitment by SADC Ministers responsible for Marine Fisheries on Illegal, Unreported and Unregulated Fishing (2008), and its related implementation plan, as well as conservation measures of all the applicable regional fisheries management organisations (RFMOs) that South Africa is a party to. Furthermore, linked to activity 2 of KPI 2 of the Fisheries Management Strategic Plan, it should strengthen partnerships with all the relevant law enforcement agencies at National, Regional and International levels.

C: Market analysis and strategy

The market analysis and strategy are about the industry description and outlook; the target market for the products of a particular establishment; market test results, and lead times. Taking the target market aspect of the market analysis, this is the part that clearly defines who is the ideal customer or client of that particular establishment for which the business plan is written, for example where characteristics like the demographics, i.e. gender, age; income levels and lifestyles should be included (Haag, 2013). Furthermore, in the balanced small business website[157] It is stated that it is equally important to include in this part of the business plan data on the target market's size, the potential driving factors of the target market to purchase the goods, and the channels through which the products could be acquired. Therefore, market analysis in a business plan can be summarised as information and knowledge that a particular business entity should have about its target market and size; trends, segmentation and potential clients for the business[158]. That is critically important for the South African MCS program to reflect on this business plan aspect. However, it is also equally important to mention that it is a government program with no products sold to generate revenue for DEFF but services that the Department is mandated and required to provide to its clients.

Analysis of potential clients should incorporate their various locations and their needs, and the underlying reasons why they would buy from your business or, in this context, why they require the services and how they benefit from MCS. Of importance is how the services that a particular company provides are meeting the needs and expectations of its customers. Also, characteristics of its competitors, i.e. the services they provide compared to other options; the advantage they have over those, and their shortcomings in the products they provide (Ehmke & Akridge, 2010; Haag, 2013). In general terms, the fisheries sector is viewed as a highly contested terrain both at the national level and globally. With that is an intertwined myriad of challenges inclusive of overexploitation, which is about targeting high-value species; Illegal, Unreported and Unregulated (IUU) fishing; corruption of both government officials and

[157] https://www.thebalancesmb.com/small-business-plans-4161640. What You Need to Know About Small Business Plans - Small Business Plans Explained. Accessed 06 February 2021

[158] https://www.poeticmind.co.uk/business/structure-of-business-plan/. Structure of Business Plan by Gil Dekel. Accessed 23 November 2020

participants from the fishing sector, and generally low compliance levels. The responsibility of the Department of Environment, Forestry and Fisheries (DEFF) through the Branch: Fisheries, and the CD: MCS in particular, and in collaboration with all its identified stakeholders, is to develop and implement a suite of comprehensive and highly effective MCS interventions to address these challenges.

Given that MCS is a government-driven public good service for the fisheries sector, some stakeholders are the recipients of services, and others are the participants in the development of services and products that MCS offers. MCS stakeholders may either be within the Republic of South Africa, i.e. national stakeholders or International stakeholders given the global nature of fisheries. National stakeholders may be aligned with commercial fisheries; small scale fisheries, and the civil society, i.e. Non-Governmental Organisations (NGOs); Community Based Organisations (CBOs) or a variety of interested parties. Commercial fisheries stakeholders, particularly the large conglomerates targeting high-value species like Hake (*Merluccius capensis* and *Merluccius paradoxus*), have different needs compared to the small scale fishery sector which incorporates the traditional line fish and subsistence fishery. This study has shown different levels of threat to the two sectors, i.e. commercial and small scale fisheries. Proximity to the coastline of inshore fisheries coupled with ease of access to fisheries, for example, the West Coast rock lobster (*Jasus lalandii)* and the abalone (*Haliotis midae),* predisposes these fisheries to high levels of poaching and other transgressions (Attwood, 2016; Cochrane *et al.*, 2020; Minnaar *et al.,* 2018).

Therefore, a rethink towards the re-formulation of the MCS service is necessary. That would be a positive response to legal fishers' concerns about the status of the resource they are exploiting and its sustainability, including from an economic point of view. Besides, that would also help to address scepticism with which traditional fishing coastal communities view government interventions. Distrust in government interventions may be due to a common belief in these communities, that they were dispossessed of their birthright to access fisheries, as much as they are economically excluded from marine living resources (de Greef, 2016; Lambrechts & Goga, 2016; Minnaar *et al*., 2018; Pinnock, 2016). This study's results revealed similar sentiments under Section D 1, whereby the SAFIR Group expressed a less optimistic view about the South African MCS program's effectiveness in ensuring the implementation of a collective approach and stakeholder engagement process in fisheries governance.

Global stakeholders and regional stakeholders are also crucial as stakeholders for the MCS products and services we are developing and providing to the fisheries community. That is possible through the active and relentless participation of South Africa in regional fisheries governance cooperative programs and activities in which the country has a stake, i.e. the continental perspective. A well-established entry point for this exercise is the African Union's New Economic Partnership for Africa Development (NEPAD) and its associated continental and regional programs, together with the Southern Africa Development Community (SADC) all deliberated in Chapter 1 of this study. Also, the global fisheries governance tools, for example, the United Nations Convention on the Law of the Sea (UNCLOS) and a range of others, should be the bedrock of the MCS products and services that DEFF is developing and providing. They were also discussed extensively in Chapter 2 of this study. Their principal purpose is to provide a framework that guides the development of MCS products and how their impact should be measured at all levels, i.e. nationally; regionally and globally. Therefore, through this business plan, and in the market analysis process, strategies should be put in place for tapping onto these resources in the development of practical MCS information and knowledge products, if the objectives of the mission and vision of this business plan are to be realised.

D. Marketing and sales plan

The marketing and sales plan component is enunciated as the part of the business plan that determines the prospects of a venture, where customers must be enticed to develop a keen interest in the products that the venture is manufacturing and selling (Haag, 2013). Furthermore, the marketing and sales plan needs to explicate the niche market of the venture, and the cornerstone of that clarification is market research conducted through customers and potential clients, (Ehmke & Akridge, 2010). Although strengths and weakness should form part of the marketing and sales plan, the emphasis should be on strengths, but that should be preceded by a thorough analysis of opportunities and risks that the company is likely to contend with (Haag, 2013). In the CD: MCS business plan this could instead be considered in an elaborate and honest strategy to improve on the image and credibility of the organisation to the South African public, especially coastal communities, and the fishing industry. This study revealed that views of the South African Fishing Industry (SAFIR) group that participated in

this study are that the overall effectiveness of the South African MCS program is below average. A marketing and sales plan would need to understand why this is the case and what can be done to address the stakeholders' concerns and improve the image.

The marketing and sales plan covers a wide range of areas that are inclusive of resources, the MCS process and consultation with all the relevant stakeholders. It can also be interpreted as a forecast for prospects of the South African MCS program, that if there is no intervention, the chances are high that its effectiveness will remain low and the impact of that on the perceptions of the fishing sector will remain locked on the opposing side. Viewing it from within DEFF, as MCS inspectors alluded to during this research, staff shortages; lack of requisite skills, and widespread negativity due to staff not being promoted, all harm planning and result in inferior MCS products in the end.

Therefore, on the "Marketing" aspect of this part of the business plan, there should be an elaborate communication plan. This communication plan's primary objective would be to improve the image or individual perceptions about a government program and create platforms for active engagement for collaborative development and dissemination of MCS products. Hence the foundation of this communication plan must be a database of all MCS stakeholders. Stakeholders will have to be categorised according to their roles, contribution and level of engagement with the Fisheries Governance Authority (FGA). Particular attention should be given to compliance and enforcement to change the common perception that enforcement is just a means of punishing transgressors. In essence, an effective plan should be about ensuring sustainable utilisation of resources for which cooperation with stakeholders is essential. Therefore, considering the vastly different stakeholders of the Department efforts should be made to engage productively with them. The intention would be to get their buy-in and a high level of cooperation between them and the DEFF.

That is critically important considering that whilst the MCS target market does not directly purchase an MCS system's goods, it benefits from them, and as South African citizens and frequently taxpayers, the market has the right to expect high-quality services. A crucial component should be a communications plan to inform and educate the general public, the industry and other interested parties about MCS products and their value for fisheries. This approach would also assist the Government in learning about essential issues from the stakeholders relatively early, for example, how the industry receives such new conservation measures, and how that translates into expected compliance levels. In the process that could

enable the CD: MCS to plan better, both at the conceptual stage, to be expeditiously responsive to risks and threats, and in the implementation of appropriate plans to mobilise adequate resources to address the estimated threats.

Overall, the importance of incorporating the process of launching a new product, which, in its simplest form, involves communicating all the information about the product to a specific target audience, cannot be overemphasised. In a business plan, and under the market and sales plan, a roadmap called a communication plan can be achieved. It is important to note that the development and application of compliance and law enforcement products and services, should be a collective effort between the State and the recipients or beneficiaries of such products. That serves to assist in changing existing perceptions and stereotypes about fisheries compliance and law enforcement, of which some were covered extensively in Chapter 3 of this study. Lastly, a buy-in from coastal communities, active participation of all parties concerned in improving compliance with regulations which leads to improvement in the overall fisheries governance is the likely product of this approach.

E. Competitive analysis

Competitive analysis is defined as a method for determining competitors' comparative strengths and weaknesses with regards to their marketing strategies and their range of products, which may be inclusive of current products and those that would still be under development[159]. Apart from understanding each business's competitiveness, i.e. through activities like competitor profiling, the competitive analysis also helps businesses identify their respective essential internal operational or structural adjustments if they are to take advantage of their competitors' weaknesses[160]. There are no competitors for the South African MCS program in the services that it renders; instead, there is or should be, cooperation with the legal fraternity and other law enforcement agencies. There are also invaluable contributions from members of civil society for the MCS program to achieve its objectives, including individuals, community-

[159] https://articles.bplans.com/what-is-a-competitive-analysis/. What is Competitive Analysis? Accessed on the 26 November 2020

[160] optimally. https://www.inc.com/jeff-haden/how-to-write-a-great-business-plan-competitive-analysis.html. How to Write a Great Business Plan: Competitive Analysis: The seventh in a comprehensive series to help you craft the perfect business plan for your startup. Accessed on the 26 November 2020.

based organisations (CBOs), and stakeholders from the fisheries sector. Cooperation with other law enforcement agencies has benefitted the South African collective MCS efforts over the years through interventions like Operation Orca; Operation Trident and most recently, Operation Phakisa's Initiative 5 as discussed in Chapter 3. The same could be said about cooperation at the regional level, i.e. at SADC level, albeit not fully utilised to bolster the regional MCS capability.

The MCS program is about compliance and law enforcement, whereas the opposite is overfishing and a wide-range of illegal fishing activities. Therefore, competition in this instance is between the Fisheries Governance Authority (FGA) through its MCS program and the transgressors, and can also include ensuring the trust and cooperation of the clients as discussed in the previous section on marketing a sales plan. Competitive analysis from this business plan's point of view would be on understanding the prevalent modus operandi and trends analysis of transgressions. In other words, the end product should be different MCS products that cater to different situations, instead of a universal approach to all situations. It is understood that the FGA's dual responsibility is protecting marine living resources and ensuring regulated access to natural resources to deliver on food security[161] that does not imply an indiscriminate approach to compliance and law enforcement, but rather a measured approach, undertaken in cooperation with other agencies and stakeholders, supported by different MCS products for different situations. An example would be the differences in strategies required for MCS interventions against highly sophisticated criminal incursions and those for addressing illegal fishing by frustrated legitimate fishers (de Coning & Witbooi, 2015; Isaacs & Witbooi, 2019). Hence, it is critically important that through this business plan, a platform be created to develop such diverse products informed by the competitive analysis processes.

Furthermore, there would be an internal assessment of the FGA and how it responds to the threat presented by weaknesses in the system and transgressors in fisheries governance. An ideal response by the FGA, which could be the starting point of addressing the problem, following the competitive analysis framework, would be to develop and implement a capacity building and career-pathing plan. This plan would focus on the organisational structure

[161] http://www.srfood.org/images/stories/pdf/officialreports/20121030_fish_en.pdf. United Nations General Assembly (UNGA) 'Promotion and protection of human rights: human rights questions, including alternative approaches for improving the effective enjoyment of human rights and fundamental freedoms: The right to food' Interim Report of the Special Rapporteur on the Right to Food, A 67/268. Accessed 09 September 2020

development; re-skilling and upskilling of the MCS managers and FCOs; assessment of minimum and maximum requirements of the MCS unit in discharging its mandate; reliability of equipment and implementation of a depreciation and replacement plan to cater for all the MCS movable assets. However, that should be preceded by an all-inclusive gap analysis or skills audit exercise to determine the basket of skills available in the organisation versus skills required for a complete MCS offering. For example, a determination must be made whether DEFF would benefit from having some social scientists and community workers in its staff complement to improve MCS in small-scale fisheries, and other sectors. On the other hand, the design process of a career pathing plan that introduces new levels and responsibilities in the organisation should be a product of institutional arrangements between the FGA and DEFF Human Resources Development (HRD), which work-study professionals should drive to oversee its implementation and monitor its progress.

F. Management and organisation description

In a business plan, the Management and Organisation description encompasses the introduction of a company's management or leadership team and provides a roadmap on how the business idea or concept is to be made a reality[162]. The business's organisational structure can be presented graphically, i.e. in the form of a flow chart, where the different divisions and different management levels showing reporting lines would be illustrated. Following this outline, the Branch Fisheries Management currently comprises five branches: Monitoring, Control and Surveillance (MCS), and its top management structure is reflected in Chapter 3 (Figure 3.3), which is reflected as Figure 7.1.

[162] https://us.accion.org/resource/business-plan-section-3-organization-and-management/. Business Plan Section 3: Organization and Management. Accessed on the 26 November 2020.

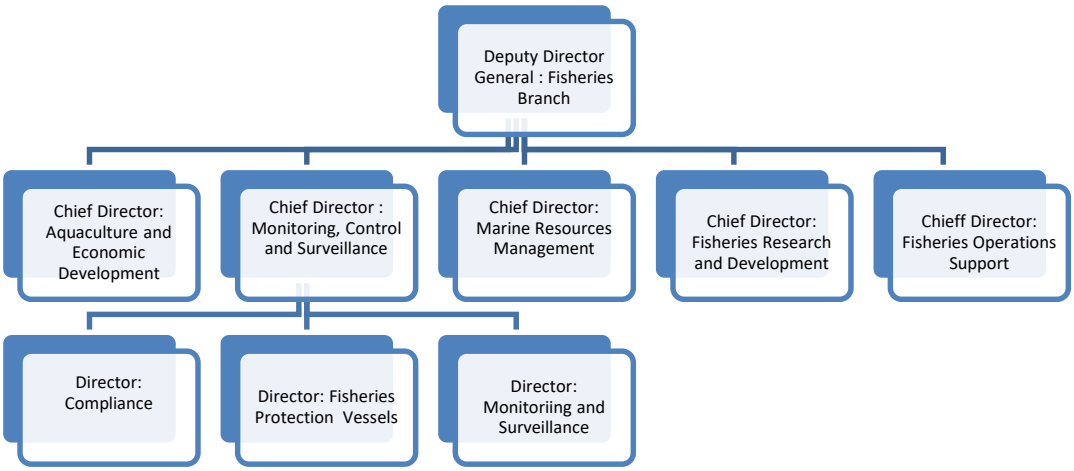


Figure 7.1: Top management structure of the fisheries branch and the management structure of Monitoring, Control and Surveillance

The Fisheries Branch mandate is stated as management, monitoring and ensuring sustainable use of marine living resources through the development of a sound South African fisheries sector (Strategic Plan for the Department of Agriculture, Forestry and Fisheries: 2013/14 to 2017/18). The mandate of the MCS Chief Directorate is to deliver on the protection and promotion of sustainable utilisation of marine living resources as reflected in the Branch Fisheries Management mandate, but with more focus on the intensification of compliance and law enforcement. However, for the Branch Fisheries to deliver on its mandate, there needs to be a stable legislative and policy framework to guide its activities. This study has shown that legislation and policy are one of the strong points of DEFF, but a significant shortcoming is instead in planning, implementing plans, and monitoring and evaluation capacity. In essence, can be interpreted as an inefficient implementation of policy and legislation, attributed, in part, to the low level of awareness within the institution's management ranks about the MCS environment and its needs.

Furthermore, this is linked to the lack of experience and qualifications, which this study has shown are both areas that need urgent improvement. Both have a direct impact on the ability of an organisation to plan and execute its plans. Inevitably, that has a bearing in playing an oversight role that Departments are expected to exercise over their products and services. Additionally, the organisational structure regarding filling vacancies and career pathing from senior inspectors through junior to middle management needs some strengthening. That will result in the timeous introduction of new blood in the organisation, keeping experience and institutional knowledge within the ranks of the organisation, and be able to sustain high levels

of effectiveness in its operations. Therefore, a business plan could lead to an effort on the part of MCS Senior Management to conduct organisational structure reform with the assistance of external professional parties. Furthermore, management tools like project management, personnel retention strategy, and other relevant tools for improving the organisation's efficiency and effectiveness can be developed through this process.

Internal risk identification and an assessment framework that promotes joint planning by the three Directorates, and limits following a silo-approach in implementing the National MCS strategy or plans are vital in the MCS business plan. That will directly respond to this study's findings of an institutionalised silo approach of the MCS Directorates which currently do not plan together or have targets supporting each other. Appropriate management of MCS personnel and activities is critically important, as discussed in Chapter 6. To that end, the business plan should make provisions for Provincial MCS forums that work closely with the head office, but with some level of autonomy that allows immediate responses to emergencies. Closely linked to that is what has been further revealed in the study, as discussed in Chapter 6 Section 6.5.3 Part B, in the coastal Provinces leadership and expected appropriate managerial oversight for regional or provincial MCS activities are deficient. The underlying reasons being that the Head Office, i.e. MCS Senior Management, is not involved as much as it should be in overseeing Provincial MCS programs. Therefore, the business plan should address the regional or provincial MCS administration and management strategy.

G. Products and services

In a business plan, the products and services section outlines products and services a particular organisation offers in the market and seeks to respond to questions on why its offerings are needed, as well as clear plan or strategy on how it plans to compete with other businesses or organisations that are offering similar products and services[163]. Equally important is the description of products and services that a particular organisation is offering. It must be comprehensive but also kept as simple as possible, where potential customers or clients are

[163] https://www.thebalancesmb.com/business-plan-format-1794224. How to Write the Business Plan Products and Services Section, by Randy Deurmyer (30 October 2019). Accessed 30 November 2020.

spared of a technical detail that may end up losing them[164]. Furthermore, specific needs for developing products and services coupled with legal issues that are inherently bound to that particular organisation's products and services should be clearly articulated under the products and services section of its business plan.[165]The South African MCS national program is about ensuring the sustainability of marine living resources by implementing all applicable policies, legislation, infrastructure development and capacity building. Implementation can be strengthened through a well-structured collaboration between DEFF and all of its compliance and enforcement stakeholders, civil society, NGOs and other interested parties.

As revealed by the results, the South African MCS program's overall effectiveness in discharging its mandate or responsibility is average where it should be excelling given the dual responsibility of State in food security and economic development, of which marine living resources play a significant role in both. Given this dichotomy, DEFF commits to develop and provide MCS products that will seek to strike a balance between the two responsibilities of State as explained. Such products should be about a seamless, all-inclusive MCS program that promotes compliance with all fisheries governance laws and policies, to ensure equitable access to Marine Living Resources by all South Africans and other Nationals who have been granted access. The key objective is sustainable utilisation of the resource, and eradication or minimisation of fisheries infarctions through provisioning of, for example, the following MCS products:

- A Working Group in MCS (WG-MCS) with representation from a wide range of DEFF Stakeholders to collectively identify government shortfalls, gaps in fisheries governance, and collectively develop solutions where possible and appropriate.
- Consolidated semi-autonomous Provincial MCS Management, Planning and Coordination structures to develop, implement, monitor, and evaluate Provincial MCS programs and activities.

[164] https://www.inc.com/jeff-haden/how-to-write-a-great-business-plan-products-and-services.html. How to Write a Great Business Plan: Products and Services: The fourth in a comprehensive series to help you craft the perfect business plan for your startup.
[165] https://us.accion.org/resource/business-plan-section-4-products-and-services/. Business Plan Section 4: Products and Services. Accessed on the 30 November 2020.

- A dedicated, professional and well-resourced MCS inspectorate that attends to all MCS related fisheries governance queries 24 hours a day, for the entire year.
- Intensified coastal patrols and surveillance programs in all coastal Provinces, strategic inland areas, particularly borders, and identified hotspot areas.
- Two variations or levels of MCS inspections, i.e. scheduled and random inspections, all synchronised between the three MCS Directorates at landing sites; Fisheries Processing Establishments (FPEs); at-sea; storage facilities and at the point of sale.
- An improved automated fisheries management system linked to fishing vessels' registration database and their respective vessels' electronic logbooks. Inspectors will be provided with electronic scanners linked to the fisheries management system at all inspection sites as a tool for monitoring compliance in all aspects of the fishing activity, and all data to be sent to a central database for all the Chief Directorates of the Fisheries Management Branch.
- Reliable and affordable VMS for all fisheries sectors.

H. Operating plan

The operating plan describes the physical activities and necessities of operations in a particular business that are inclusive of all the requisite equipment, facilities, and the business's physical location.[166] Furthermore, the operating plan is future-oriented as it outlines budgets for precise implementation of the business's strategic plan with clearly defined team-based activities and outcomes for a minimum of a year to a maximum of a three or five-year period[167]. An operating plan works well where there is a collective agreement by all those that are part of the business, making it easier to assign timelines to specific tasks, assess and measure the success of the set goals, reporting and timeous interventions where and when necessary (Soderstrom & Weber, 2020). This approach and effort lead to an organisation that operates efficiently with all of its different teams, bound by a common objective, so that they can achieve all their set objectives.

[166] https://www.thebalancesmb.com/operating-section-of-business-plan-2947031. Writing the Operations Plan Section of the Business Plan. Accessed on the 29 November 2020

[167] https://www.projectmanager.com/blog/operational-planning-make-operation-plan. Operational Planning: How to Make an Operations Plan by John Leo Weber, 16 December 2019. Accessed on the 29 November 2020

That is an ideal approach for a national MCS program. Therefore, suggestions are that this approach could be expedited for the South African MCS program through a business plan. The first step could be developing and implementing an MCS governance framework and formal institutional arrangements with all stakeholders, within government and relevant parties within the Republic of South Africa, the regional and international bodies.

That could also assist the Department in developing a database of all its stakeholders, i.e. those actively participating in fishing or those that only have an interest in fisheries governance matters. It would also improve collective MCS implementation as decisions would have been taken through a collective decision-making process. In essence, that will improve general compliance with fisheries regulations. For the collective decision-making process to bear the desired outcomes, socio-economic and political issues should be taken into consideration during the consultation and planning phase. Furthermore, this approach will also improve the development and upkeep of precise service delivery standards for DEFF, whilst ensuring that all other parties deliver on their commitments and responsibilities that collectively seek to improve the South African MCS program's effectiveness. Besides, this approach may assist in improving an inspection system that does not inconvenience fishing vessels or companies while delivering on the expectations of the FGA at National, Regional and International level. Currently, the inspection system that is utilised by the FGA may be focusing almost exclusively on the interests of the inspecting party and not of the inspected party.

Some steps that should be included in an Operating Plan to develop or improve products and services towards the achievement of the South African MCS program's broader objectives as encapsulated in the vision and mission of this business plan are as follows:

- A complete overhaul of the Strategic Plan of the Branch Fisheries to discourage the silo-approach to the MCS program is vital to the MCS program's success given the current financial and human resources challenges.
- A comprehensive review of standalone SOPs to improve on efficiency and effectiveness, development of a central SOP to improve on central coordination, coupled with an overhaul of the of the day to day inspector duties and responsibilities to improve on communication and implementation of MCS activities between the three Directorates.

- Development and implementation of monthly special operations and deployment strategies overseen by the CD: MCS, but implemented jointly with other law enforcement agencies.
- Develop a framework for the management of Information and Communication Technology (ICT) infrastructure and related equipment. The Vessel Monitoring System (VMS), i.e. its maintenance, related contracts, upgrades and dissemination all along the South African coastline, with measured incremental use of the system to new fisheries, should be managed under the ICT Management Framework. Stakeholder databases for different MCS activities will be developed and managed under the ICT framework as well, and that includes the determination of other access to information security controls.
- Joint Regional MCS plans developed with other countries in the region utilising the SADC Protocol on fisheries and appropriate conservation measures of the Regional Fisheries Management Organizations (RFMOs) that South Africa is a party to.
- Encourage, and facilitate the establishment of a Regional MCS Inspectors network for facilitating exchange programmes of inspectors among all coastal States in the region, which will also serve as a node of information exchange and regional MCS capacity building.
- Develop and implement a resource mobilisation strategy that will facilitate the establishment of a resource mobilisation unit within the CD: MCS (discussed further in I: Financial Projection Needs below).

DEFF's commitment to providing MCS products and associated operating plans must be effected by developing an MCS implementation plan, which must be preceded by an elaborate planning process that considers requirements, risks and indicators as summarised in the examples shown in Table 7.1. The planning process is informed by the structure and detail of the Operating Plan as encapsulated in its aspects, and it should reflect the mission and vision of the MCS program and the underlying pieces of legislation and relevant fisheries governance policies. The aspects of an Operating Plan are further elaborated on during the planning process to give specifications about the human resources, equipment and the remediation needed to implement each aspect. The risk factor and measurable indicators are its other two components for monitoring and evaluation purposes. They are mainly designed to provide feedback to senior management about the operating plan's performance in achieving its set goals and

objectives. The risk factor level should not only increase the level of sensitivity to the senior managers about its potential effect, for example, if it is high, but should lead to the timeous development of several alternative countermeasures. Therefore, through information provided by the two components, timeous adjustments could be made to improve the output of each aspect and the overall success of the operating plan.

Table 7.1. A summary of the output from MCS planning process towards the development and management of an MCS operating plan, showing some examples of aspects that should be included in such a plan.

Nature/Aspect	Remediation	Workforce required	Equipment Required	Risk Factor	Measurable Indicators
Improvement of capacity for MCS operations	Perform a skills audit, to establish the required skills for an effective MCS program, and compare with the available capacity.	Work-study officer to perform the organisational structure diagnostic function (form/structure; personnel/positions in the structure – vacant and filled, objectives of the organisation/function; work distribution and workload per individual, and other tests.	-Office space and appropriate Information, Communication and Technology (ICT) infrastructure. -Recruitment and selection policy, and other related policies approved by the Department of Public Service and Administration (DPSA) -Customised recruitment and selection plan with timeframes and targets. -Sufficient budget for advertisement, transportation and accommodation of candidates	Low	Skills audit completed and a report with recommendations forwarded to the CD: MCS -Approved sufficient budget for this activity
	Assessment of current organisational structure and determine its effectiveness.			High (Dependent on the availability of work-study experts which DEFF does not have; contracting the private sector depends on the granting of permission to do an open tender process)	
	Determine current critical pressures to fisheries (globally, regionally and	Fisheries Management and Governance Experts; MCS Practitioners	-Database of all relevant stakeholders, their respective areas of	High (dependent on commitments of participants and	- A report about pressures in different fisheries, with trend analysis;

	nationally) to formulate an appropriate response through specifically developed or fishery specific MCS annual plans that feed onto the 3 – 5 MCS Strategic Plan. Responses should be at the operational level, including personnel, equipment, costing, and partnerships.	with strategic and operational expertise to provide the necessary advice and guidance to improve at both MCS operational and MCS administrative levels.	expertise and contact details. -Sufficient budgets for organising meetings, meeting venue and travelling expenses including subsistence and travelling for all task team members.	availability of budget)	- Recommended plan of action for MCS operations for specific fisheries presented to DDG: Fisheries Management; -Approved budget for this activity
	Identify courses and training opportunities to upskill the current workforce in the inspectorate.	Temporal task teams that comprise fisheries academics/experts from higher learning institutions; fishing operations experts from the fishing industry, Senior or middle MCS managers and HRD practitioners. This task team will have its TORs compiled by the CD: MCS Senior Managers working with their respective internal teams. The	- Revised recruitment and selection policies. -Human Resource Development Policy. -MCS HRD Committee with powers or leverage to co-opt experts from the private sector (universities and industry). -Skills Audit Committee that produces a periodical skills audit report.	Moderate (dependent on commitments of participants and availability of budget)	-Signed agreements or MOUs with external stakeholders to provide training. -Calendar of training and training modules that can be reviewed and updated as per agreement between all parties.
	Engage external stakeholders (Universities, Colleges, South African Police				

	Service, the fishing industry, and other relevant parties) to develop induction and other appropriate training material and short courses for those who will be hired without an in-depth knowledge of fisheries and fisheries compliance and law enforcement.	Task Team will meet monthly, and report to the DDG: Fisheries Branch and his / her team of CDs quarterly or when required. Their task is to develop training programs, manuals and the development of training calendars.			
Establishment of Provincial MCS Forums to improve efficiency by decentralising key functions.	Establishment of Regional semi-autonomous MCS Management Structures that are presided over by an appropriate rank.	-Middle and Junior management (e.g. Deputy Directors and Assistant Directors) for planning, implementation and oversight of Regional or Provincial MCS program, which is a sub-set of the National MCS program. -Personnel for fleet management, asset control personnel, administration and finance.	-Office space and ICT infrastructure (IT Network; Telephones, and e-mails) -Light vehicles for general office work.	High (DEFF has to provide an additional budget, physical resources and appropriately qualified personnel).	- Provincial MCS programs, with regional structures that have their budget that they and their assets directly control with their asset registers. - Regional MCS program, with their implementation plan and evaluation standards which must be a sub-set of the National MCS program.

Resource Mobilisation Strategy to ensure the availability of budgets required for an effective MCS programme	-A written motivation to the Department of Public Service and Administration to review the Branch Fisheries and CD: MCS structure, and permission to change or modify the existing organisational structure to accommodate the new Directorate: Resource Mobilisation.	Director: Resource Mobilisation and Coordination; Specialist 1: Development Finance; Specialist 2: Government Processes and Administration; Office Administrator/s	-A resource mobilisation concept document; -Directorate: Resource Mobilisation Organisational structure; -Office space; ICT equipment; Office furniture; vehicles; personnel; operational budget	High (Permission to change the organisational structure and functions from the Department of Public Service and Administration may be time-consuming; Getting a budget allocation for the new function and salaries of staff from the National Treasury.	-An approved resource mobilisation strategy; -The establishment of the Directorate: Resource Mobilisation; - Mobilisation of additional funds for improving the effectiveness of MCS operations.
Monthly Special Operations & Deployment Strategies to ensure optimal and coordinated use of capacity and resources.	- Provincial monthly special operations and deployment strategies implemented jointly with other law enforcement agencies. - Incorporated in: -- National MCS 3-5 year MCS strategy; -- National MCS Annual Plans;	-Chief Director: MCS; MCS Directors; -Semi-autonomous Provincial MCS Heads; -Provincial MCS Forums	Will not require additional equipment specifically for this purpose, but strategies should lead to more effective use of: - slipways and launching sites; -ICT infrastructure and a functional VMS; -Two-way radios and cell phones; -Surveillance equipment;	Moderate (Availability of personnel and equipment for the deployment, planning time and oversight)	- Terms of Reference (ToRs) or guidelines for monthly special operations and deployment strategies; - - Schedule of meetings for fisheries regulations compliance to determine appropriate actions; - More effective deployment and use

			-Vehicles, tow trucks and boats, sea-going vessels; drones and chartered aircrafts		of MCS capacity and resources.
Joint SADC Operations and establishment of a Regional MCS Inspectors' Network to improve regional coordination following the SADC Protocol on fisheries.	-Establishment and regular meetings of a SADC Working Group for Monitoring, Control and Surveillance (WG-MCS); -Implementation of regional MCS Capacity Building and Exchange Program Committee (working under the auspices of the SADC Fisheries Secretariat) with a representative from each country. -MCS specific bilateral agreements with capacity building and inspector exchange program as one of the thematic areas.	-MCS Operations managers in South Africa including Regional or Provincial Heads; Technical Experts from each of the SADC States (at the level of Assistant or Deputy Director) and Control Officers or Chief Inspectors	-ICT equipment -Operational budget for liaison and exchanges. -MCS platforms, i.e. ships and aircrafts.	High (Availability of the required technical expertise in all the countries; budgets to implement regional MCS activities; sharing of resources where a framework to do may still need development; willingness and flexibility which may depend on national MCS program schedules. Language differences is another challenge.)	-Guidelines for regional MCS capacity building and exchange program (the South African perspective), and influence to the SADC Fisheries secretariat. -Bilateral arrangements with the individual SADC States to advance the capacity building and the exchange program designed for inspectors. -A program to harmonise laws, but with the standardisation of systems first, e.g.

	-Regional joint patrols working together with the regional MCS Centre and the SADC Fisheries Secretariat in the implementation of regional MCS plans.				VMS, to enable a more direct exchange of information between the Member States. That will assist operations of the regional MCS Centre.

I. Financial needs projections

The MCS national program is a government undertaking, and the South African government budgeting process, i.e. the Mid Term Expenditure Framework (MTEF)[168] can be utilised in this business plan. The MTEF budgeting process is undertaken every year, and it involves the projection of expenditure, income and borrowing for three successive financial years. An MCS program is a resource-intensive undertaking, and currently, the South African MCS system's needs are not fulfilled by the existing budget. Therefore, it would be advisable that there be a stabilisation budget in the first year of a new cycle (2020/2021), which will guarantee the continuation of the current MCS program and allow some improvement in areas where there has been non-performance due to severe under-budgeting.

The proposed budget for the new financial year (2020/2021) was compiled utilising the 2019/2020 MCS actual budget for the first three quarters of the financial year (which was the most recently available) as a reference point (Table 7.2). As revealed by this study in chapter 4, the current severe under-budgeting contributed to the ineffectiveness of the South African MCS program in some areas of the program. For instance, the Administrative Cost budget sub-part, as illustrated in Table 7.2, where there was a total budget allocation of R12 047 283.00 and an over-expenditure of R5 048 091.00 41.90% of the total allocation in the first three quarters of the year.

[168] https://www.parliament.gov.za/storage/app/media/EducationPubs/16.02.15_Budget_pamphlet_eng.pdf - How the Budget Works for Us – Accessed on the 01 April 2020

Table 7. 2: MCS budget allocation per budget subpart and over-expenditure in 2019/2020 after the first three quarters of the financial year.

MCS BUDGET ALLOCATION AND EXPENDITURE COMPARISON – 2019/2020				
BUDGET SUBPART	**MCS PERFORMANCE ASSESSMENT FRAMEWORK SECTIONS / COMPONENTS**	**TOTAL BUDGET ALLOCATION PER SUBPART**	**TOTAL BUDGET EXPENDITURE [169]**	**TOTAL OVER EXPENDITURE PER BUDGET SUBPART**
Administrative Cost	B.1.1: Management & Strategic Level Assessment; B.1.2: Regional & International Integration; C.1: Prior Fishing Inspection; C.2: During Fishing Inspection; C.2.1: Safety & Catch Inspection; C.3: During Landing Inspection; C.3.1: Foreign Fishing Vessels Inspection; D.1: Stakeholder Engagement; D.2.1: Risk Management – Personnel; D.2.2: Risk Management – Mapping and Monitoring of Hotspots	R12 047 287.00	R17 095 378.00	**R5 048 091.00**
Inventory Cost	C.1: Prior Fishing Inspection; C.2: During Fishing Inspection; C.2.1: Safety & Catch Inspection; C.3: During Landing Inspection; C.3.1: Foreign Fishing Vessels Inspection	R1 035 765.00	R1 069 039.00	**R33 274.00**
Professional & Special Services	B.1.2: Regional & International Integration; B.2: Legislative& Administrative Measures; D.2.1: Risk Management – Personnel; D.2.2: Risk Management – Mapping and Monitoring of Hotspots	R98 895 169.00	R99 053 016.00	**R157 847.00**
Asset Related Expenses	B.3: Infrastructure Evaluation	R382 662.00	R383 480.00	**R818.00**
Capital Expenditure	B.3: Infrastructure Evaluation	R140 200.00	R269 267.00	**R129 067.00**
TOTAL		**R112 501 083.00**	**R117 870 180.00**	**R5 369 097.00**

[169] These are actual MCS expenditure figures sourced from the MCS Oracle report printed on the 20 January 2020, i.e. after three quarters of the 2019/2020 financial year.

It can then be extrapolated, from the expenditure after nine months, that the average overall MCS quarterly expenditure, e.g. Administrative Cost would be R 5 698 459.33 (R17 095 378.00 divided by three). Assuming all things being equal, this gives a calculated annual budget estimate of R22 793 837.33 (Table 7.3). That implies that R 22 793 837.33 would have been a realistic budget allocation for the Administrative Cost budget subpart for the 2019/2020 financial year instead of the R12 047 283.00 or 52.85% initially budgeted (Table 7.2). Utilising a similar approach, the overall annual budget estimate for the MCS program for the 2019/2020 financial year should have been R157 160 240.00 (Table 7.3). It should be noted that these corrections, presented in Table 7.3, show the budget necessary to achieve the current performance of MCS reported here and, on their own, would not be sufficient to lead to improved performance.

Considering the standard approach to budgeting where an estimated inflation rate, usually 6%, is added on to the actual expenditure for the year, for the 2020/2021 financial year the MCS budget could be estimated to be R166 589 865.00. The baseline value utilised in this estimation is the 2019/2020 estimated annual MCS budget of R157 160 240.00 (Table 7.2) therefore, for the additional two years in line with the MTEF, the MCS annual stabilisation budget is proposed to be (a) R 176 585 256.90 for the 2022/2023 financial year and R187 180 372.314.00 for the 2023/2024 financial year. This budget would only serve to stabilise the South African MCS program, especially during the first year, whilst overhauling the entire MCS program. Furthermore, it should ensure that all inspections do take place, that different diagnostic committees are consolidated with the presence and participation of experts and consultants from within and outside the Government; that necessary services are expedited; the assessment process of the availability and status of infrastructure and movable assets is completed; organisational structure reviewed and determination of the fitness of duty for employees or inspectors with regards to the environment they are operating undertaken; as well as the development of a communication plan and publicity activities to improve on how the general public and its stakeholders view MCS.

Table 7. 3: Proposed MCS stabilisation budget for the 2021/2022 financial year (numbers rounded to the nearest R1000).

PROPOSED MCS BUDGET ALLOCATION FOR THE – 2021/2022		
BUDGET SUBPART	**MCS PERFORMANCE ASSESSMENT FRAMEWORK SECTIONS / COMPONENTS**	**TOTAL BUDGET ALLOCATION PER SUBPART**
Administrative Cost	B.1.1: Management & Strategic Level Assessment; B.1.2: Regional & International Integration; C.1: Prior Fishing Inspection; C.2: During Fishing Inspection; C.2.1: Safety & Catch Inspection; C.3: During Landing Inspection; C.3.1: Foreign Fishing Vessels Inspection; D.1: Stakeholder Engagement; D.2.1: Risk Management – Personnel; D.2.2: Risk Management – Mapping and Monitoring of Hotspots	R22 794 000
Inventory Cost	C.1: Prior Fishing Inspection; C.2: During Fishing Inspection; C.2.1: Safety & Catch Inspection; C.3: During Landing Inspection; C.3.1: Foreign Fishing Vessels Inspection	R1 425 000
Professional & Special Services	B.1.2: Regional & International Integration; B.2: Legislative& Administrative Measures; D.2.1: Risk Management – Personnel; D.2.2: Risk Management – Mapping and Monitoring of Hotspots	R132 071 000
Asset Related Expenses	B.3: Infrastructure Evaluation	R511 000
Capital Expenditure	B.3: Infrastructure Evaluation	R359 000
TOTAL		R157 160 000

Whilst all of what has been summarised above is of utmost importance; a critical starting point would be the determination, assessment, costing and creation of new positions for the MCS in line with the MCS governance framework and formal institutional arrangement strategy as

outlined in Parts F and H, in particular, of this business plan. As mentioned by some of MCS Managers, human capacity is a problem and the underlying reasons for that are that currently there is a staff complement of less than 150, who are heavily overworked, compared to the 2009/2010 financial year where the MCS staff complement was over 250. Also, some MCS Inspectors including some designated as station managers, and some MCS Managers, indicated that there had not been any meaningful replacement of vehicles, and small watercraft in the past eight years and that also needs to be rectified through a well-balanced budget. It can also be noted that in 2019/2020 there was no decent budget allocation for the capital expenditure budget subpart.

The situation with the national budget is not likely to improve in the next few years. Reports were that the Government's serviceable debt has since the 2016/2017 financial year been standing at R2.2 trillion, and steadily escalating[170]. That is further broken down to R1.58 trillion in general government spending, with an interest payment of R146 billion, which translates into a 9.2% interest rate[171]. Therefore, given the current pressure on government resources, the situation seems not likely to improve in the foreseeable future. Moreover, there is the backdrop of the relentless demands on the services of the national MCS program. Therefore, the South African economic situation provides a good motivation towards developing and implementing an MCS resource mobilisation strategy instead of relying only on just the national treasury annual allocation. A further proposal is for the resources mobilisation strategy to be placed under a new Directorate, the Resource Mobilization and Coordination Directorate (D: RM&C). Its function would be to target development finance sources such as like-minded countries with bilateral arrangements with South Africa, United Nations agencies that are operating in the continent, and the private sector through elaborate private sector-public sector programs, raising funds for the national MCS program.

Resources mobilisation is defined as a process of formulating an assortment of strategies for soliciting resources from resource providing organisations to maintain and improve the organisational efficiency and effectiveness through a precise and appropriate implementation of its key objectives (Golhasani & Hosseinirad, 2016). Central to this proposed unit's functions, as illustrated in Figure 7.2, will be the introduction of the private sector approach or a private

[170] http://www.treasury.gov.za/documents/national%20budget/2019/review/Chapter%207.pdf. Government debt and contingent liabilities. Accessed 20 February 2021

[171] http://www.statssa.gov.za/?p=11763. General government spending slows in 2016/17. Accessed 16 January 2021

sector business model in the governance machinery of the South African MCS. Also, to firmly anchor the focus and functioning of the D: RM&C to its core objectives, the top management of CD MCS will lead the process of developing a concise and specific set of Terms of Reference (TORs) of the Directorate. As would be delineated in the TORs, the scope of work would give guidance on the ultimate organisational structure and functioning of the Resource Mobilization and Coordination Directorate. When the process is concluded, the end product is to have an almost self-sufficient national MCS program, i.e. a program that has considerable fiscal semi-autonomy as opposed to relying heavily on government funding.

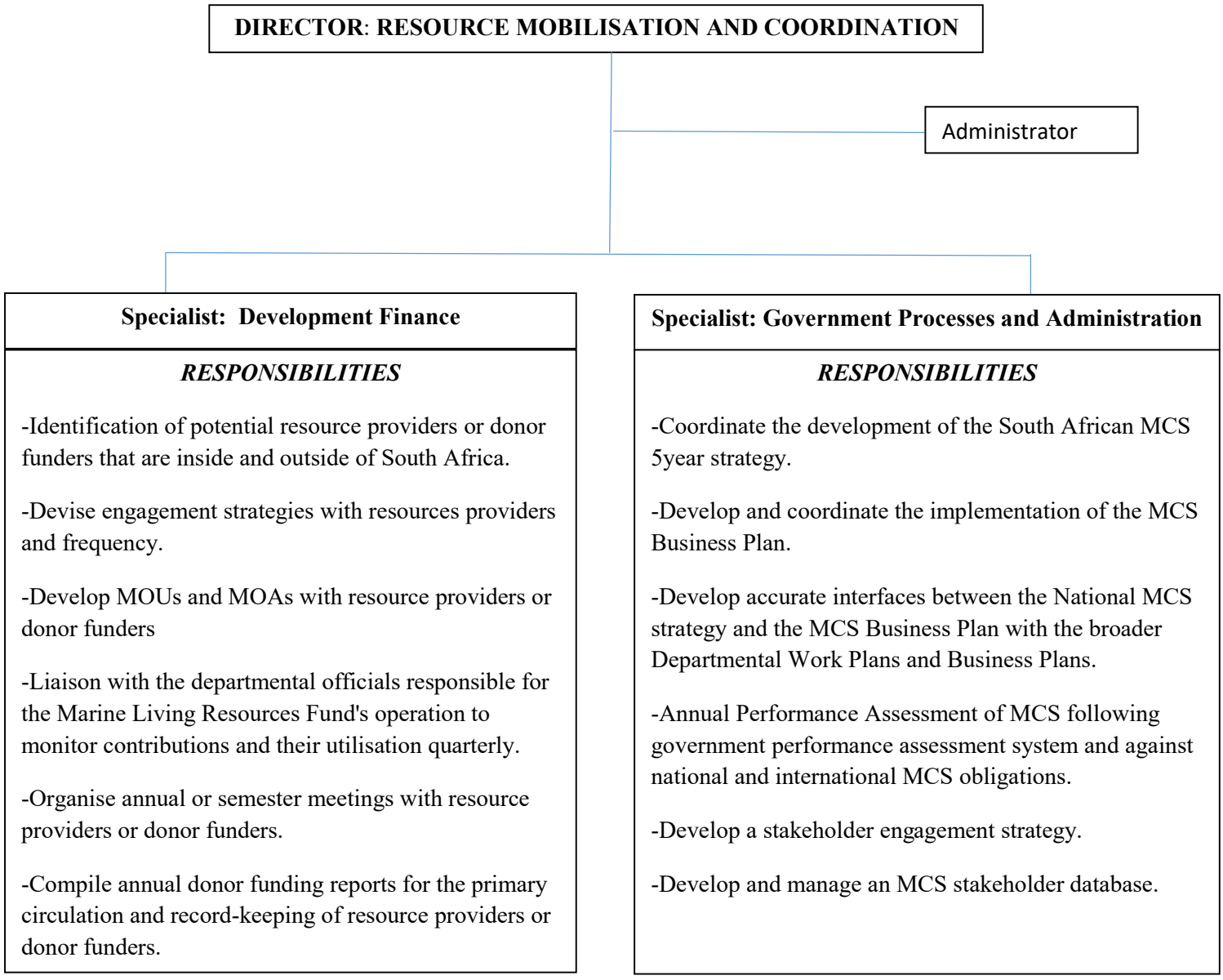


Figure 7.2: Management organisational structure and functions of the MCS Resources Mobilisation Unit or Directorate

When targeting foreign funding establishments, it is worth noting that the latest developments in the continent are that such funding opportunities are only realised through multilateral arrangements, regional bodies or regional economic arrangements. In most instances, these sources are likely to be available only for limited periods, typically three to five years, during which the donors would expect South Africa to develop and implement an internal, sustainable approach to funding. A sustainable approach to funding could be achieved through a mixture of funding from central Government and from the private sector stakeholders that benefit from MCS, and ensure a highly efficient and cost-effective MCS system. Therefore, the D: RM&C would be positioned to identify, explore and negotiate with all the potential funders, i.e. both internally and externally of South Africa, for the national MCS program. Furthermore, it will be charged with developing and utilising the private sector and public sector approaches to lobby for the bulk of resources that are key in the operations of the South African MCS program.

Besides, the use of a business plan as an additional tool to the existing strategic plan and annual Plan of DEFF, in the development of a resources mobilisation strategy, will serve to create a conducive environment for the development and implementation of appropriate operational plans for a highly effective South African MCS program. It is indeed all about available resources at the disposal of the CD: MCS, and the resource mobilisation unit that will be a significant determining factor in the National MCS program's effectiveness. Therefore, in consideration of diminishing budgets and the escalating demands of improved service from the CD: MCS through its national MCS program, i.e. both at National and Regional level, and notwithstanding the additional burden of international obligations that the MCS must deliver on, this business plan will enable DEFF to review and reconfigure the South African MCS Head Office organisational structure to include the Resource Mobilisation and Coordination Unit or Directorate (D: RM&C).

J. Exhibits and appendices

Exhibits and appendices constitute the last part of a business plan, and this section contains all the additional information that adds credibility to a particular business entity[172]. The additional information can include detailed market research, marketing plan and products and services, and other information that banks and investors would be interested in. In the CD: MCS business plan such information could include, for example, the strategic plan and annual plans; the detailed communication plan; information brochures about offices and buildings all along the South African coastline, vessels and other specialised crafts and equipment. Additional information can be information brochures about previous regional successful regional collaborations. However, only when DEFF develops a formal business plan is that the exact structure and the relevant information to include would be decided upon by the Department. In the existing literature that was utilised for this study there was no evidence of any attempts on utilizing such a business planning process in African fisheries agencies. Through this research it has been established that its use can improve overall governance processes, but with MCS its utilisation will improve planning; implementation, coordination and resource mobilisation for sustained and expansive compliance and law enforcement operations.

[172] https://corporatefinanceinstitute.com/resources/knowledge/strategy/business-plan-example-and-template/. Business Plan Example and Template. Accessed 04 December 2020

8. CONCLUSION AND RECOMMENDATIONS

8.1. Background goals of this research

This research work focused on South Africa, where the researcher is based. The country has a strong fisheries sector, and an assumption made at the start of the study was that it also has a reasonably effective MCS program. Two other SADC countries were selected for limited comparative analysis for this study and to consider the implications of regional cooperation. They were the Republic of Namibia and the Republic of Mozambique. Overall, this research work set out to determine the South African MCS program's effectiveness and how it impacts and is affected by other MCS programs in the SADC region. That was done by assessing whether the South African MCS system's structure and functioning conform to internationally accepted MCS standards as outlined in international fisheries law and practices, considering both binding and non-binding fisheries agreements; continental and regional legislative and policy frameworks. Secondly, it determined whether the South African MCS program is significantly responsive to regional cooperation and collaboration and contributes to them. Also, although to a lesser extent, this study sought to establish whether the South African MCS model could be easily replicated and successfully implemented by other developing countries, especially in the continent of Africa, focussing not only on its direct impact on overall fisheries management or governance but to its structural and operational effectiveness.

Specifically, the research objectives of this study that were developed directly from the research questions can be summarised as follows:

- To establish a globally acceptable MCS model, developed according to international agreements, policies and guidelines, and determine whether the South African MCS program conformed with such a model.
- To determine the status and use of the South African MCS program's human and physical resources, including personnel, the availability of funding; storage facilities; vehicles and sea-going vessels.
- To determine the South African MCS program's level and intensity of responsiveness to regional cooperation and cooperation.

8.2. Summary of methods used

Available literature including the United Nations and other international publications; research papers; other formal publications and government documents were utilised to define MCS and establish an effective MCS program. These literature sources were extensively utilised in the development of the questionnaire, which was not only the primary data collection tool, but it was also intended to provide a framework for assessing an effective MCS program in other countries and regions, particularly but not necessarily limited to other comparative developing countries. Additional to the questionnaire, formal and informal interviews with Chief Fisheries Control Officers (CFOs); Fisheries Control Officers (FCOs); Regional MCS Managers; MCS Assistant Directors; Deputy Directors; Directors and Acting Directors across the three Directorates of the Chief Directorate Monitoring, Control and Surveillance; Control Officers in the Vessel Monitoring System (VMS) Operations Room; the Acting Chief Director MCS and the former Deputy Director General (DDG) of the Branch Fisheries, helped not only in shaping this research work but in bringing to the fore facts on successes and failures of the South African MCS program.

Information was collected utilising the questionnaire for South African fisheries from three stakeholder groups: Fisheries Control Officers and MCS Managers from the FGA and representatives from the South African Fishing Industry and other relevant stakeholders or Non-Governmental Organisations (NGOs), the SAFIR Group. Data were analysed to examine overall effectiveness and also compared to determine whether different roles of these groups in the MCS processes resulted in different perceptions of effectiveness. This research investigated the effectiveness of all aspects of the South African MCS program. Also, it considered the assessment of regional MCS cooperation utilising Namibia and Mozambique as examples of other SADC countries in the region. The researcher assimilated this information and all the opinions expressed in the thesis, unless otherwise acknowledged, are those of the researcher and not necessarily shared by any of the above. For the researcher, the years of serving as the Director: Fisheries Protection Vessels helped obtain and interpret all the information. That collectively led to a far-reaching set of conclusions and recommendations that will enable policy and decision-makers to make informed decisions in addressing challenges that the South African MCS program is currently experiencing and improve its effectiveness in the shortest possible period.

8.3. Conclusion

8.3.1 Structure of the questionnaire and its value as a framework for evaluating MCS programs

Predominantly, the questionnaire's content was crafted utilising several United Nations (UN) documents, and other relevant UN agencies literature about the international law framework applicable to global fisheries governance. Documents that were used in this regard included the United Nations Convention on the Law of the Sea of 10 December 1982 (UNCLOS); the Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (UNFSA); the FAO Code of Conduct for Responsible Fishing; the International Plan of Action against Illegal, Unreported and Unregulated fishing (IPOA-IUU), and others of which more details are given in Chapters 2 and 3. A questionnaire with four parts, Part A to D, was developed to collect data to assess the effectiveness of the South African MCS program. However, it was also intended to define a framework for an effective MCS system in general, which could also be useful in other countries.

Part A was about soliciting background information of a particular National MCS program and is comprised of a total of 21 questions. Questions one to 13 were operational questions, and questions 14 to 21 were strategic questions. The operational questions were about drawing a picture of the environment where MCS operations occur and the level of awareness of those entrusted to drive all operational processes. Strategic questions sought to establish the nature and level of engagement between the Fisheries Governance Authority (FGA) inside and outside South Africa and the legislative and policy framework that guides its function.

Part B of the questionnaire focused more on MCS enablers. Enablers are broadly defined by the United Nations Development Program (UNDP), as a function of activities at the centre of both efficiency and effectiveness in any program[173]. To satisfy this definition and utilising the

[173] www.unaids.org/files/media_asset/2... Understanding and acting on critical enablers and development synergies… accessed on the 11 March 2019.

FAO guidelines for the development of a questionnaire[174], this part of the questionnaire was divided into three different but interrelated sub-parts which are:

- ***B.1.*** *– The enabling environment;*
    - (a) ***B.1.1****. – Management / Strategic Level Assessment and National Institutional Arrangements* and
    - *(b)* ***B.1.2****. - Regional and International integration.*
- ***B.2****. – The legislative Framework and Administrative Measures;*
- ***B.3.*** *– Evaluation of infrastructure and physical resources*

Part C of the questionnaire was about the MCS program's reactive approach and the possible steps on how its effectiveness can be evaluated. It was divided into four subparts which were developed in accordance with Bergh and Davies (2009) core components or dimensions of an MCS program which are ***(a)*** *before fishing;* ***(b)*** *while fishing;* ***(c)*** *during landing,* and ***(d)*** *post landing*. From the guidelines that Bergh and Davies provided (2009), the design and detail of the questionnaire in Part C were as follows:

- **C.1** *– Before / Prior Fishing – At Port Inspections;*
- **C.2**. *During Fishing or at Sea Boarding*, with a further subpart of **C.2.1**. *Safety and Catch Inspection*;
- **C.3**. *During Landing / At the Landing Sites, Declared Fishing Harbors and Commercial Ports, with a further subpart of* ***C.3.1*** *Inspection of Foreign Fishing Vessels;*
- ***C.4.*** *Post Landing Inspections.*

Part D was the last part of the questionnaire, and it had two subparts which were:

- *Part D.1. – Stakeholder engagement / collective approach, and*
- *Part D.2. Risk Identification, Analysis and Management.*
    - *(a) D.2.1. Personnel,*
    - *(b) D.2.2. Mapping and Monitoring of Activities in Hotspots*

Part D was developed to focus on the proactive aspect of an MCS program. The proactive approach in policing is defined as a situation where police officers out of their initiative act to

[174] http://www.fao.org/3/w3241e/w3241e05.htm. Chapter 4: Questionnaire Design. Accessed 02 February 2020

gather information about a particular criminal activity or even more importantly develop strategies to suppress it (Crank, 1998). Intelligence-led policing, which applies to MCS operations, is a component of proactive policing and includes intelligence-gathering processes and, central to it, information synthesising processes that enable law enforcement agencies better to understand criminal activities in their area of operation so that they can develop and implement inhibition or enforcement strategies utilising all the equipment at their disposal (Ratcliffe & Guidetti, 2008; Verfaillie & Vander Beken, 2008).

8.3.2. Strengths and weaknesses of the South African MCS program

According to the Food and Agricultural Organisation (FAO), MCS is a mechanism used to implement agreed policies, plans or strategies for oceans and fisheries management. Furthermore, a prominent view held by the FAO with regards to MCS is that it is key to the successful implementation of any fisheries management and planning strategies[175]. In assessing the South African MCS system performance with regards to the UN Code of Conduct for Responsible Fishing, Pramod *et al*. (2006[176]) observed mixed results that were dependent on different fisheries and the extent of needs for their respective management and protection. To put this into perspective, the small pelagic fishery where the targeted species include the sardine, redeye round herring (*Etrumeus whiteheadi*), anchovy (*Engraulis encrasicolus*) with its associated bycatch Cape horse mackerel, is generally well managed (Anderson *et al.*, 2012; Cochrane *et al*., 2020; Hara, 2013), but the change in sardine distribution from the West Coast to the South Coast, led to an unprecedented host of challenges in the management of the sector between 2001 and 2005 (Attwood, 2016). Underreporting of catches, illegal processing of fish and other related fraudulent activities are some of the MCS challenges in the small pelagic fishery that arose from this (Attwood, 2016). High grading or dumping of fish at sea was another widely reported transgression in the small pelagic fishery, and it is an illegal activity that is attributable to various economic driven pressures including, for example, the acceptable

[175] http://www.fao.org/fishery/topic/3021/en. Accessed on 17 March 2015

[176] https://www.researchgate.net/publication/274066887_An_Estimation_of_Compliance_of_the_Fisheries_of_South_Africa_with_Article_7_Fisheries_Management_of_the_UN_Code_of_Conduct_for_Responsible_Fishing. Accessed 20 September 2020

minimum length of fish that was set at 14cm by canning factories (Cochrane et al., 2020; Hara, 2013).

Another South African offshore commercial fishery is tuna and tuna-like species fishery, in the Atlantic and Indian Oceans, divided into tuna pole-line and large pelagic longline fisheries (Department of Agriculture Forestry and Fisheries (DAFF), 2016). Targeted species include yellowfin tuna (*Thunnus albacares*) and Albacore tuna (*Thunnus alalunga*). In the Atlantic Ocean, the International Commission for the Conservation of Atlantic Tunas (ICCAT), South Africa is a Contracting Party[177], reported that there was no fisheries transgression against South Africa apart from minor administrative errors which were subsequently rectified[178]. In the Indian Ocean, the Indian Ocean Tuna Commission (IOTC) reported that South Africa showed absolute commitment to complying with all the IOTC Conservation Measures in force[179]. Similar sentiments on good fisheries governance in the South African hake fishery, which hinges on good compliance, were expressed by MSC by issuing a third MSC certification to the sector[180]. These examples show that MCS and compliance are generally good in the offshore sectors (Cochrane *et al.*, 2020).

It is in the inshore fisheries that most and well documented MCS challenges are experienced. The abalone (*Haliotis midae*) and the West Coast rock lobster (*Jasus lalandii*) were the two species in the inshore fisheries sector that this study focused on (Chapter 4), and the study revealed that both were subject to high levels of illegal fishing. A general view is that poaching of abalone in South Africa has been steadily escalating since the early 1990s (Brick *et al.*, 2009; Cochrane *et al.*, 2020; Minnaar *et al.*, 2018). Natural conditions of the fishery and the development of intricate organised criminal syndicates locally and internationally with extensive abalone poaching activities in the Western Cape of South Africa, make the abalone fishery particularly difficult to manage (Brick *et al.*, 2009; Hauck & Sweijd, 1999; Hauck & Kroese, 2006; Lambrechts & Goga, 2016; Raemaekers & Britz, 2009). Natural conditions that predispose abalone to illicit fishing activities are its proximity to the coastline, and the fact that

[177] https://www.iccat.int/Documents/SCRS/Manual/CH1/CH1-ENG.pdf. ICCAT Manual – What is ICCAT? Accessed 11 September 2020

[178] https://www.iccat.int/Documents/BienRep/REP_EN_18-19_II-1.pdf.

[179] https://www.iotc.org/compliance/monitoring. South Africa – Compliance report of 2017. Accessed 11 September 2020.

[180] https://www.msc.org/media-centre/press-releases/south-africa-hake-celebrates-third-successful-certification. South Africa hake celebrates third successful certification -May 27, 2015. Accessed 11 February 2021.

it is a high-value species are similar to those of the West Coast rock lobster (Cochrane *et al.*, 2020; DAFF, 2016).

The research revealed that these two species are difficult to manage and that MCS resources deployed towards the management of inshore fisheries have not had much success. Corruption by Fisheries Control Officers (FCO), as witnessed through the Bengis case in Houtbay and the Mossel Bay case, adds another dimension of difficulty in the management of inshore fisheries as through it meagre resources of the Department continue to be put under tremendous pressure (Attwood, 2016; van Sittert *et al*., 2006). As described in Chapter 3, over the years several joint MCS efforts between the Department and other State law enforcement agencies, for example, operation Neptune II and Operation Trident, were instituted in a quest to rid the abalone fishery of illicit and organised criminal activity without any lasting solution as they were all short-lived (Hutchings *et al.*, 2009; Minnaar *et al.*, 2018; Steinberg, 2005). Currently, there is Operation Phakisa – Initiative 5, which has taken the form of the previous joint MCS efforts but also like other previous interventions it does look beyond a 5-year horizon upon which all resources deployed through it are likely to be withdrawn as with other interventions (Marine Protection Services and Governance, 2020).

Even though the literature demonstrates mixed effectiveness, the literature review and the questionnaire results indicate that the South African MCS program is well structured following the relevant and applicable global and regional fisheries governance prescripts. For example, the three components of MCS, i.e. Monitoring, Control and Surveillance with their respective functions are appropriately delineated in the South African MCS program as illustrated in the top management structure of the fisheries branch and the management structure of Monitoring, Control and Surveillance (Chapter 3 and 7). The Chief Directorate: Monitoring, Control and Surveillance (CD: MCS) has three directorates, the Compliance Directorate; the Fisheries Protection Vessels (FPVs) Directorate and the Monitoring and Surveillance or Specialist Investigations Unit Directorate. The respective mandates of these three directorates follow the definitions of the three aspects of MCS as defined in Chapters 1;3;5 and 14 of the book by Cochrane and Garcia (2009). The national legislative framework, of which the Marine Living Resources (MLRA) is the principal South African fisheries law, recognises most of the premier international fisheries governance prescripts. Recognition is in the form of ratification or by becoming a signatory in most of them, which has been followed by domestication and implementation, for example, of the United Nations Convention on the Law of the Seas (UNCLOS) and FAO Code of Conduct for Responsible Fisheries (FAO, 1995). Domestication

is done either through the MLRA or incorporating some parts of it into the permit conditions of specific fisheries. Therefore, this research showed that the South African MCS program is relatively strong in the legislative framework.

Arguably, an MCS program is one of the public good undertakings that are resource-intensive. Resources are both human and physical resources, which are some of the critical enablers of an MCS program. Findings of this research were that the South African MCS program is poorly resourced, and the three groups were in agreement about the severe deficiencies in both human and physical resources. Whilst it is possible that it may have been lingering for some time, the research further revealed that the government re-engineering and re-alignment process that followed the 2009 general elections led to an even more challenging period for the South African MCS program. During the re-alignment process of government departments at the time the FGA, i.e. the erstwhile Marine and Coastal Management (MCM) ceased to exist, and the fisheries governance function was transferred to the Department of Agriculture, Forestry and Fisheries (DAFF). As discussed in Chapters 3 and 6, the difficult period for MCS manifested itself with severe staff shortages and outdated or old equipment, including recurring problems with the Vessel Monitoring System (VMS).

Furthermore, from 2012/2013 to the 2019/2020 financial years, i.e. seven years, there has not been any hiring of inspectors even though during this time some resigned or retired, and some were fired due to committing corrupt activities. Instead, positions were abolished because they were not funded despite appearing in the organisational structure. That depleted the required numbers for compliance and law enforcement activities and institutional memory and the technical expertise required to carry out MCS activities effectively. Also, delays in the appointment of Senior Managers are hampering the CD: MCS strategic planning ability. The negative impact of that can be seen in the strategic plan of DAFF, which the Branch Fisheries Management still uses even though they are now under a new Department, where there is no convergence of MCS targets for the CD: MCS. Instead, targets are for each Directorate, and that encourages polarisation of the MCS effort.

Challenges that are associated with budgetary constraints had far-reaching implications in the overall functioning of MCS. As illustrated in Figure 3.11 (Chapter 3), and extensively discussed in the same chapter, there has not been much change in the budget allocation for the year-to-year MCS operations from 2006/2007 to the 2017/2018 financial year. Overall, for the 11 years, the MCS budget increase was on average 4.09%, which is significantly less than the

average inflation rate of 6.21% for the same period. Worth noting is that the South African MCS program has limited sources of funding, which are the National Treasury for the significant part of funding for MCS operations albeit with diminishing budget allocation over the years; Operation Phakisa: Initiative 5, the minimal amount for a maximum period of 5 years and the MLRF which caters for the administrative side of vessel management. However, the continually diminishing budget allocation for the MCS program, taking inflation into account, is not likely to change in the foreseeable future considering other competing priorities that the State must attend to, such as the Department of Health fiscal requirements prioritised over fisheries governance matters.

Another challenge identified with asset management, such as vehicles and small watercrafts, was the non-existence of a depreciation model. The Department could use a depreciation model to project the assets' useful life period, and devise assets deposition and replacement strategy. When this research was concluded, there was no depreciation model, nor was any asset replacement strategy in place for the South African MCS program. That is not only a considerable weakness in the South African MCS program, but it is also a high-risk matter considering that compliance and law enforcement activities can lead to life-threatening situations hence there is a need for all equipment to be in its prime condition at all times.

Linked to this is the recurrent Vessel Monitoring System (VMS) non-functionality, which is currently mostly substituted with the Automatic Identification System (AIS). The AIS is part of the Operation Phakisa's Ocean Information Management System (OCIMS) service products, and DAFF used it for its VMS needs. Results indicate that it may be filling the VMS gap well, as respondents reflected on its adequate performance. However, that may also indicate a lack of understanding of the design and functions of these systems. The recent past of a chronic non-functionality of the VMS was followed by utilising AIS as a substitute program that is generally professed to perform the same function. Results it has yielded for compliance and law enforcement, particularly for the Operation Phakisa Initiative 5 program, could explain the expressed views.

Furthermore, an MCS program's operational arm has four key components: the before fishing; during fishing; during landing and post landing (Bergh & Davies, 2009). For these components, the effectiveness of the South African MCS program was viewed as adequate to good. However, a standard view held by Managers and Inspectors was that their related Standard Operating Procedures (SOPs) were obsolete as they were last reviewed about eight

years ago. Also, there were only standalone specific SOPs without a central SOP that promotes coordination of implementing collectively designed MCS operational plans. That compromises the South African MCS program's effectiveness, as it encourages Directorate centred MCS programs with no integrated approach. That was attributed to lack of planning capacity within the CD MCS; inadequate skills and experience among the CD MCS employees, and funds. Similarly, under the MCS proactive approach for hotspots identification and mapping, there was a general agreement that the South African MCS program's effectiveness was moderate. However, the effectiveness of the South African MCS program in responding to emergencies and attending to transgressions such as high grading of catches was found to be below adequate levels. Results pointed out that the reason for poor performance was insufficient and inadequate resources at the MCS program's disposal, i.e. human resources and physical resources.

Furthermore, regional MCS cooperation and coordination of activities was investigated utilising two countries that are part of SADC, as South Africa is, i.e. Namibia and Mozambique. MCS regional cooperation was to be measured utilising a range of global fisheries governance tools, covered extensively in Chapter 2 of this study, which includes the SADC Protocol on Fisheries. An appropriate analysis to determine the nature and level of regional cooperative fisheries governance, using MCS, could not be performed because of insufficient data returned from the two countries. However, similarities could be drawn between South Africa and Namibia's commercial fisheries structure, as discussed in Chapters 3 and 4. Additionally, the organisational structure, legislative framework, infrastructure, and surveillance tools were similar between them. These are enablers for MCS cooperation between the two countries, and the recently signed MOU bears testimony. Mozambique has a different fisheries structure from the two countries, and the MCS organisational structure and relevant resources are not similar to those of Namibia and South Africa. However, the Mozambican regional MCS structures, their management; financing and cross-management with line function Ministries is a model that South African could learn from in strengthening its regional MCS planning and implementation.

This research showed that the weaknesses that have been discussed are caused by a combination of factors that are inclusive of insufficient budget for MCS operations, lack of planning capacity, and absence of coherent and collective planning within the CD: MCS. Therefore, consolidation of governance processes within the CD: MCS could be a significant step in addressing the South African MCS program's shortcomings. Currently, Government

Departments utilises strategic plans and annual work plans, but this research work has shown that the adoption and utilisation of a business plan for the South African MCS program could improve its effectiveness. That is achievable through streamlining management and the planning processes, whilst simultaneously improving MCS products offered by the program to its stakeholders. Furthermore, relations between the Department and its stakeholders is another focus area that is inbuilt in the business plan, and it provides a seamless product for addressing all aspects of MCS, focusing on people, equipment, facilities and the MCS products. That would be made possible by high-level planning and adequate funds at the MCS program's disposal, both addressed by business plan.

8.4. Recommendations

In addition to recommendations made in the different chapters, the following primary recommendations arise from this study.

1) It is recommended that the Branch: Fisheries Management needs:
    a. To urgently start the process of strengthening the effective internal governance ability of the MCS program. That should incorporate the strategic and operational planning capability of the Chief Directorate: Monitoring, Control and Surveillance (CD: MCS). Improving internal governance processes should involve developing an MCS Business Plan, which will augment the existing strategic management tools, which are the Branch Strategic Plan and Annual Plans. Its particular focus would be to include an appropriate selection of private sector management principles that are to be assimilated in the revamping and development strategy of a new approach to the national MCS program, in a bid to improve on its effectiveness as would be evaluated through service delivery objectives of the Department.
    b. Closely linked to the business plan would be the development of a three or five-year MCS strategy, with its associated annual plans for each Directorate. Within the three or five-year MCS Strategy, new Key Performance Areas (KPAs); Key Performance Indicators (KPIs); Activities and Targets that promote close cooperation among the three Directorates will have to be incorporated. That is a response to what this research revealed that the existing

Branch Strategic Plan promotes a silo-approach to MCS by the three Directorates, where all those interviewed commented and confirmed lack of effective joint planning between the three Directorate.

2)

a. It is recommended that the FGA undertake a process of improving the MCS infrastructure, equipment and human capital, starting with the development of an infrastructure assessment and development plan. A two-pronged approach is needed for this process, i.e. for equipment National Treasury will have to be approached for additional budget, and the Department of Public Works and Infrastructure (DPW&I) for infrastructure development. MCS Senior Management needs to form a task team to conduct a comprehensive assessment of the available MCS equipment, ranging from mechanical to ICT.

b. Liaising with DEFF Supply Chain Management and Finance teams, and the proposed Resource Mobilisation Directorate, they will have to draft the Assets Depreciation and Replacement Strategy, which will monitor availability and depreciation of MCS equipment, and facilitate their expeditious replacement.

c. For infrastructure development and renovations, a forum or task team comprised of DEFF and Department of Public Works and Infrastructure (DPW&I) officials, should be established to develop a plan of improving existing offices and the provision of new MCS accommodation and support facilities like storage facilities and other coastal facilities that are essential for an effective MCS program. Also, and closely linked to this proposal, the CD: MCS needs to adopt an MCS asset register with asset depreciation model, and an associated asset replacement strategy or plan.

d. For all these recommendations to materialise, which also needs to be enhanced in the South African MCS program, improved human resource management and capacity building are required within the organisation. Central to that is developing all the requisite skills and critical competencies in the CD: MCS, at all levels and across the Directorates to improve the organisation's ability to execute organisational mandates. Staff retention strategies need to be in-built in all these interventions to ensure organisational stability, continuity and retention of institutional memory and expertise needed to carry the organisation forward.

3) To improve fisheries law enforcement and compliance, it is further recommended that a Working Group on Monitoring, Control and Surveillance (WG-MCS) be established.

Its overall responsibility would be to coordinate all efforts to improve compliance with all fisheries regulations. Working with MCS Senior Management, WG-MCS would also be responsible for coordinating strengthening partnerships with other State law enforcement agencies, both inside of South Africa and the SADC region. Linked to that is the coordination of joint sea patrols or air patrols where appropriate, and expediting decision-making processes given the time-sensitivity in law enforcement activities, especially when dealing with transgressions. Collective decision making, involving a suite of stakeholders, is critically important for an MCS program if it is to be effective. Hence it is further proposed that the WG-MCS be tasked with the identification and categorisation of MCS stakeholders. Furthermore, the WG-MCS should develop, implement and monitor a stakeholder engagement plan, which may also be referred to as a public participation plan for fisheries governance matters.

4) To pull all the above together and enable them to happen, it is critically important that a new directorate, i.e. the Resource Mobilisation Directorate, be established as the fourth directorate of the CD: MCS, as discussed in Chapter 7. Its primary focus will be identifying potential sources of funding outside of government and developing, implementing, and managing contracts between funders and the DEFF. The unit will also strengthen internal CD: MCS capability in risk management; performance or effectiveness audits, the development of universally acceptable MCS standards; and project management.
5) A range of fisheries infarctions, for example, IUU fishing, exploit any gap that may exist in fisheries governance structures, particularly in straddling and shared stocks. As discussed in Chapters 1 and 2, and various other parts of this thesis, cooperative regional fisheries governance should be encouraged and maintained. Following numerous global and regional fisheries governance conventions, regional cooperation in fisheries governance is critically important to safeguard marine living resources. It is recommended that South Africa, working through the Secretariat of SADC Fisheries, strengthen its regional MCS cooperation at different levels. At a lower level of regional cooperation, South Africa is encouraged to champion the establishment of a Regional Network of Inspectors. At a strategic level, South Africa is encouraged to work with the regional MCS Coordination Centre to implement the SADC Protocol pronouncements to share resources, conduct joint patrols, and develop an exchange program of managers and MCS experts.

REFERENCES

Adangor, Z., & Arugu, O. W. (2018). An Evaluation of the Rights and Duties of Coastal States under the United Nations Convention on The Law of the Sea 1982. *Research Gate*, *April 2019*, 65–84.

Afonso, P. S. (2004). Country review: Mozambique. In C. de Young (Ed.), *Review of the state of world marine capture fisheries management: Indian Ocean. FAO Technical Paper 488* (p. 470). FAO.

Agardy, T., Claudet, J., & Day, J. C. (2016). 'Dangerous Targets' revisited: Old dangers in new contexts plague marine protected areas. *Aquatic Conservation: Marine and Freshwater Ecosystems*, *26*, 7–23. https://doi.org/10.1002/aqc.2675

Agardy, T., di Sciara, G. N., & Christie, P. (2011). Mind the gap : Addressing the shortcomings of marine protected areas through large scale marine spatial planning. *Marine Policy*, *35*(May), 226–232. https://doi.org/10.1016/j.marpol.2010.10.006

Agnew, D. J. (2000). The illegal and unregulated fishery for toothfish in the southern Ocean, and the CCAMLR catch documentation scheme. *Marine Policy*, *24*(5), 361–374. https://doi.org/10.1016/S0308-597X(00)00012-9

Agnew, David J., Pearce, J., Pramod, G., Peatman, T., Watson, R., Beddington, J. R., & Pitcher, T. J. (2009). Estimating the worldwide extent of illegal fishing. *PLoS ONE*, *4*(2). https://doi.org/10.1371/journal.pone.0004570

Alcock, F. (2002). Bargaining, Uncertainty, and Property Rights in Fisheries. *World Politics*, *54*(4), 437–461. https://doi.org/10.1353/wp.2002.0011

Appleby, T., Cardwell, E., & Pettipher, J. (2018). Fishing rights, property rights, human rights: The problem of legal lock-in in UK fisheries. *Elementa*, *6*. https://doi.org/10.1525/elementa.295

Arias, A. (2015). Understanding and managing compliance in the nature conservation context. *Journal of Environmental Management*, *153*, 134–143. https://doi.org/10.1016/j.jenvman.2015.02.013

Attwood, C. (2016). The case of the "Lotto" fish. *Maritime Review Africa*, *February*, 10–12.

AU-IBAR. (2016). *Status of Monitoring, Control and Surveillance Systems in Southern Africa - Strengthening National and Regional Capacities for Combating Illegal, Unreported and Unregulated Fishing.* African Union – Interafrican Bureau for Animal Resources (AUIBAR).

AUC-NEPAD. (2014). *Policy Framework and Reform Strategy for Fisheries and Aquaculture in Africa*. *May*, 62. http://www.au-ibar.org/general-publications%5C

Baker, D. (2008). Policing the "bastard boys": reality and significance of the police-union "accord" during the national waterfront dispute. *Flinders Journal of Law Reform*, *10*(3), 357–372.

Bardin, A. (2002). Coastal state's jurisdiction over foreign vessels. *Pace International Law Review*, *14*(1), 27–50.

Barnes, J. I., & Alberts, M. (2008). Sustainable natural resource use on the coast of Namibia.

DEA Research Paper, *78*(78), 32pp.

Belhabib, D., Willemse, N. E., Pauly, D., Willemse, N. E., & Pauly, D. (2015). A fishery tale: Namibian fisheries between 1950 and 2010. In *Fisheries Centre - The University of British Columbia* (No. 2015–65; Issue Working Paper #2015-65).

Bennett, N. J., & Dearden, P. (2014). From measuring outcomes to providing inputs: Governance, management, and local development for more effective marine protected areas. *Marine Policy*, *50*(PA), 96–110. https://doi.org/10.1016/j.marpol.2014.05.005

Bergh, P. E., & Davies, S. (2004). Against all odds: Taking control of the Namibian Fisheries. In U.R. Sumaila, D. Boyer, M. D. Skogen, & S. I. Steinshamn (Eds.), *Namibia's Fisheries: Ecological, Economic and Social Aspects* (pp. 289–318). Eburon Academic Publishers.

Bergh, P. E., & Davies, S. (2009). Fishery Monitoring, Control and Surveillance. In K.L. Cochrane & S. M. Garcia (Eds.), *A Fishery Manager's Guide* (pp. 373–403).

Bergh, P. E., & Davies, S. (1998). An overview of Namibian fisheries, focusing on Monitoring, Control and Surveillance. *FAO/Norway Government Cooperative Program – Regional Workshop on Fisheries Monitoring, Control and Surveillance, 29 June – 3 July*, *July*, 141–163. http://www.fao.org/tempref/docrep/fao/field/006/X1351E/x1351e00.pdf

Berkes, F. (2009). Evolution of co-management: Role of knowledge generation, bridging organizations and social learning. *Journal of Environmental Management*, *90*(5), 1692–1702. https://doi.org/10.1016/j.jenvman.2008.12.001

Bonfil, R., Munro, G., Sumaila, U. R., Valtysson, H., Wright, M., Pitcher, T., Preikshot, D., Haggan, N., & Pauly, D. (1998). Impacts of distant water fleets: an ecological, economic and social assessment. *Fisheries Centre Research Reports*, *6*, 111.

Box, R. C. (1999). Running government like a business: Implications for public administration theory and practice. *American Review of Public Administration*, *29*(1), 19–43. https://doi.org/10.1177/02750749922064256

Boyer, D. C., & Hampton, I. (2001). An overview of the living marine resources of Namibia. *South African Journal of Marine Science*, *7615*(23), 5–35. https://doi.org/10.2989/025776101784528953

Branch, G. M., & Clark, B. M. (2006). Fish stocks and their management: The changing face of fisheries in South Africa. *Marine Policy*, *30*(1), 3–17. https://doi.org/10.1016/j.marpol.2005.06.009

Branch, T. A., Lobo, A. S., & Purcell, S. W. (2013). Opportunistic exploitation: An overlooked pathway to extinction. *Trends in Ecology and Evolution*, *28*(7), 409–413. https://doi.org/10.1016/j.tree.2013.03.003

Brandão, A., Butterworth, D. S., Watkins, B. P., & Miller, D. G. . (2002). A first attempt at an assessment of the Patagonian toothfish(Dissostichus eleginoides) resource in the Prince Edward Islands EEZ. *CCAMLR Science*, *9*, 11–32.

Brander, L. M., van Beukering, P., Nijsten, L., McVittie, A., Baulcomb, C., Eppink, F. V., & Cado van der Lelij, J. A. (2020). The global costs and benefits of expanding Marine Protected Areas. *Marine Policy*, *116*(March), 103953. https://doi.org/10.1016/j.marpol.2020.103953

Brick, K., Muchapondwa, E., & Visser, M. (2009). *Abalone poaching, methamphetamine use, criminal activity in South Africa and the associated implications for resource management*. 183–195. https://www.researchgate.net/publication/255608360_Abalone_poaching_methamphetamine_use_criminal_activity_in_South_Africa_and_the_associated_implications_for_resource_management_Draft/link/00b7d538253f5a07ab000000/download

Brigham, D. (2007). Emerging Commons and Tragic Institutions. *Environmental Law*, *37*(3), 515–571.

Brill, G. C., & Raemaekers, S. J. P. N. (2013). A decade of illegal fishing in Table Mountain National Park (2000-2009): trends in the illicit harvest of abalone Haliotis midae and West Coast rock lobster Jasus lalandii. *African Journal of Marine Science*, *35*(4), 491–500. https://doi.org/10.2989/1814232X.2013.850443

Bulte, H. E., Horan, R. D., & Shogren, J. F. (2003). Elephants : Comment. *The American Economic Review*, *93*(4), 1437–1445.

Caddy, J. F., & Cochrane, K. L. (2001). A review of fisheries management past and present and some future perspectives for the third millennium. *Ocean and Coastal Management*, *44*(9–10), 653–682. https://doi.org/10.1016/S0964-5691(01)00074-6

Carlsson, L., & Berkes, F. (2005). Co-management: Concepts and methodological implications. *Journal of Environmental Management*, *75*(1), 65–76. https://doi.org/10.1016/j.jenvman.2004.11.008

Carrasco, J. M. F., Ferrari, S. L. P., & Arellano-Valle, R. B. (2014). Errors-in-variables beta regression models. *Journal of Applied Statistics*, *41*(7), 1530–1547. https://doi.org/10.1080/02664763.2014.881784

Carson-Jackson, J. (2012). Satellite AIS - Developing technology or existing capability? *Journal of Navigation*, *65*(2), 303–321. https://doi.org/10.1017/S037346331100066X

Castiano, M. (2004). *O regime Juridico da Pescaria de Camarão em Moçambique. (internal report).*

Chadwick, P., Duncan, J., & Tunley, K. (2014). State of Management of South Africa's Marine Protected Areas. *WWF South Africa Report Series*, 1–209.

Chang, S. K. (2011). Application of a vessel monitoring system to advance sustainable fisheries management-Benefits received in Taiwan. *Marine Policy*, *35*(2), 116–121. https://doi.org/10.1016/j.marpol.2010.08.009

Chiripanhura, B., & Teweldemedhin, M. (2016). An Analysis of the Fishing Industry in Namibia. *African Growth and Development Policy*, *42*. http://www.agrodep.org/sites/default/files/AGRODEPWP0021_0.pdf

Christie, P. (2004). Marine protected areas as biological successes and social failures in Southeast Asia. *American Fisheries Society Symposium*, *2004*(42), 155–164.

Clarke, C. (2006). Proactive Policing: Standing on the Shoulders of Community-Based Policing. *Police Practice and Research*, *7*(1), 3–17. https://doi.org/10.1080/15614260600579508

Coad, L., Leverington, F., Burgess, N. D., Cuadros, I. C., Geldmann, J., Marthews, T. R., Mee, J., Nolte, C., Stoll-kleemann, S., Vansteelant, N., Zamora, C., & Hockings, M.

(2013). Progress towards the CBD Protected Area Management effectiveness targets. *Parks*, *19*(1), 13–24.

Cochrane, K. L., & Garcia, S. M. (eds) (Eds.). (2009). *A Fishery Manager's Guidebook Second Edition* (pp. 373–403). Wiley-Blackwell and The Food and Agricultural Organization.

Cochrane, K L, Japp, D. W., Norman, S., & Wilkinson, S. (Eds.). (2019). "BCC 2020. Governance Baseline Assessment and Strategy for Strengthening Ocean Governance in the BCLME Region Prepared for the Benguela Current Commission." In *Report prepared for the Benguela Current Commission, Swakopmund, Namibia*.

Cochrane, Kevern L. (1995). Anticipated impacts of recent political changes on fisheries management in South Africa. *Naga*, *18*(1), 4–8.

Cochrane, Kevern L. (2000). Reconciling sustainability , economic efficiency and equity in fisheries : the one that got away ? *Fish and Fisheries*, *2*(1), 3–21.

Cochrane, Kevern L., Eggers, J., & Sauer, W. H. H. (2020). A diagnosis of the status and effectiveness of marine fisheries management in South Africa based on two representative case studies. *Marine Policy*, *112*(September 2019), 1–18. https://doi.org/10.1016/j.marpol.2019.103774

Cockcroft, A. C., Van Zyl, D., & Hutchings, L. (2008). Large-scale changes in the spatial distribution of South African West Coast rock lobsters: An overview. *African Journal of Marine Science*, *30*(1), 149–159. https://doi.org/10.2989/AJMS.2008.30.1.15.465

Coll, M., Libralato, S., Pitcher, T. J., Solidoro, C., & Tudela, S. (2013). Sustainability implications of honouring the Code of Conduct for Responsible Fisheries. *Global Environmental Change*, *23*(1), 157–166. https://doi.org/10.1016/j.gloenvcha.2012.10.017

Conradie, J. P. (2019). *Security Institute for Governance and Leadership in Africa*. *1982*(June), 1–2. http://www.sun.ac.za/english/faculty/milscience/sigla/Documents/Briefs/Briefs 2019/Brief 16 2019.pdf

Constable, A. J., De LaMare, W. K., Agnew, D. J., Everson, I., & Miller, D. (2000). Managing fisheries to conserve the Antarctic marine ecosystem: Practical implementation of the Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR). *ICES Journal of Marine Science*, *57*(3), 778–791. https://doi.org/10.1006/jmsc.2000.0725

Crank, J. P. (1998). Understanding the Police Culture. *American Journal of Criminal Justice*, *24*(1), 151–154.

Cremers, K., Wright, G., & Rochette, J. (2020). Strengthening monitoring, control and surveillance of human activities in marine areas beyond national jurisdiction: Challenges and opportunities for an international legally binding instrument. *Marine Policy*, *122*(April), 103976. https://doi.org/10.1016/j.marpol.2020.103976

Crosoer, D., van Sittert, L., & Ponte, S. (2006). The integration of South African fisheries into the global economy: Past, present and future. *Marine Policy*, *30*(1), 18–29. https://doi.org/10.1016/j.marpol.2005.06.013

Cunningham, S., & Bodiguel, C. (2006). Subregional review: Southwest Indian Ocean. In C.

de Young (Ed.), *Review of the state of world marine capture fisheries management: Indian Ocean. FAO Fisheries Technical Paper. No. 488* (p. 458). Food and Agricultural Organization (FAO). http://www.fao.org/3/a1465e/a1465e00.pdf

Damania, R., Fredriksson, P. G., & List, J. A. (2003). Trade liberalization, corruption, and environmental policy formation: Theory and evidence. *Journal of Environmental Economics and Management*, *46*(3), 490–512. https://doi.org/10.1016/S0095-0696(03)00025-1

Davies, A. J., Roberts, J. M., & Hall-Spencer, J. (2007). Preserving deep-sea natural heritage: Emerging issues in offshore conservation and management. *Biological Conservation*, *138*(3–4), 299–312. https://doi.org/10.1016/j.biocon.2007.05.011

de Coning, E., & Witbooi, E. (2015). Towards a new'fisheries crime' paradigm: South Africa as an illustrative example. *Marine Policy*, *60*, 208–215. https://doi.org/10.1016/j.marpol.2015.06.024

de Graaf, G., & Garibaldi, L. (2014). The value of African fisheries. In *FAO Fisheries and Aquaculture Circular* (Vol. 1093). http://www.fao.org/3/i3917e/i3917e.pdf

de Greef, K. (2016). *The Abalone Poacher*. Roads and Kingdoms. https://roadsandkingdoms.com/2016/the-abalone-poacher/

Department of Agriculture Forestry and Fisheries (DAFF). (2016). *Status of the South African Marine Fishery Resources 2016.*

Department of Agriculture Forestry and Fisheries (DAFF) Report. (2012). *Status of the South African marine fishery resources*. http://www.nda.agric.za/doadev/sidemenu/fisheries/indexpage_DOCS/STATUS REPORT 2012FINAL DRAFT.pdf

Detsis, E., Brodsky, Y., Knudtson, P., Cuba, M., Fuqua, H., & Szalai, B. (2012). Project Catch: A space based solution to combat illegal, unreported and unregulated fishing: Part I: Vessel monitoring system. *Acta Astronautica*, *80*, 114–123. https://doi.org/10.1016/j.actaastro.2012.06.009

Dudley, N., Stolton, S., & Elliott, W. (2013). Editorial: Wildlife crime poses unique challenges to protected areas. *Parks*, *19*(1), 7–12. https://doi.org/10.2305/IUCN.CH.2013.PARKS-19-1.ND.en

Ehmke, J., & Akridge, C. (2010). Elements of a Business Plan: First steps for a new Entrepeneurs. *Entrepreneur*, 1–13.

Elago, P. N. (2004). *Duration of Fishing Rights and Investment : an Empirical Study of Investment in Namibian*. University of Akureyri, Iceland.

Erceg, D. (2006). Deterring IUU fishing through state control over nationals. *Marine Policy*, *30*(2), 173–179. https://doi.org/10.1016/j.marpol.2004.11.004

Evans, L., Cherrett, N., & Pemsl, D. (2011). Assessing the impact of fisheries co-management interventions in developing countries: A meta-analysis. *Journal of Environmental Management*, *92*(8), 1938–1949. https://doi.org/10.1016/j.jenvman.2011.03.010

Falk, T., Vollan, B., & Kirk, M. (2014). Tragedy of the commons. *Essential Concepts of Global Environmental Governance*, 212–215. https://doi.org/10.4324/9780203553565

FAO. (1995a). Agreement to promote compliance with international conservation and management measures by fishing vessels on the high seas. In *FAO: Vol. XXXIII* (Issue 2).

FAO. (1995b). Code of Conduct for Responsible Fisheries. In *FAO*. FAO: Italy.

FAO. (1998). Fishing Operations 1: Vessel Monitoring Systems. In *FAO Technical Guidelines For Responsible Fisheries No 1. Suppl. 1*. FAO.

FAO. (2011). Fisheries Management 4: Marine protected areas and fisheries. In *FAO Technical Guidelines For Responsible Fisheries No 4. Suppl. 1* (Suppl.4). FAO.

Fergus, M., Manning, P., & Eide, H. (2005). Results and Impact Review of Namibian / Norwegian co-operation in the fisheries and maritime sectors. In *NORAD Report 2/05 Discussion* (Vol. 53, Issue 9).

Flewwelling, P., & Cullinan, C. (2001). *Guide to monitoring, control and surveillance systems for coastal and offshore capture fisheries*.

Flewwelling, Peter, Cullinan, C., Balton, D., Sautter, R. P., & Reynolds, J. E. (2002). Recent trends in monitoring , control and surveillance system for capture fisheries. *FAO. Fisheries Technical Paper*, 200. http://www.fao.org/docrep/005/y4411e/y4411e00.htm

Frederickson, G. H., Smith, K. B., Larimer, C. W., & Licari, M. J. (2012). *ThePublic Administration Theory Primer* (2nd ed.). Westview Press.

Furlong, W. (1991). The Deterrent Effect of Regulatory Enforcement. *Land Economics*, *67*(1), 116–121.

Gibson, C. C., Williams, J. T., & Ostrom, E. (2005). Local enforcement and better forests. *World Development*, *33*(2 SPEC. ISS.), 273–284. https://doi.org/10.1016/j.worlddev.2004.07.013

Girard, P., & Du Payrat, T. (2017). An inventory of new technologies in fisheries: Challenges and opportunities in using new technologies to monitor Sustainable fisheries. *Oecd Green Growth and Sustainable Development Forum*. https://www.oecd.org/greengrowth/GGSD_2017_Issue Paper_New technologies in Fisheries_WEB.pdf

Golhasani, A., & Hosseinirad, A. (2016). The Role of Resource Mobilization Theory in Social Movement. *International Journal of Multicultural and Multireligious Understanding*, *3*(6), 1–5. https://doi.org/http://dx.doi.org/10.18415/ijmmu.v3i6.58

Goodisan, P. (1991). *The namibian fisheries experience*.

Goosen, P. (2010). *History of the South African Monitoring, Control and Surveillance*.

Government of the Republic of Namibia. (2018). *Namibian Marine Resources Act 27 of 2000*. *61*(1), 1–54.

Graycar, A., & Monaghan, O. (2015). Rich Country Corruption. *International Journal of Public Administration*, *38*(8), 586–595. https://doi.org/10.1080/01900692.2014.949757

Grayson, D., & Hodges, A. (2004). Corporate Social Opportunity: 7 Steps to make Corporate Social Responsibility Work for your Business. In *Greenleaf Publishing* (1st Editio). Greenleaf Publishing. https://doi.org/10.4324/9781351280884

Gutiérrez, N. L., Hilborn, R., & Defeo, O. (2011). Leadership, social capital and incentives promote successful fisheries. *Nature*, *470*(7334), 386–389. https://doi.org/10.1038/nature09689

Haag, A. B. (2013). Writing a Successful Business Plan. *Workplace Health & Safety*, *61*(1), 19–29. https://doi.org/10.1177/216507991306100104

Halpern, B. S., Walbridge, S., Selkoe, K. A., Kappel, C. V., Micheli, F., D'Agrosa, C., Bruno, J. F., Casey, K. S., Ebert, C., Fox, H. E., Fujita, R., Heinemann, D., Lenihan, H. S., Madin, E. M. P., Perry, M. T., Selig, E. R., Spalding, M., Steneck, R., & Watson, R. (2008). A global map of human impact on marine ecosystems. *Science*, *319*(5865), 948–952. https://doi.org/10.1126/science.1149345

Hara, M. (2013). Efficacy of rights-based management of small pelagic fish within an ecosystems approach to fisheries in South Africa. *African Journal of Marine Science*, *35*(3), 315–322. https://doi.org/10.2989/1814232X.2013.829788

Hara, M., de Wit, M., Crookes, D., & Jayiya, T. (2008). *Socio-economic contribution of South African fisheries and their current legal, policy and management framework* (No. 6). https://media.africaportal.org/documents/WP6.pdf

Hardin, G. (1968). The Tragedy of the Commons. *Science*, *162*(3859), 1243–1248. https://doi.org/10.1126/science.162.3859.1243

Harrison, H. B., Williamson, D. H., Evans, R. D., Almany, G. R., Thorrold, S. R., Russ, G. R., Feldheim, K. A., Van Herwerden, L., Planes, S., Srinivasan, M., Berumen, M. L., & Jones, G. P. (2012). Larval export from marine reserves and the recruitment benefit for fish and fisheries. *Current Biology*, *22*(11), 1023–1028. https://doi.org/10.1016/j.cub.2012.04.008

Hauck, M. (2009). Rethinking small-scale fisheries compliance: From criminal justice to social justice. In *PhD thesis*. University of Cape Town.

Hauck, M., & Kroese, M. (2006). Fisheries compliance in South Africa : A decade of challenges and reform 1994 – 2004. *Marine Policy*, *30*, 74–83. https://doi.org/10.1016/j.marpol.2005.06.007

Hauck, M., & Sweijd, N. A. (1999). A case study of abalone poaching in South Africa and its impact on fisheries management. *ICES Journal of Marine Science*, *56*, 1024 –1032. https://doi.org/10.4324/9781315093390-11

Heck, S., Béné, C., & Reyes-Gaskin, R. (2007). Investing in African fisheries: Building links to the Millennium Development Goals. *Fish and Fisheries*, *8*(3), 211–226. https://doi.org/10.1111/j.1467-2679.2007.00251.x

Hersoug, B., & Paulsen, O. (1996). *Monitoring, control and surveillance in fisheries management*. University of Namibia.

Hersoug, Bjorn. (1998). Fishing in a Sea of Sharks - Reconstruction and Development in the South African Fishing Industry. *Transformation: Critical Perspectives on Southern Africa*, *35*(35), 77–102.

Hester, P. T., & Adams, K. M. (2017). Managing and Analyzing Stakeholders 2014 Applied Solutions Conference. *Applied Solutions Conference June 1, 2014*, *September*. https://www.researchgate.net/publication/288164165

Hill, C. J., & Lynn, L. E. (2005). Is hierarchical governance in decline? Evidence from empirical research. *Journal of Public Administration Research and Theory*, *15*(2), 173–195. https://doi.org/10.1093/jopart/mui011

Hinz, H., Murray, L. G., Lambert, G. I., Hiddink, J. G., & Kaiser, M. J. (2013). Confidentiality over fishing effort data threatens science and management progress. *Fish and Fisheries*, *14*(1), 110–117. https://doi.org/10.1111/j.1467-2979.2012.00475.x

Hoegh-guldberg, O. (2015). Reviving Ocean Economy. In *WWF International: Vol. CXXX* (Issue November 3).

Hosch, G. (2009). Analysis of the implementation and impact of the FAO Code of Conduct for Responsible Fisheries since 1995. In *FAO fisheries and aquaculture circular. No. 1038* (Issue August). https://doi.org/10.13140/2.1.1461.5686

Hosch, Gilles, & Blaha, F. (2017). Seafood traceability for fisheries compliance: country-level support for catch documentation schemes. In *FAO Fisheries and Aquaculture Technical Paper 619*. http://www.fao.org/3/a-i8183e.pdf

Huggins, B. E., Meiners, E. R., Benjamin, D. K., & Scarborough, B. (2011). Fencing Fisheries in Namibia and Beyond : Through Trade. *Montana The Magazine Of Western History*.

Huppert, D. D. (2005). An overview of fishing rights. *Reviews in Fish Biology and Fisheries*, *15*(3), 201–215. https://doi.org/10.1007/s11160-005-4869-9

Hutchings, L., Augustyn, C. J., Cockcroft, A., Van Der Lingen, C., Coetzee, J., Leslie, R. W., Tarr, R. J., Oosthuizen, H., Lipinski, M. R., Roberts, M. R., Wilke, C., Crawford, R., Shannon, L. J., & Mayekiso, M. (2009). Marine fisheries monitoring programmes in South Africa. *South African Journal of Science*, *105*(5–6), 182–192. https://doi.org/10.4102/sajs.v105i5/6.85

ICCAT. (2019). *ICCAT Compliance Report* (Vol. 2019, Issue November). https://www.iccat.int/com2019/

International Bank for Reconstruction and Development / The World Bank. (2019). *Fisheries Co-Management in Mozambique - Lessons from the Artisanal Fisheries & Climate Change Project (FISHCC) 2015–2019*.

International Maritime Organization (IMO). (1993). *1993 Torremolinos Protocol Relating To the 1977 Torremolinos International Convention for the Safety* (Issue April). https://www.imo.org/en/OurWork/Safety/Pages/Fishing Vessels-Default.aspx

IOTC. (2020). *Report of the Eighth Session of the Compliance Committee* (Issue March). https://www.iotc.org/meetings/17th-session-compliance-committee

Isaacs, M., & Witbooi, E. (2019). Fisheries crime, human rights and small-scale fisheries in South Africa: A case of bigger fish to fry. *Marine Policy*, *105*(December 2018), 158–168. https://doi.org/10.1016/j.marpol.2018.12.023

Ithindi, A. P. (2003). Rent capture in the Namibian fisheries : The case of hake [Reykjavik University, Iceland]. In *Fisheries (Bethesda)*. https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.596.5202&rep=rep1&type=pdf

IUCN World Commission on Protected Areas (IUCN-WCPA). (2008). Establishing Resilient

Marine Protected Area Networks — Making It Happen. In *Governance An International Journal Of Policy And Administration*. IUCN-WCPA, National Oceanic and Atmospheric Administration and The Nature Conservancy. https://www.iucn.org/content/establishing-resilient-marine-protected-area-networks-making-it-happen

Jacquet, J., Fox, H., Motta, H., Ngusaru, A., & Zeller, D. (2010). Few data but many fish: Marine small-scale fisheries catches for Mozambique and Tanzania. *African Journal of Marine Science*, *32*(2), 197–206. https://doi.org/10.2989/1814232x.2010.501559

Japp, D. (2004). Country review: South Africa (Indian Ocean). In D. Young (Ed.), *Review of the State of World Marine Capture Fisheries Management: Indian Ocean - FAO Fisheries Technical Paper. No. 488* (Vol. 6, Issue December). http://www.fao.org/3/i1116e/i1116e.pdf

Jeffery, N. (2009). Stakeholder Engagement : A Road Map to Meaningful Engagement. *Doughty Centre, Cranfield School of Management*, *2*(July), 19–48. https://www.fundacionseres.org/lists/informes/attachments/1118/stakeholder engagement.pdf

Juda, L. (2002). Introduction : The Problem. In O. S. Stokke & Ø. B. Thommessen (Eds.), *Yearbook of International Co-operation on Environment and Development 2001/2002* (pp. 53–58). http://hdl.handle.net/1834/755

Katara, I., & Silva, A. (2017). Mismatch between VMS data temporal resolution and fishing activity time scales. *Fisheries Research*, *188*, 1–5. https://doi.org/10.1016/j.fishres.2016.11.023

Kelleher, K. (2002). The Costs of Monitoring, Control and Surveillance of Fisheries in Developing Countries. *FAO Fisheries Circular No. 976*, *January 2002*, 54. https://www.researchgate.net/publication/277888419_The_costs_of_monitoring_control_and_surveillance_of_fisheries_in_developing_countries

Kirchner, C. H., & Beyer, J. E. (1999). Estimation of total catch of silver kob Argyrosomus inodorus by recreational shore-anglers in Namibia using a roving-roving creel survey. *South African Journal of Marine Science*, *7615*(21), 191–199. https://doi.org/10.2989/025776199784126141

Kockel, A., Ban, N. C., Costa, M., & Dearden, P. (2020). Evaluating approaches for scaling-up community-based marine-protected areas into socially equitable and ecologically representative networks. *Conservation Biology*, *34*(1), 137–147. https://doi.org/10.1111/cobi.13368

Kourti, N., Shepherd, I., Schwartz, G., & Pavlakis, P. (2001). Integrating Spaceborne SAR Imagery into Operational Systems for Fisheries Monitoring. *Canadian Journal of Remote Sensing*, *27*(4), 291–305. https://doi.org/10.1080/07038992.2001.10854872

Kuruc, M. (2003). The Expert Consultation on Fishing Vessels Operating under Open Registries and Their Impact on Illegal, Unreported and Unregulated Fishing. *International Network for the Cooperation and Coordination of Fisheries-Related Monitoring, Control and Surveillance Activities.*

Lackey, R. T. (2005). Fisheries: History, Science, and Management. *Water Encyclopedia*, *January 2005*. https://doi.org/10.1002/047147844x.sw249

Lambrechts, D., & Goga, K. (2016). Money and Marginalisation: The Lost War Against Abalone Poaching in South Africa. *Politikon*, *43*(2), 231–249. https://doi.org/10.1080/02589346.2016.1201728

Landsberg, C. (2012). *The African Union and the New Partnership for Africa's Development (NEPAD). Restoring a relationship challenged?* https://www.accord.org.za/ajcr-issues/the-african-union-and-the-new-partnership-for-africas-development-nepad/

Lester, S. E., Halpern, B. S., Grorud-Colvert, K., Lubchenco, J., Ruttenberg, B. I., Gaines, S. D., Airamé, S., & Warner, R. R. (2009). Biological effects within no-take marine reserves: *Marine Ecology Progress Series*, *384*, 33–46. http://www.jstor.org/stable/24873394

Levi-Faur, D. (2011). Levi-Faur, From Big Government to Big Governance. In *Jerusalem Papers in Regulation & Governance* (ISSN: 2079-5882; Issue 35). http://regulation.huji.ac.il/papers/jp35.pdf

Lobach, T. (2010). Combating IUU fishing: Interaction of global and regional initiatives. *Law, Technology and Science for Oceans in Globalisation: IUU Fishing, Oil Pollution, Bioprospecting, Outer Continental Shelf*, *1329*, 109–129. https://doi.org/10.1163/ej.9789004180406.i-610.35

Lombard, A. T., Durbach, I., Harris, J. M., Harris, J. M., Mann, B. Q., Branch, G. M., & Attwood, C. G. (2019). South Africa's Tsitsikamma marine protected area - winners and losers. In *Marine Protected Areas: Science, Policy and Management* (Issue October). https://doi.org/10.1016/B978-0-08-102698-4.00013-7

Longépé, N., Hajduch, G., Ardianto, R., Joux, R. de, Nhunfat, B., Marzuki, M. I., Fablet, R., Hermawan, I., Germain, O., Subki, B. A., Farhan, R., Muttaqin, A. D., & Gaspar, P. (2018). Completing fishing monitoring with spaceborne Vessel Detection System (VDS) and Automatic Identification System (AIS) to assess illegal fishing in Indonesia. *Marine Pollution Bulletin*, *131*(December 2016), 33–39. https://doi.org/10.1016/j.marpolbul.2017.10.016

Marine Protection Services and Governance. (2019). *Unlocking the Economic Potential of South Africa ' s Oceans Marine Protection Services and Governance JOINT OPERATIONS REPORT APRIL 2018 TO MARCH 2019* (Issue May 2019).

Marine Protection Services and Governance. (2020). *Unlocking the Economic Potential of South Africa ' s Oceans Marine Protection Services and Governance JOINT OPERATIONS REPORT APRIL 2019 TO MARCH 2020* (Issue May 2020).

McCauley, D. J., Woods, P., Sullivan, B., Bergman, B., Jablonicky, C., Roan, A., Hirshfield, M., Boerder, K., & Worm, B. (2016). Ending hide and seek at sea. *Science*, *351*(6278), 1148–1150. https://doi.org/10.1126/science.aad5686

Miller, D. D., & Sumaila, U. R. (2014). Flag use behavior and IUU activity within the international fishing fleet: Refining definitions and identifying areas of concern. *Marine Policy*, *44*, 204–211. https://doi.org/10.1016/j.marpol.2013.08.027

Miller, D. G. M., Slicer, N. M., & Hanich, Q. (2013). Monitoring, control and surveillance of protected areas and specially managed areas in the marine domain. In *Marine Policy* (Vol. 39, Issue 1, pp. 64–71). https://doi.org/10.1016/j.marpol.2012.10.004

Miller, D. G., Slicer, N., & Sabourenkov, E. (2010). IUU fishing in antarctic waters:

CCAMLR actions and regulations. In D. Vidas (Ed.), *Law, technology and science for oceans in globalization* (pp. 175–196). Martinus Nijhoff Publishers.

Mills, C. M., Townsend, S. E., Jennings, S., Eastwood, P. D., & Houghton, C. A. (2007). Estimating high resolution trawl fishing effort from satellite-based vessel monitoring system data. *ICES Journal of Marine Science*, *64*(2), 248–255. https://doi.org/10.1093/icesjms/fsl026

Minnaar, A., Schalkwyk, L. Van, & Kader, S. (2018). The difficulties in policing and combatting of a maritime crime : the case of Abalone poaching along South Africa ' s coastline. *Journal of the Indian Ocean Region*, *14*(1), 71–87. https://doi.org/10.1080/19480881.2018.1421448

Mitchell, R. K., Agle, B. R., & Wood, D. J. (1997). Toward a Theory of Stakeholder Identification and Salience: Defining the Principle of Who and What Really Counts. *The Academy of Management Review*, *22*(4), 853. https://doi.org/10.2307/259247

Moolla, S. (2010). *Illegal fishing of marine living resources in South African waters: In search of solutions*.

Morse, S. (2006). Is corruption bad for environmental sustainability? A cross-naitonal analysis. *Ecology and Society*, *11*(1). https://doi.org/10.5751/es-01656-110122

MRAG. (2005). Review of Impacts of Illegal, Unreported and Unregulated Fishing on Developing Countries. *Final Report, MRAG, London*, *July*, 178. http://transparentsea.co/images/5/58/Illegal-fishing-mrag-report.pdf

Muench, A., DePiper, G. S., & Demarest, C. (2017). On the precision of predicting fishing location using data from the Vessel Monitoring System (VMS). *Canadian Journal of Fisheries and Aquatic Sciences*, *75*, 1036–1047.

Muhl, E.-K., & Sowman, M. (2020). Rights , Resources , Rezoning and the Challenges of Governance in South Africa's Oldest Marine Protected Area. *Conservation & Society*, *18*(4), 366–377. https://doi.org/10.4103/cs.cs

Myers, R. A., & Worm, B. (2003). Rapid worldwide depletion of predatory fish communities. *Nature*, *423*(6937), 280–283. https://doi.org/10.1038/nature01610

Naish, K. A., Hecht, T., & Payne, A. I. (1991). Growth of cape horse mackerel Trachurus trachurus capensis off South Africa. *South African Journal of Marine Science*, *10*(1), 29–35. https://doi.org/10.2989/02577619109504616

Namibia Ministry of Fisheries and Marine Resources. (2012). *Annual Report 2011 - 2012*. http://the-eis.com/elibrary/sites/default/files/downloads/literature/Ministry of Fisheries and Marine Resources Annual Report 2011_2012.pdf

Namibia Ministry of Fisheries and Marine Resources. (2013). *Annual Report 2012 - 2013* (Issue June). http://www.mfmr.gov.na/documents/120354/165201/Policy+statement+%28guidelines%29+for+the+granting+of+rights+to+harvest+marine+resources+and+allocation+of+Quota+Revised/d5faa27b-fd85-4d3d-a436-d99426688c42

Namibia Ministry of Fisheries and Marine Resources. (2017). *Ministry of Fisheries and Marine Resources 2017/18 to 2021/22 Strategic plan: 2017* (Issue April). http://the-eis.com/elibrary/search/19656

Namibia Ministry of Fisheries and Marine Resources. (2019). *Ministry Budget Speech for 2019-2020* (Issue 03). https://www.parliament.na/index.php/archive/category/184-speeches-2019?download=8536:vote-22-fisheries-and-marine-resources

Natale, F., Gibin, M., Alessandrini, A., Vespe, M., & Paulrud, A. (2015). Mapping fishing effort through AIS data. *PLoS ONE*, *10*(6), 1–16. https://doi.org/10.1371/journal.pone.0130746

Nichols, P. (2006). Marine Fisheries Management in Namibia: Has It Worked? In U.R. Sumaila, D. Boyer, M. D. Skogen, & S. . Steinshamn (Eds.), *Namibia's fisheries: ecological, economic and social aspects* (pp. 319–332). Eburon Academic Publishers.

Nielsen, J. R. (1996). *Fisheries co-management: Theoretical aspects, international experiences and future requirements*. 1–15. https://www.oceandocs.org/bitstream/handle/1834/618/Co-Man34.pdf?sequence=1&isAllowed=y

Nielsen, Jesper Raakjær, & Hara, M. (2006). Transformation of South African industrial fisheries. *Marine Policy*, *30*(1), 43–50. https://doi.org/10.1016/j.marpol.2005.06.002

Nombembe, P., & Hyman, A. (2017, July 17). The man who destroyed the West Coast rock lobster. *Times Live*. https://www.timeslive.co.za/news/south-africa/2017-07-21-knock-on-door-and-handcuffs-in--future/

Norman, S. J., Wilkinson, S. J., Japp, D. W., Reed, J., & Sink, K. J. (2018). *A Review and Strengthening of the Spatial Management of South Africa ' s Offshore Fisheries* (Issue July). https://cer.org.za/wp-content/uploads/2019/07/A-Review-of-Spatial-Management-in-South-Africas-Offshore-Fisheries_Final-Report-July-2018.pdf

Norton, M., & Jarre, A. (2020). Being well-governed: Including inspectors in a systems approach to fisheries management. *Ambio*, *49*(4), 1000–1018. https://doi.org/10.1007/s13280-019-01237-3

Nunan, F., Cepić, D., Yongo, E., Salehe, M., Mbilingi, B., Odongkara, K., Onyango, P., Mlahagwa, E., & Owili, M. (2018). Compliance, corruption and co-management: How corruption fuels illegalities and undermines the legitimacy of fisheries co-management. *International Journal of the Commons*, *12*(2), 58–79. https://doi.org/10.18352/ijc.827

OECD. (2017). OECD Review of Fisheries 2017 General Survey of Fisheries Policies. *OECD Publishing*, *January*, 117. http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=TAD/FI(2017)14/FINAL&docLanguage=En

Oelofsen, B. W. (1999). Fisheries management: The Namibian approach. *ICES Journal of Marine Science*, *56*(6), 999–1004. https://doi.org/10.1006/jmsc.1999.0537

Okes, N. C., Petersen, S., McDaid, L., & Basson, J. (2012). Enabling people to create change: Capacity building for Ecosystem Approach to Fisheries (EAF) implementation in Southern Africa. *Marine Policy*, *36*(1), 286–296. https://doi.org/10.1016/j.marpol.2011.06.007

Österblom, H., & Bodin, Ö. (2012). Global Cooperation among Diverse Organizations to Reduce Illegal Fishing in the Southern Ocean. *Conservation Biology*, *26*(4), 638–648. https://doi.org/10.1111/j.1523-1739.2012.01850.x

Österblom, H., Constable, A., & Fukumi, S. (2011). Illegal fishing and the organized crime

analogy. *Trends in Ecology and Evolution*, *26*(6), 261–262. https://doi.org/10.1016/j.tree.2011.03.017

Österblom, H., & Sumaila, U. R. (2011). Toothfish crises, actor diversity and the emergence of compliance mechanisms in the Southern Ocean. *Global Environmental Change*, *21*(3), 972–982. https://doi.org/10.1016/j.gloenvcha.2011.04.013

Pan African Fisheries (PAF). (2014). The Pan-African Fisheries and Aquaculture Policy Framework and Reform Strategy : How to Stop Illegal Fishing in Africa Options for Actions to Ensure Change at Regional and International Levels. In *Policy Brief*. https://nepad.org/file-download/download/public/15769

Paterson, A. R. (2009). Legal framework for Protected Areas: South Africa. *IUCN Environmental Policy and Law Paper*, *81*(South Africa), 1–47. http://cmsdata.iucn.org/downloads/south_africa.pdf

Paterson, B., Sowman, M., Raemaekers, S., Russel, D., Nkosi, L., Draper, K., & Willemse, N. (2014). *Strengthening the Human Dimension of an Ecosystem Approach to Fisheries Management in the BCC region. FINAL REPORT of FAO-BCC Project EAF 09/12*. 93. http://www.the-eis.com/data/literature/BCC Human Dimensions Report Final 2015.pdf

Paterson, Barbara, Kirchner, C., & Ommer, R. E. (2013). A short history of the Namibian hake fishery-a social-ecological analysis. *Ecology and Society*, *18*(4). https://doi.org/10.5751/ES-05919-180466

Pauly, D., Christensen, V., Guénette, S., Pitcher, T. J., Sumaila, U. R., Walters, C. J., Watson, R., & Zeller, D. (2002). Towards sustainability in world fisheries. *Nature*, *418*(6898), 689–695. https://doi.org/10.1038/nature01017

Pereira, M. A. M., Litulo, C., Santos, R., Leal, M., Fernandes, R. S., Tibiriçá, Y., Williams, J., B.Atanassov, Carreira, F., Massingue, A., & da Silva, I. M. (2014). Mozambique Marine Ecosystems Review. In H. Costa (Ed.), *Biodinâmica* (Issue December). https://doi.org/10.13140/2.1.2092.5766

Pinnock, D. (2016). *Gang Town*. Tafelberg.

Pitcher, T. J., & Preikshot, D. (2001). RAPFISH: A rapid appraisal technique to evaluate the sustainability status of fisheries. *Fisheries Research*, *49*(3), 255–270. https://doi.org/10.1016/S0165-7836(00)00205-8

Pitcher, Tony J., Kalikoski, D., & Pramod, G. (2006). Evaluations of Compliance with the FAO (UN) Code of Conduct for Responsible Fisheries. *Fisheries Centre Research Reports*, *14*(2), 1–75.

Plant, J., & Scott, M. (2009). Effective Policing and Crime Prevention. *US Dept. of Justice. Office of Community Oriented Policing Services*, 68.

Plet-Hansen, K. S., Eliasen, S. Q., Mortensen, L. O., Bergsson, H., Olesen, H. J., & Ulrich, C. (2017). Remote electronic monitoring and the landing obligation – some insights into fishers' and fishery inspectors' opinions. *Marine Policy*, *76*(September 2016), 98–106. https://doi.org/10.1016/j.marpol.2016.11.028

Pomeroy, R., Parks, J., Pollnac, R., Campson, T., Genio, E., Marlessy, C., Holle, E., Pido, M., Nissapa, A., Boromthanarat, S., & Thu Hue, N. (2007). Fish wars: Conflict and collaboration in fisheries management in Southeast Asia. *Marine Policy*, *31*(6), 645–656. https://doi.org/10.1016/j.marpol.2007.03.012

Pomeroy, R. S., Katon, B. M., & Harkes, I. (1998). Fisheries co-management: Key conditions and principles drawn from Asian experiences. *The Seventh Annual Conference of the International Association for the Study of Common Property*, 23.

Pramod, G. (2018). Global Evaluation of Fisheries Monitoring Control and Surveillance in 84 Countries India-Country Report. In *Policy Report* (Vol. 1, Issue 1). https://iuuriskintelligence.com/

Pramod, G., Pitcher, T. J., Pearce, J., & Agnew, D. J. (2008). *Fisheries Centre Research Reports Supporting Estimates Of Unreported Fishery Catches (IUU) For 59 Countries And The High Seas* (Vol. 16, Issue 4). https://www.researchgate.net/publication/259755321_Sources_of_Information_Supporting_Estimates_of_Unreported_Fishery_Catches_IUU_for_59_Countries_and_the_High_Seas_Fisheries_Fisheries_Centre_Research_Report_Vol_164_242_pp

Raemaekers, S., Hauck, M., Bürgener, M., Mackenzie, A., Maharaj, G., Plagányi, É. E., & Britz, P. J. (2011). Review of the causes of the rise of the illegal South African abalone fishery and consequent closure of the rights-based fishery. *Ocean and Coastal Management*, *54*(6), 433–445. https://doi.org/10.1016/j.ocecoaman.2011.02.001

Raemaekers, S. J. P. N., & Britz, P. J. (2009). Profile of the illegal abalone fishery (Haliotis midae) in the Eastern Cape Province, South Africa: Organised pillage and management failure. *Fisheries Research*, *97*(3), 183–195. https://doi.org/10.1016/j.fishres.2009.02.003

Randall, J. K. (2004). Improving compliance in U.S. federal fisheries: An enforcement agency perspective. *Ocean Development and International Law*, *35*(4), 287–317. https://doi.org/10.1080/00908320490508859

Ratcliffe, J. H., & Guidetti, R. (2008). State police investigative structure and the adoption of intelligence-led policing. *Policing*, *31*(1), 109–128. https://doi.org/10.1108/13639510810852602

Redpath, J. (2002). *Poached close to extinction*. Helen Suzman Foundation. https://hsf.org.za/publications/focus/issue-25-first-quarter-2002/poached-close-to-extinction

Remolà, A. O., & Gudmundsson, A. (2018). *Global review of safety at sea in the fisheries sector* (Vol. 1153). FAO. http://www.fao.org/3/I9185EN/i9185en.pdf

Republic of Mozambique Ministry of Fisheries. (2006). *Monitoring, Control and Surveillance and Surveillance Management Plan: 2007-2012* (p. 23).

Republic of Mozambique Ministry of Fisheries. (2010). *MCS Policy (MCS – Monitoring, Control and Surveillance)* (p. 12).

Republic of Mozambique Ministry of Fisheries. (2011a). *National Plan Of Action to Deter and Eliminate Illegal and Non-Reporting and Non-Regulated Fishing* (p. 30).

Republic of Mozambique Ministry of Fisheries. (2011b). *Republic of Mozambique Ministry of Fisheries. (2011a). Fisheries Master Plan 2010-19.*

Rittel, H. W. J., & Webber, M. M. (1973). Dilemmas in a general theory of planning. *Policy Sciences*, *4*(2), 155–169. https://doi.org/10.1007/BF01405730

Robbins, P. (2000). The rotten institution: corruption in natural resource management.

Political Geography, *19*, 423–443.

Roberts, A. (2001). *Procurement and building of the new South African MCS vessels*.

Rohan, G. (2003). Ensuring monitoring contributes to the pursuit of management objectives: An Australian Fisheries Management Authority perspective. In *FAO ternational Conference on Governance and Management of Deep Sea Fisheries, held 1 – 5 December 2003, Fisheries Report* (Issue 772). FAO. http://www.fao.org/docrep/008/y5890e/y5890e00.htm

Roux, J. P., & Shannon, L. J. (2004). Ecosystem approach to fisheries management in the northern Benguela: The Namibian experience. *African Journal of Marine Science*, *26*(June), 79–93. https://doi.org/10.2989/18142320409504051

RSA (Republic of South Africa). (1993). Occupational Health and Safety Act (Act 85 of 1993). *Republic of South Africa Goverment Gazette*, *85*. https://www.gov.za/documents/occupational-health-and-safety-act

RSA (Republic of South Africa). (1997). White Paper - Marine Fisheries Policy for South Africa. *Republic of South Africa Goverment Gazette*, *May*, 1–25. http://dlc.dlib.indiana.edu/dlc/bitstream/handle/10535/3894/seafisheries.pdf?sequence=1

RSA (Republic of South Africa). (1998a). Marine Living Resources Act (Act 18 of 1998). *Republic of South Africa Goverment Gazette*, *395*(18930), 34.

RSA (Republic of South Africa). (1998b). *South African Maritime Safety Authority Act (Act 5 of 1998)*.

RSA (Republic of South Africa). (2005). Act No. 13, 2005 INTERGOVERNMENTAL RELATIONS FRAMEWORK ACT, 2005. *Republic of South Africa Goverment Gazette*, *482*.

RSA (Republic of South Africa). (2012). *Policy for the Small Scale Fisheries* (No 474 of 2012). *10505*, 3–58. https://www.nda.agric.za/docs/policy/policysmallscalefishe.pdf

RSA (Republic of South Africa). (2014). Marine Living Resources Amendment Act No 587 of 2014. *Republic of South Africa Government Gazette*, *383*, 1–4.

SADC Protocol on Fisheries, (2003). https://www.sadc.int/files/8214/7306/3295/SADC_Protocol_on_Fisheries.pdf

SADC. (2016). *SADC Fisheries Fact Sheet, Volume 1, No. 1* (Vol. 1, Issue 1). https://www.sadc.int/files/9814/8724/5613/SADC_Fisheries_Fact_Sheet_Vol.1_No._1__Focus_on_Mozambique.pdf

Sakko, A. L. (1998). The influence of the Benguela upwelling system on Namibia's marine biodiversity. *Biodiversity and Conservation*, *7*(4), 419–433. https://doi.org/10.1023/A:1008867310010

Sammut-Bonnici, T., & Galea, D. (2015). PEST analysis. *Wiley Encyclopedia of Management*, *October*, 1–1. https://doi.org/10.1002/9781118785317.weom120113

Samoilys, M. A., Osuka, K., Mussa, J., Rosendo, S., Riddell, M., Diade, M., Mbugua, J., Kawaka, J., Hill, N., Koldewey, H., & Melita, A. (2019). An integrated assessment of coastal fisheries in Mozambique for conservation planning. *Ocean & Coastal Management*, *v. 182*, 2019 v.182. https://doi.org/10.1016/j.ocecoaman.2019.104924

Santos, R. (2007). *Fisheries in Angoche, Moma and Pebane: A Preliminary Description*. http://www.biofund.org.mz/wp-content/uploads/2015/03/Pesca-Angoche-Moma-e-Pebane.pdf

Sarpong, D. B., Quaatey, S. N. K., & Harvey, S. K. (2005). The economic and social contribution of Fisheries to the Gross Domestic Product (G.D.P.) and rural development in Ghana. *Sustainable Fisheries Livelihoods Progreamme Final Report*, *June*.

Sauer, W., Hecht, T., Britz, P., & Mather, D. (2003). An economic and sectoral study of the South African fishing industry (Vol. 2: Fishery profiles). *Report Prepared for Marine and Coastal …*, *2*(February 2014). http://scholar.google.com/scholar?hl=en&btnG=Search&q=intitle:An+Economic+and+Sectoral+Study+of+the+South+African+Fishing+Industry+Volume+2+.+Fishery+profiles#0

Saunders, M., Lewis, P., & Thornhill, A. (2009). *Research methods for business students* (Fifth). Pearson Education Limited. https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.475.7307&rep=rep1&type=pdf

Selbe, S. (2014). *Monitoring and Survillance Technologies*.

Shepperson, J. L., Hintzen, N. T., Szostek, C. L., Bell, E., Murray, L. G., & Kaiser, M. J. (2018). A comparison of VMS and AIS data: The effect of data coverage and vessel position recording frequency on estimates of fishing footprints. *ICES Journal of Marine Science*, *75*(3), 988–998. https://doi.org/10.1093/icesjms/fsx230

Sheptycki, J. (2014). Transnational crime: an interdisciplinary perspective. In N. Boister & R. J. Currie (Eds.), *Routledge Handbook of Transnational Criminal Law*. Routledge. https://doi.org/10.4324/9780203380277

Sjöstedt, M., & Sundström, A. (2013). Overfishing in Southern Africa: A Comparative Account of Regime Effectiveness and National Capacities. *Journal of Comparative Policy Analysis: Research and Practice*, *15*(5), 415–431. https://doi.org/10.1080/13876988.2013.835525

Sjöstedt, M., & Sundström, A. (2014). Coping with illegal fishing: An institutional account of success and failure in Namibia and South Africa. *Biological Conservation*, *189*, 78–85. https://doi.org/10.1016/j.biocon.2014.09.014

Snipes, M., & Taylor, D. C. (2014). Model selection and Akaike Information Criteria: An example from wine ratings and prices. *Wine Economics and Policy*, *3*(1), 3–9. https://doi.org/10.1016/j.wep.2014.03.001

Soderstrom, S. B., & Weber, K. (2020). Organizational Structure from Interaction: Evidence from Corporate Sustainability Efforts. *Administrative Science Quarterly*, *65*(1), 226–271. https://doi.org/10.1177/0001839219836670

Soliman, A. (2014). Do Private Property Rights Promote Sustainability? Examining Individual Transferable Quotas in Fisheries. *Seattle Journal of Environmental Law*, *4*(1), 245–281.

Sousa, L., Abdula, S., Palha de Sousa, B., & Penn, J. W. (2018). *Assessment of the shallow water shrimp fishery of Sofala Bank , Assessment of the shallow water shrimp fishery of Sofala Bank , Mozambique 2014 . Fisheries Research Institute Research Report* . (Issue

April).

Sowman, M. (2006). Subsistence and small-scale fisheries in South Africa: A ten-year review. *Marine Policy*, *30*(1), 60–73. https://doi.org/10.1016/j.marpol.2005.06.014

Sowman, M., & Cardoso, P. (2010). Small-scale fisheries and food security strategies in countries in the Benguela Current Large Marine Ecosystem (BCLME) region: Angola, Namibia and South Africa. *Marine Policy*, *34*(6), 1163–1170. https://doi.org/https://doi.org/10.1016/j.marpol.2010.03.016

Sperandei, S. (2014). Understanding logistic regression analysis. *Biochemia Medica*, *24*(1), 12–18. https://doi.org/10.11613/BM.2014.003

Standing, A. (2008). Corruption and industrial fishing in Africa. *U4ISSUE*. https://www.cmi.no/publications/3188-corruption-and-industrial-fishing-in-africa

Steinberg, J. (2005). The Illicit Abalone Trade in South Africa. *Institute for Security Studies*, *April*. https://doi.org/10.5040/9781501300936.ch-009

Sullivan, C., & O'Keeffe, Z. (2017). Evidence that curtailing proactive policing can reduce major crime. *Nature Human Behaviour*, *1*. https://doi.org/10.1038/s41562-017-0211-5

Sumaila, R., Alder, J., & Keith, H. (2006). Global scope and economics of illegal fishing. *Marine Policy*, *30*, 696–703. https://doi.org/10.1016/j.marpol.2005.11.001

Sumaila, Ussif Rashid. (2000). Fish as vehicle for economic development in namibia. *Forum for Development Studies*, *27*(2), 295–315. https://doi.org/10.1080/08039410.2000.9666143

Sumaila, Ussif Rashid, Jacquet, J., & Witter, A. (2017). When bad gets worse: Corruption and fisheries. *Corruption, Natural Resources and Development: From Resource Curse to Political Ecology*, 93–105. https://doi.org/10.4337/9781785361203.00015

Sumaila, Ussif Rashid, & Vasconcellos, M. (2000). Simulation of ecological and economic impacts of distant water fleets on Namibian fisheries. *Ecological Economics*, *32*(3), 457–464. https://doi.org/10.1016/S0921-8009(99)00120-2

Sundström, A. (2013). Corruption in the commons: Why bribery hampers enforcement of environmental regulations in South African fisheries. *International Journal of the Commons*, *7*(2), 454–472. https://doi.org/10.18352/ijc.370

Sundström, A. (2015). Covenants with broken swords: Corruption and law enforcement in governance of the commons. *Global Environmental Change*, *31*, 253–262. https://doi.org/10.1016/j.gloenvcha.2015.02.002

Supreme Court of Appeals. (2003). *Department of Environmental Affairs and Tourism versus Some Hake Deep Sea Trawl Fishery Right Holders in 2003*. http://www.saflii.mobi/za/cases/ZASCA/2003/46.pdf

Sutinen, J. G., & Andersen, P. (1985). The Economics of Fisheries Law Enforcement. *Land Economics*, *61*(4), 387–397. https://doi.org/https://doi.org/10.2307/3146156

Sutinen, J. G., & Kuperan, K. (1998). Blue Water Crime: Deterence, Legitimacy and Compliance. *Law and Society Review*, *32*(2), 309–338.

Sutinen, J. G., & Kuperan, K. (1999). A socio-economic theory of regulatory compliance. *International Journal of Social Economics*, *26*(1–3), 174–193.

https://doi.org/10.1108/03068299910229569

Taljaard, S., van Niekerk, L., & Weerts, S. P. (2019). The legal landscape governing South Africa'S coastal marine environment – Helping with the 'horrendogram.' *Ocean and Coastal Management*, *178*(November 2018), 104801. https://doi.org/10.1016/j.ocecoaman.2019.05.003

The International Bank for Reconstruction and Development, & The World Bank. (2004). Saving Fish and Fishers: Toward Sustainable and Equitable Governance of the Global Fishing Sector. In *Fisheries (Bethesda)*. http://documents.worldbank.org/curated/en/317081468780329501/pdf/290900GLB0whit1h010Fishers01public1.pdf

Treisman, D. (2000). The causes of corruption: a cross-national study. *Journal of Public Economics*, *76*, 399–457. https://doi.org/10.1007/978-3-658-04633-0_1

Ugwu, C., & Odo, F. (2014). The New Partnership for African Development (NEPAD) initiative of socio-economic development in Africa: achievements and challenges. In *African Dynamics in a Multipolar World: 5th European Conference on African Studies — Conference Proceedings*. Centro de Estudos Internacionais do Instituto Universitário de Lisboa (ISCTE-IUL). https://repositorio.iscte-iul.pt/bitstream/10071/7618/1/Chuwuka_Ugwu_%26_Odo_Fidelis_ECAS_2013.pdf

UN Division for Ocean Affairs and the Law of the Sea. (2010). *Fish Stocks Agreement: Overview of what the Agreement says and its impact*. *May 2010*. https://www.un.org/depts/los/convention_agreements/reviewconf/FishStocks_EN_B.pdf

United Nations. (1982). United Nations Convention on the Law of the Sea (UNCLOS). *United Nations*. https://www.un.org/Depts/los/convention_agreements/convention_overview_convention.htm

United Nations Office on Drugs and Crime. (2020). Handbook on police accountability, oversight and integrity. In *Criminal Justice Handbook Series*. www.unodc.org

Valsson, E., & Stokkan, K. (2014). *Mozambique Fisheries Surveillance Report 2014* (Issue 14).

Van Calster, P. (2006). Re-visiting Mr. Nice. on organized crime as conversational interaction. *Crime, Law and Social Change*, *45*(4–5), 337–359. https://doi.org/10.1007/s10611-006-9038-0

van der Geest, C. (2017). Redesigning Indian Ocean Fisheries Governance for 21st Century Sustainability. *Global Policy*, *8*(2), 227–236. https://doi.org/10.1111/1758-5899.12447

van Sittert, L., Branch, G., Hauck, M., & Sowman, M. (2006). Benchmarking the first decade of post-apartheid fisheries reform in South Africa. *Marine Policy*, *30*(1), 96–110. https://doi.org/10.1016/j.marpol.2005.06.012

van Zyl, B. J. (2001). A Decade of Namibian Fisheries and Biodiversity Management. In *Ministry of Fisheries and Marine Resources (Namibia) - Resource Management Directorate*. https://www.cbd.int/doc/nbsap/fisheries/VanZyl.pdf

Varghese, J. (2012). Police Structure: A Comparative Study of Policing Models. *SSRN Electronic Journal*, *July*. https://doi.org/10.2139/ssrn.1605290

Verfaillie, K., & Vander Beken, T. (2008). Proactive policing and the assessment of organised crime. *Policing: An International Journal of Police Strategies & Management*, *31*(4), 534–552. https://doi.org/10.1108/13639510810910553

Watson, J. E. M., Dudley, N., Segan, D. B., & Hockings, M. (2014). The performance and potential of protected areas. *Nature*, *515*(7525), 67–73. https://doi.org/10.1038/nature13947

Weisburd, D., Majmundar, M. K., Aden, H., Braga, A., Bueermann, J., Cook, P. J., Goff, P. A., Harmon, R. A., Haviland, A., Lum, C., Manski, C., Mastrofski, S., Meares, T., Nagin, D., Owens, E., Raphael, S., Ratcliffe, J., & Tyler, T. (2019). Proactive Policing: a Summary of the Report of the National Academies of Sciences, Engineering, and Medicine. *Asian Journal of Criminology*, *14*(2), 145–177. https://doi.org/10.1007/s11417-019-09284-1

Welsch, H. (2003). Corruption, Growth, and the Environment : A Cross- Country Analysis. In *ECONSTOR*. https://www.econstor.eu/handle/10419/18117

Wepener, V., & Degger, N. (2018). South Africa. In *World Seas: An Environmental Evaluation Volume II: The Indian Ocean to the Pacific* (2nd ed., pp. 101–119). https://doi.org/10.1016/B978-0-08-100853-9.00006-3

Williams, P., & Godson, R. (2002). Anticipating organized and transnational crime. *Crime, Law and Social Change*, *37*(4), 311–355. https://doi.org/10.1023/A:1016095317864

Witbooi, E. (2006). Law and fisheries reform: Legislative and policy developments in South African fisheries over the decade 1994-2004. *Marine Policy*, *30*(1), 30–42. https://doi.org/10.1016/j.marpol.2005.06.005

Witbooi, E., Ali, K.-D., Santosa, M. A., Hurley, G., Husein, Y., Maharaj, S., Okafor-Yarwood, I., Arroyo Quiroz, I., & Salas, O. (2020). *Organised Crime in the Fisheries Sector*. https://oceanpanel.org/blue-papers/organised-crime-associat-

Yan, Y., & Graycar, A. (2020). Exploring corruption in fisheries. *Natural Resources Forum*, *44*(2), 176–190. https://doi.org/10.1111/1477-8947.12201

Yoshimura, M., Okamoto, J., Yasuma, H., & Kimura, N. (2016). Characteristics of operations at fish-landing sites managed by private owners in Thailand. *Bulletin of Fisheries Science, Hokkaido University*, *66*(1), 51–58. https://doi.org/10.14943/bull.fish.66.1.51

Ysa Tamyko, Colom Joan, Albareda Adrià, Ramon Anna, Carrión Marina, S. L. (2014). *Governance of Addictions. European Public Policies*. Oxford University Press. https://global.oup.com/academic/product/governance-of-addictions-european-public-policies-9780198703303

Zeller, D., Booth, S., & Pauly, D. (2006). Fisheries contributions to the gross domestic product: Underestimating small-scale fisheries in the pacific. *Marine Resource Economics*, *21*(4), 355–374. https://doi.org/10.1086/mre.21.4.42629521

APPENDIX A: QUESTIONNAIRE

ANALYSIS AND EVALUATION OF AN MCS SYSTEM QUESTIONNAIRE

The objective of this questionnaire which is in two parts is to conduct an in-depth analysis to determine the status of Monitoring, Control and Surveillance (MCS) in each of the countries that are part of this study, which are the Republic of Namibia; the Republic of South Africa and the Republic of Mozambique. In the development of this questionnaire, the FAO Fisheries Technical Paper (2003), which outlines and details the recent trends and standards in monitoring, control and surveillance, was utilised extensively for providing the guiding principles of the questionnaire and taking into consideration that MCS is a central component in the present-day fisheries governance processes. Also, was the recognition of the fact that even though MCS is the keystone of fisheries governance broadly, albeit always undervalued, this questionnaire seeks to amplify the need to investigate and determine its completeness, thus ensuring a relatively high success rate in the implementation of any fisheries management strategy (FAO: 2003). Therefore, this questionnaire is geared towards realising that objective, i.e. an in-depth analysis that will incorporate an evaluation and the testing of effectiveness and efficiency of the national MCS programs for the three countries as mentioned above.

Furthermore, through this questionnaire, this study seeks to provide a snapshot of each country's overall effort at the time of testing. Effort in this study's context, as covered in this questionnaire, is inclusive of the background information, which is Part A, the enabling environment that forms Part B to D of this questionnaire. These sections, to a certain extent, also addresses various game-changers of the MCS processes. Furthermore, the enabling environment is broken down into the legislative framework and administration, national institutional arrangements; regional and international integration; evaluation of human, infrastructure and physical resources. The second part of this testing tool focuses on the MCS processes, and the primary criteria used are according to Bergh and Davies (2009). In their broad state and in the quest of determining and analysing effectiveness, these criteria cover the before fishing phase, while fishing, during landing and the post-landing phase. Each of these phases will have a varying number of questions under it, and some are further divided into subsections with more questions that are scrutinising the operations and their impact thereof.

The analytical method that will be utilised for analysing the scores allocated to the countries through this questionnaire is the RAPFISH technique developed by Pitcher and Preikshot (2001). The application of this technique was utilised in the conceptualisation of the criteria, and further reference was to the Code of Conduct for Responsible Fisheries (FAO:1995); the South African Marine Living Resources Act (Act 18 of 1998), and the Namibian Marine Resources Act (Act 27 of 2000). To complete the questionnaire, the responded should please note that in Part A, the

background information section, there can either be a "yes" or a "no" answer. A respondent, therefore, can click on either of the boxes, and the one selected will be checked. If the respondent wants to change the answer, they can click again on the selection, and it will be unchecked.

Regarding Part B, Part C, and Part D of the questionnaire, all the criteria are to be scored on a scale of 1 to 5, where 1 represents *Poor*; 2 represents *Developing*; 3 represents *Average*, and 4 represents *Good, and* 5 represents *Excellent*. To complete these sections, the respondent must click on the "***choose selection***" button, and a roll-down menu will appear with numbers 1 to 5. To allocate a score, the respondent must click on any number they would like to allocate to that particular question. If the respondent wants to go back and change the score, the same procedure can be followed. Should there be additional information that the respondent wants to provide, i.e. in support of the allocated score to a question, that information can be given in the comments column.

MCS EFFECTIVENESS QUESTIONNAIRE

PART A: BACKGROUND INFORMATION QUESTIONS

1. In your country is there a Ministry or a Government department with a specific focus or mandate to manage fisheries?	**Yes** ☐ **No** ☐
2. If there is no single department or Ministry that is responsible for fisheries management, is the mandate split among a number of departments or Ministries?	**Yes** ☐ **No** ☐
3. In your country is there a fully functional Fisheries Management Advisory Body or Scientific Body?	**Yes** ☐ **No** ☐
4. Do you have a National Monitoring, Control and Surveillance (MCS) program or strategy that may be three (3) or five (5) years?	**Yes** ☐ **No** ☐
5. Is the National MCS program of your country fully funded by the National or Central Government?	**Yes** ☐ **No** ☐
6. If the answer to the question above is "No", is your National MCS program fully or partially funded through foreign funding?	**Yes** ☐ **No** ☐
7. How long is the coastline of your country?	Choose an item.
8. In line with your National MCS Strategy are your MCS operations covering the entire coastline of your country?	**Yes** ☐ **No** ☐
9. How many MCS offices or MCS coastal stations are there in your country?	Choose an item.

10. Are there sufficient storage facilities for all operations, i.e. for equipment that is utilized for all MCS activities as well as for confiscated fish products that are all under the National Fisheries Governance Authority asset register?	**Yes** ☐ **No** ☐
11. In monitoring and surveillance of fishing vessels is the Vessel Monitoring System (VMS) used extensively?	**Yes** ☐ **No** ☐
12. Do you have a fully functional VMS control center in your country?	**Yes** ☐ **No** ☐
13. In the quest to protect your National marine living resources does cooperation between law enforcement agencies exist in your country?	**Yes** ☐ **No** ☐
14. Is your country a signatory to the United Nations Convention for the Law of the Sea (UNCLOS)?	**Yes** ☐ **No** ☐
15. Is your country a signatory to the Southern African Development Community (SADC) Protocol on Fisheries?	**Yes** ☐ **No** ☐
16. Is your country an active participant in all fisheries management related matters that are organized or developed and implemented under the auspices of SADC?	**Yes** ☐ **No** ☐
17. In your country is there a specific National fisheries governance legislation?	**Yes** ☐ **No** ☐
18. Is your country a contracting party, or a non-contracting but a co-operating party, to two or more of the following Regional Fisheries Management Organizations (RFMOs)? South East Atlantic Fisheries Organization (SEAFO); Indian Ocean Tuna Commission (IOTC); Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR), International Commission for the Conservation of Atlantic Tunas (ICCAT) and the Commission for the Conservation of the Southern Bluefin Tuna (CCSBT).	**Yes** ☐ **No** ☐
19. Does your country participate in any of the activities, i.e. meetings, conferences and seminars, organized by the Commission on Fisheries (COFI) or Food and Agricultural Organization (FAO)?	**Yes** ☐ **No** ☐
20. Although the Port State Measures is one of the non-binding international tools that are aimed at curbing illegal, unregulated and unreported (IUU) fishing activities, has your country ratified it?	**Yes** ☐ **No** ☐
21. Are there any other non-binding international tools in fisheries governance that your country is party to?	**Yes** ☐ **No** ☐

PART B: EVALUATION OF THE MCS SYSTEM ENABLERS

B1. EVALUATION OF THE MCS SYSTEM ENABLERS / ENABLING ENVIRONMENT

B.1.1. MANAGEMENT / STRATEGIC LEVEL ASSESSMENT AND NATIONAL INSTITUTIONAL ARRANGEMENT

	SCORE	COMMENTS
22. How would you rate the performance of the Ministry or a National Government Department or an institution that is mandated with fisheries governance in your country, in discharging its full spectrum of responsibilities with regards to fisheries governance?	**Choose an item.**	
23. In your opinion, is the strategic management component of the Fisheries Governance Authority in your country properly structured to withstand all the challenges that are inherent to fisheries governance?	**Choose an item.**	
24. Based on your practical experience, is the operational level of the Fisheries Governance Authority in your country, especially the fisheries inspectorate, constituted in such a way that its effectiveness yield maximum results in the implementation of your National MCS strategy?	**Choose an item.**	
25. In the overall governance, and strategic direction of fisheries governance in general in your country, how valuable are the inputs of either the Fisheries Management Advisory Body (FMAB) or Fisheries Scientific Advisory Body (FSAB)?	**Choose an item.**	
26. In its functions, i.e. either the FMAB or FSAB, how well does it perform in your country in creating a harmonious relationship between government and the fishing industry, especially the intensive commercial fishing sector if any?	**Choose an item.**	

27. If in your country the National MCS program is only funded for all of its activities, i.e. both its capital expenditure (CAPEX) budget as well as operational expenditure (OPEX) budget related activities, by the central government and is it adequately funded?	**Choose an item.**	
28. In the event that in your country the funding structure of your National MCS program relies on a combination of foreign funding as well as a part that is an allocation from the national fiscus, is the budgeting process and the resultant funds allocation process driven by the Fisheries Governance Authority or the National Treasury, and how beneficial is that process to the National MCS program?	**Choose an item.**	
29. Alternatively, and due to existing government institutional arrangements in your country, is the budgeting process and subsequent funding of the national MCS program a function of multiple government sources which may be a combination of various Departments and government institutions, and how effective is that arrangement towards the achievement of the National MCS program objectives?	**Choose an item.**	
30. Based on your practical experience or observations how would you evaluate the efforts of government department that is charged with the responsibility of Coordinating MCS efforts with other government departments, and / or agencies, for an example the Navy; Maritime Transport; Police Services, etc.	**Choose an item.**	
31. How would you evaluate, in your country, existing formal institutional arrangements that serve to ensure that both cooperation and coordination of activities of all the stakeholders mentioned in the preceding question translates into the achievement of both the national and global agenda in the protection of the marine living resources?	**Choose an item.**	
B.1.2. REGIONAL AND INTERNATIONAL INTEGRATION		
	SCORE	**COMMENTS**

32. In the region that your country is part of, is there an existence and prevalence of cooperation between all the countries in the region and how would you evaluate its effectiveness?	**Choose an item.**	
33. Are the existing protocols, Memorandum of Agreements (MoA), Memorandum of Understanding (MoU), or any form of agreement that permits and details the scope of cooperation and sharing of information between all the party states in the region effective in the planning and implementation of joint regional MCS interventions?	**Choose an item.**	
34. What is your assessment of the level of cooperation with other Fisheries Governance Authorities, and law enforcement agencies in the countries where most of the fish and fish products from your country is exported to, as well as countries that are major fish markets in the world?	**Choose an item.**	

B.2. LEGISLATIVE FRAMEWORK AND ADMINISTRATIVE MEASURES

	SCORE	**COMMENTS**
35. In the national legislative framework of your country are international obligations, in particular mandatory measures, incorporated and supported fully through provisions of resources that facilitate their full implementation and measurement of their impact thereof?	**Choose an item.**	
36. Currently, are your national or domestic laws or national policies harmonized or synchronized with regional and international laws and agreements?	**Choose an item.**	
37. Is the National legislative framework in your country a key enabler in creating a conducive environment for the National MCS program to deliver effectively on the National, Regional and International MCS related mandatory obligations?	**Choose an item.**	
	Choose an item.	

38. In your country, is there in existence a three (3) to five (5) year National MCS Strategy or Implementation Plan that details all the strategic objectives of all MCS units for the entire coastline of your country; key responsible areas, key performance areas and activities of each of the MCS units?		
39. How would you evaluate a formalized system, which is utilized in your country, to monitor progress made in the implementation of the National MCS program? This monitoring can be performed through the analysis of reports that are derived from the institutionalization of the National MCS Implementation Plan that are audited and evaluated by an independent authorized institution at the end of each financial year.	**Choose an item.**	
40. With regards to the implementation and the general administration of MCS programs, is there an effective overall control and coordination from your country's Fisheries Governance Authority, and how effective is this approach?	**Choose an item.**	
41. In instances where there is devolution of duties and command in your country such that there is a delegated authority from the Fisheries Governance Authority National office, either in person or through written official directives, to oversee the implementation of the National MCS Implementation Plan at either Local, Regional or Provincial offices, how effective is this approach?	**Choose an item.**	

B3. EVALUATION OF INFRASTRUCTURE AND PHYSICAL RESOURCES

	SCORE	**COMMENTS**
42. Does your country have a fully functional Vessel Monitoring System (VMS) operations center, with a VMS system that allows different types of sets that utilize different communication protocols to be linked to it, and is it connected to any international satellite system?	**Choose an item.**	

43. The VMS system that was approved by the Fisheries Governance Authority in your country, preferably in consultation with the fishing industry, how widespread is its installation and utilization in your national commercial fishing vessels fleet?	**Choose an item.**	
44. In the artisanal fishing fleet of your country, how widespread is the installation and utilization of Fisheries Governance Authority approved VMS system?	**Choose an item.**	
45. How would you evaluate overall compliance of all fishing fleets, i.e. commercial; artisanal and recreational, with conditions of VMS system utilization in your national waters?	**Choose an item.**	
46. In ensuring that there is adequate aerial surveillance component, i.e. as part of your broader MCS strategy of your country: - **a)** Are there sufficient and fully operational fixed winged aircrafts and/ or helicopters?	**Choose an item.**	
b) Are these aircrafts state owned, and in your practical experience does this arrangement contributes positively towards the key objectives of the National MCS Implementation Plan?		
c) Are all aircrafts and / or fixed winged aircrafts that are utilized by your national Fisheries Governance Authority on contract for a fixed number of hours per month or per term or per annum, and in your practical experience does this arrangement contributes positively to the overall implementation of the National MCS Implementation Plan?		
47. For all sea-based MCS operations, i.e. ranging from coastal waters to the deep-sea MCS operations, are there sufficient and fully operational small boats and sea going vessels that are utilized optimally throughout the year to deliver on the objectives of the National MCS Implementation Plan?	**Choose an item.**	

48. How would you evaluate the state of readiness of your Fisheries Governance Authority with regards to storage, holding and detaining facilities, in the event there is confiscation of illegally caught marine living resources or detention of a vessels, motor vehicles and aircrafts that may be linked with illegal harvesting of marine living resources?	**Choose an item.**	
	SCORE	**COMMENTS**
49. A typical management structure that is charged with the responsibility of giving a strategic direction to any organization assumes a pyramid structure, with the Executive at the top Senior Managers at the middle as heads of various units, and further divisions of middle and junior managers at the bottom of the pyramid for the implementation of business plans and evaluation of progress. Alternatively, it can assume the structure of an inverted pyramid where there is a multiplicity of senior executives with no clearly defined business units, no clearly defined lines of communication and no middle and junior management levels. This creates problems in a command and control environment such as an MCS establishment with specific roles and responsibilities, and high expectations on accountability. Given that: - a) How would you rate the structural arrangement of the MCS Unit in the Fisheries Governance Authority of your country?	**Choose an item.**	
b) Does it conform to the pyramid structure as explained above, or does it assume the shape of an inverted pyramid structure?		
c) How would you score its efficiency and effectiveness in the execution of its responsibilities?		
50. At the operational level of any organization its where delivery of objectives of that particular organization occur. It is about a well- structured, more focused sub-divisions of certain specific business units. An example would be a sub-directorate of Monitoring and Surveillance Directorate, which may be Tactical Surveillance Planning Unit, etc. At this level business plans with key performance indicators are utilized to measure the impact and relevance of daily or monthly activities that are	**Choose an item.**	

meant to be the translation of strategic objectives as encapsulated in the MCS Strategic Plan into meaningful and measurable outcomes. Given that:- **a)** How is your national MCS organizational structure constituted at the operational level?		
b) The manner with which it is arranged, in your opinion and practical observations, is it yielding more positive results than was expected in the implementation of the National MCS strategic plans or MCS business plans?		
51. What is the level of training, understanding and competency levels of all inspectors with regards to all relevant MCS legislations, policies and procedures within your department or inspectorate?	**Choose an item.**	
52. Are there any set minimum standards for formal education or training requirements for all the inspectors in your country that are in line with international standards or benchmarks?	**Choose an item.**	

PART C: EVALUATION OF AN MCS SYSTEM PROCESS AND ITS EFFECTIVENESS – REACTIVE APPROACH

C.1. BEFORE / PRIOR FISHING – AT PORT INSPECTION

	SCORE	COMMENTS
53. In the Fisheries Governance Authority of your country, is there a general, official System of Procedure (SOP) that covers all aspects of MCS which is utilized extensively for all before fishing port inspection activities in all fisheries?	**Choose an item.**	
54. In the Fisheries Governance Authority of your country are there different Systems of Procedure (SOPs), which maybe standalone or supplementary to the main SOP, that addresses different and wide ranging aspects of MCS in certain specific fisheries?	**Choose an item.**	
55. What is the state of preparedness of inspectors for field work or inspections, i.e. do they carry with them clearly marked identification cards; pocket books; copy of the national act and relevant regulations; two-way radios or any communications device and a fine book or forms?	**Choose an item.**	
56. For an inspection, is there an all-inclusive checklist for all standard items or issues that inspectors must focus on as those that are most important in assessing the effectiveness of the country's MCS efforts?	**Choose an item.**	
57. Are there any monitoring measures that are in-built in the system to ensure that the inspection is followed precisely and that the checklist is a true reflection of the inspection process?	**Choose an item.**	

C.2. DURING FISHING / AT SEA BOARDINGS

	SCORE	COMMENTS
58. In the Fisheries Governance Authority, is there an official, general System of Procedure (SOP) which is mainly applicable to all at sea MCS interventions of your country?	**Choose an item.**	
59. In the Fisheries Governance Authority of your country are there different Systems Of Procedure (SOPs) that are mainly applicable to at sea MCS interventions, which maybe standalone or supplementary to the main SOP, that addresses different aspects of MCS in certain specific fisheries?	**Choose an item.**	
60. What is the state of readiness of inspectors to undertake the boarding and inspection of vessels at sea within your country's Exclusive Economic Zone (EEZ)? In their possession there should be an identification card; pocket book; a copy of the Act, a two-way radio or any other communication device; protective personal equipment as they may inspect cold storage facilities of the vessel; measuring devices for both the fish and the fishing gear (e.g. mesh size, etc.) and a fine book or forms.	**Choose an item.**	
61. After the completion of an inspection at sea, is there a comprehensive checklist that must be completed by the responsible inspector and verified and approved by the inspector's supervisor to ascertain that there was a particular focus on those inspection aspects that are key in assessing the effectiveness of your country's MCS efforts?	**Choose an item.**	

C.2.1. SAFETY AND CATCH INSPECTION

	SCORE	COMMENTS
62. Are regular checks made to ensure that: - a) Is the number of crew members on board the vessel for effort controlled fisheries, in accordance with permit conditions? Vessel crew lists, and the crew's identity documents may be utilized for this exercise. b) Operation of the Fisheries Processing Establishment (FPE), as sampling of finished products to apply conversion rates and estimate catches at the moment of inspection. Maintenance of health and safety standards as prescribed by the Fisheries Governance Authority.	**Choose an item.**	
c) How would you score the procedures of cargo holds inspection in your country for the verification of catches through sampling, i.e. for the targeted species as well as by-catch species. For this exercise, catch records in the logbooks are used as source books.	**Choose an item.**	
d) What is the accuracy and frequency of reporting of the VMS system in your country, i.e. in relation to your country's international obligations? This assessment should be inclusive of the VMS tracking from the day the boarded	**Choose an item.**	

vessel left the harbor, to the day of boarding at sea to ascertain whether the area of fishing conforms to the specifications of the fishing license, and when the vessel docks for landing.		

C.3. DURING LANDING / AT THE LANDING SITES, DECLARED FISHING HARBOURS AND / OR COMMERCIAL PORTS

	SCORE	COMMENTS
63. What is the state of readiness of inspectors to undertake an inspection at the landing site/s? In their possession there should be an identification card; pocket book; a copy of the Act, a two-way radio or any other communication device; protective personal equipment as they may inspect cold storage facilities of the vessel; measuring devices to measure samples of fish being offloaded; scales and bins for weighing fish and a fine book or forms.	**Choose an item.**	
64. It is the responsibility of the Fisheries Governance Authority to develop an in-built evaluation program for the effectiveness of the national MCS program. Part of that is to keep track of all fish landing activities in all landing sites at any given time. To that end it is imperative to ask the following questions: - a) Are all ports, fishing harbors or landing sites listed and under the control of the Fisheries Governance Authority?	**Choose an item.**	

b) If all or some of the landing sites are not under the direct control of the Fisheries Governance Authority (FGA), is there an easy access to these facilities for the FGA officials or inspectors anytime of the day throughout the year?	**Choose an item.**	
c) For those landing sites that are under the direct control of the FGA, is there adequate and effective management, or control of all these facilities? The determining factor in the effectiveness of the system should be the overall impact of management in the broader national MCS strategy.	**Choose an item.**	
d) What is the possibility, if any, of illegal activities during fish landings, in the landing sites that are the jurisdiction of the FGA?	**Choose an item.**	
65. During fish landings is there availability, and utilization of a System of Procedure (SOP) for general inspections, which may be linked to specific SOPs for particular fisheries? The SOP should cover, but not limited to the following: - a) Confirmation of the notification to land which must be sent to the Fisheries Governance Authority 24 hours before landing.	**Choose an item.**	
b) Inspection procedures for trawlers, fish carrying reefer vessels, at sea Fish Processing Establishments (FPEs) that are detailing inspection of logbooks; VMS equipment; cargo holds; FPEs; fishing gear, etc.	**Choose an item.**	
c) Inspection form which must be completed by the responsible inspector and be counter signed by the skipper of the vessel.	**Choose an item.**	

d) Confirmation of the amount of landed fish, and to ensure that the landed fish amount will be deducted from the allocation of the permit holder so as to keep track of the fish that the permit holder is still to fish, or if the permit holder has fished all his allocation.	**Choose an item.**	
e) Confirmation of the fishing vessel details and that it is indeed licensed to fish the landed species, and that it is landing the fish in a port or fishing harbor where it is licensed to land it.	**Choose an item.**	
f) Determine the amount of by-catch in relation to the landed targeted species, all in accordance with permit conditions.	**Choose an item.**	
66. Between the three units of the MCS system, i.e. landside; at-sea and surveillance, are there applied methods that are about cross-referencing the work of the three units when conducting a before fishing inspection, boarding and inspections at sea, or during landing, or post landing?	**Choose an item.**	
67. How effective and efficient is your national MCS program in ensuring that the operational system of procedure does observe linkages between the three units of MCS to ensure smooth and seamless transition between all three of them in their functioning?	**Choose an item.**	

C.3.1. INSPECTION OF FOREIGN FISHING VESSELS

	SCORE	COMMENTS
68. For the inspection of foreign vessels, what is the state of preparedness of inspectors for this kind of inspection, i.e. do they carry with them clearly marked identification cards; pocket books; copy of the act; two-way radios or any communications device and a fine book or forms; do they possess an extensive knowledge on how to handle and to subsequently search and inspect foreign fishing vessels; above average knowledge of different Regional Fisheries Management Organizations (RFMOs) and their respective inspection system of procedures and conservation measures, a clear understanding of the processes and procedures to followed in the event that contraventions are noted etc.?	**Choose an item.**	
69. Are inspectors that are allocated the task of foreign vessels inspections highly proficient in any of the foreign languages that are dominant in the foreign fishing fleets, for an example Spanish or Chinese, etc.?	**Choose an item.**	
70. In the event that none of the inspectors in your national MCS program can communicate in one or more of the foreign languages that are dominant in the fisheries sector, are there any alternative methods that your country employs to ensure that there is a level of communication that is guaranteed between the inspectors and the crew of the vessel that is inspected, for an example the use of language cards to ensure basic communication takes place with understanding on both parties in the fulfilment of the country's national MCS objectives and international obligations?	**Choose an item.**	

71. How diligent is your FGA, through its MCS program, in conducting pre-checks and screening of vessels requesting entry into the country's EEZ, and their subsequent use of the country's port facilities? Amongst other things, the screening process is to determine blacklisted vessels, which is done by a number of Regional Fisheries Management Organization (RFMOs), to ensure compliance with the International Maritime Organization (IMO) regulations; compliance with regulations governing certain specific fisheries, e.g. the Electronic Catch Documentation Scheme (E-CDS) for the Patagonian toothfish, etc.	**Choose an item.**	
C.4. POST LANDING INSPECTIONS		
72. Does an excellent state of readiness exist for your national MCS program to undertake inspections at various points of sale; land-based FPEs; airports and implementation of roadblocks and other SMS intervention strategies beyond the fish landing activity? All activities on post landing MCS interventions should be guided and standardized through and MCS Strategic Plan and supported by one or more specific SOPs and business plans.	**Choose an item.**	
73. Is there in existence a System of Procedure (SOP) that is focusing on post landing MCS interventions that are covering general inspections and/or a fishery specific SOP for all fisheries which are of economic importance or self-sustenance that details procedures which are of strategic importance to the overall MCS strategy of the country which is inclusive of, but not limited to the following: -	**Choose an item.**	

a) Validation of the FPE/s operating license as issued by the Fisheries Governance Authority. This should also be inclusive of validation procedures to establish the source of fish that is being processed, its amount; vessel or vessels that are linked to the FPE; the fishing grounds from where it was fished and the landing site/s, and to determine all the permit holders that are supplying the FPE/s with fish, their respective allocations and maintain records of fish still to be fished by each permit holder in accordance with their allocations. Upon completion of inspection/s, an inspection form which details the inspection for all the landed targeted species and its by-catch, should be completed by the responsible inspector and counter signed by the manager of the FPE.		
b) Inspections that are specifically focusing on the permits of trucks that are used to transport landed fish to predetermined FPEs. Truck permits, as issued by Fisheries Governance Authority, should give details of the truck, i.e. the model and registration of the truck, and the FPE where the fish will be delivered to.	**Choose an item.**	
c) A deliberate and more focus on points of sales monitoring, i.e. chain stores, restaurants, etc. With them more attention should be given on invoices that must detail the species of fish, the amount of fish and the date of purchase and supply each establishment has bought, and the FPE they sourced it from.	**Choose an item.**	
d) Ports and airports, i.e. export and import points, to verify and validate import and export permits, the products that are exported or imported; the destination country of exports and the country of origin for imports.	**Choose an item.**	

PART D: EVALUATION OF AN MCS SYSTEM PROCESS AND ITS EFFECTIVENESS – PROACTIVE APPROACH

D.1. STAKEHOLDER ENGAGEMENT / COLLECTIVE APPROACH		
	SCORE	**COMMENTS**
74. Is there an institutionalized stakeholder identification process, i.e. both primary and secondary stakeholders, which is an integral part of the broader MCS strategy of your country?	**Choose an item.**	
75. Does the Fisheries Governance Authority possess a stakeholder database that details all the fishermen, local fishermen leaders, community based fishing organizations and their management structures, other law enforcement organizations which are interested parties to the national MCS program?	**Choose an item.**	
76. In the event that the database exists, and in the interest of a broader footprint of the national MCS program, are there other fisheries interested forums or parties in the coastal communities, or organizations that are funded or sponsored by the commercial fishing industry which MCS is part of their fisheries management obligations, which have access or indirectly linked to the Fisheries Governance Authority database only for promotion of fisheries compliance, information dissemination and awareness programs?	**Choose an item.**	
77. Are there stakeholder engagement plans that serve as a roadmap for a more focused engagement strategy with all the identified stakeholders at varying levels of intensity? Amongst other things, these plans should cover all areas of interest for all the stakeholders, for an example frequency of meetings and other interactions of all parties concerned, information exchange platforms about new developments which may be new regulations as influenced by each country's international obligations, etc.	**Choose an item.**	

78. Is there an existence of an active stakeholder forum or a similar body, which can be audited for its operations, that is currently a platform for regular discussions and consultations with stakeholders?	**Choose an item.**	

D.2. RISK IDENTIFICATION, ANALYSIS AND MANAGEMENT

D.2.1. PERSONNEL

	SCORE	COMMENTS
79. Are candidates for employment to the MCS unit thoroughly screened prior to hire, i.e. for their health status; criminal records; verification of qualifications and various requisite competencies?	**Choose an item.**	
	Choose an item.	

80. Are there adequate measures in place to mitigate risks of corruption and fraud, or at least to limit the risk factor to a bare minimum amongst inspectors given the nature of the industry that predisposes them to these risks all in the line of duty?		
81. If you have experienced high levels of fraud and corruption in your MCS unit over the past five years, how bad was the impact of such an occurrence both in the image of the Fisheries Governance Unit of your country, and the level of confidence that the general public had in your institutional abilities in response to such adverse publicity?	**Choose an item.**	
82. Are annual lifestyle audits or infrequent lifestyle audits conducted to all inspectors that are in the employ of the Fisheries Governance Authority of your country?	**Choose an item.**	
D.2.2. MAPPING AND MONITORING OF ACTIVITIES IN HOTSPOTS		
		COMMENTS
83. Does the MCS system in your country include use of environmental intelligence teams that keep track of all criminal activities that are marine related along the entire coastline of your country? Source of information for the environmental intelligence teams can be the national or local police services or crime intelligence unit, etc.	**Choose an item.**	
	Choose an item.	

84. Does the MCS system of your country have the ability to determine patterns, prepare and present a situation analysis that will assist in planning and implementation of preventative and counter measures by your Fisheries Governance Authority?		
85. In the event of an urgent need for the implementation of countermeasures in the pre-identified hotspot areas what is the ability and state of readiness of the MCS units in your country to respond positively, effectively and at the shortest time possible for such situations?	**Choose an item.**	
86. As part of your MCS strategy and in an attempt to ensure that there are quick effective and responsive measures in emergency situations, does the Fisheries Governance Authority have and make use of highly effective and efficient strike teams that are readily available for mobilization?	**Choose an item.**	
87. High grading and by-catch targeting is prevalent in some fisheries. Is your MCS system able to accommodate a regime that seeks to predict such incidents and prevent them prior occurring?	**Choose an item.**	
88. How effective is the MCS unit in your country in identifying specific fisheries and fishing grounds, where IUU fishing activities are prevalent?	**Choose an item.**	
89. How efficient is the MCS unit in your country, preferably in collaboration with some or most of the RFMOs, in blacklisting all those that would be found to be actively involved in IUU fishing activities, i.e. to an extent of revoking their fishing licenses if they are your nationals?	**Choose an item.**	