SPECIFIC CONTRACT No 7

"Field Work Mission to Bulgaria"

Implementing framework contract MARE/2009/2008 "Assistance for the monitoring of the implementation of national programmes for the collection, management and use of data in the fisheries sector".

COUNTRY REPORT

July 2012

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Author(s):	Jose CERVERA, Pavel SALZ, Christine ALBERTI-SCHMITT, Christoph PETEREIT, Ester AZORIN
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ACRONYMS

AR	Annual Report
BTS	Bottom trawl survey
DCF / DCR	Data Collection Framework / Regulation
D FMCFR	Directorate Fisheries Management and Conservation of Fisheries Resources
DG MARE	Directorate General for Maritime Affaires and Fisheries
EC	European Commission
EFF	European Fisheries Fund
EWG	Expert Working Group
FTE	Full-time equivalent
FWC	Framework Contract
IO BAS	Bulgarian Academy of Sciences
ISS NAFA	Information System and Statistics of the National Agency of Fisheries and Aquaculture
JRC	Joint Research Centre
MAF	Ministry of Agriculture and Fod
MMF	Fisheries Management and Monitoring
NAFA	National Agency of Fisheries and Aquaculture
NC	National Correspondent
NIMRD	National Institute for Marine Research and Development
NIS	National Statistical Institute
NOC	National Oceanographic Commission
NP	National Programme
SBS	Structural Business Survey
STECF	Scientific, Technical and Economic Comitee for Fisheries
ToR	Terms of Reference
TR	Technical Report
TU	Technical University
VBGF	Von Bertelanfly Growth Function
VMS	Vessels Monitoring System

1. EXECUTIVE SUMMARY

This report presents the result of the first field work mission within the Second Horizontal Contract for 2012 of the Framework contract "Assistance for the monitoring of the implementation of national programmes for the collection, management and use of data in the fisheries sector", which took place in Sofia, Bulgaria.

The main organizations intervening in the DCF in Bulgaria are the National Agency of Fisheries and Aquaculture (NAFA) – Ministry of Agriculture and Food, the Institute of Oceanology – Bulgarian Academy of Sciences (IO BAS).

In relation to ***biological variables***, two bottom trawl surveys (BTS) targeting turbot and one hydro acoustic and pelagic trawling survey performed and analyzed by IO BAS in Varna constitute the main tools to assess biological parameters and variables. No métier specific samplings or discard analyses onboard of commercial vessels and no landing/market analyses have been performed. Market/landing sampling could not be performed due to missing co-financing. Several biological variables are collected for sprat; sex-ratio and maturation are missing. For whiting, not listed as important species in Annex VII (EC 199/2008), biological parameters are collected but only mentioned in the respective cruise report but not in TR and corresponding tables. Biological parameters are collected for turbot and sprat annually due to national importance of the two species as planned in NP. However, according DCF this sampling is mandatory only every three years.

No DCF relevant species are caught in Bulgarian ***recreational fishery***. According to NAFA, neither eel nor salmon are caught and the fishery for sturgeon is prohibited. NAFA issues recreational fisheries licenses for inland waters and in principal collect species-specific and quantitative catch data from each license holder after expiry. Fishing in the Black Sea is open.

Economic data on catching sector is based on a questionnaire distributed by the local staff of NAFA to all active fishermen. The paper questionnaires are sent to Sofia where they are processed by 2-3 experts of NAFA. The response rate reached 42% in 2011, although not all questionnaires were completely filled in. All entries on the questionnaires are taken at their face value. The questionnaires are submitted anonymously, so that it is not possible to ask the respondents any clarification. Consequently, a number of questions can be raised regarding the reliability of the data and the aggregation to the national total. In particular, the estimated number of FTEs seems too high in relation to the number of sea-days per vessel and to average income per man.

There are discrepancies between the response rates and coefficients of variation reported in the NP and the values which were drawn and calculated from the data.

Data on aquaculture sector is collected in the same way. Anonymous questionnaires are distributed and collected by the local staff of NAFA and subsequently processed by experts in Sofia. The response rate was 26% in 2010 and 2011. Consequently, similar problems arise as for the catching sector. Also in case of aquaculture there are discrepancies between the response rates and coefficients of variation reported in the NP and the values which were drawn and calculated from the data. The followed approach does not allow allocating individual firms to activities specified in the NP and TR. All aquaculture firms are aggregated into one group.

Economic data on fish processing is also collected with anonymous questionnaires, which are distributed by post. Also in this case, anonymity leads to problems with interpretation of filled in values. There are discrepancies between the response rates and coefficients of variation reported in the NP and the values which were drawn and calculated from the data. The data on fish processing is used mainly in relation to the implementation of the Bulgarian European Fisheries Fund (EFF) programme. The mission wishes to stress that the Bulgarian National Correspondent (NC) and his staff were extremely cooperative and provided access to all economic data. Consequently, it was possible to evaluate it in detail.

The ***transversal variables*** are compiled by the local and regional staff of the NAFA. Data entry takes place in the three regional centres of the coastal areas. All Bulgarian vessels, independently of their size, are subject to logbook and sales notes obligation as soon as they fish for one day per year. Therefore, full data on capacity, effort and landings is available.

Regarding the ***IT infrastructure***, all transversal variables are stored in a centralised database in NAFA headquarter whereas all other fisheries data are kept in excel files. A biological database is under construction at the Institute of Oceanology.

2. INTRODUCTION

This report is the result of the first field work visit planned for 2012 within the 7th Specific Contract signed between DevStat and DG MARE on 23rd May 2012 which objective is the monitoring of the implementation of the data collection framework in Bulgaria.

The main objective of this first field work contract is to verify whether and to which extent the programme implementation is being followed up and if all the biological, technical, environmental and socio-economic data specified in the programme are being collected according to the specified methods, procedures and quality.

For this specific field work mission, the team members were:

- Mr José Cervera. Project Manager of the Framework Contract and statistical issues expert;
- Mr Pavel Salz. Leading Technical Expert for the Horizontal Contract and fisheries socio-economics expert;
- Mrs Christine Alberti-Schmitt. Information System expert;
- Dr Christoph Petereit. Fisheries biology and environmental issues expert;
- Ms Ester Azorín. Project Assistant.

To achieve the mission objectives, the team of experts conducted a preparatory work for the field work mission to Bulgaria consisting mainly in the revision of the basic documentation and specific technical documentation in order to obtain a first evaluation of the Bulgarian situation.

After this first revision and diagnosis, the team visited from 20th to 22nd of July 2012 the Bulgarian scientific organisation dealing with the National Programme. The findings of the mission are detailed in this report.

Acknowledgements

The team wants to acknowledge the fruitful collaboration and openness of the National Agency of Fisheries and Aquaculture (NAFA), and its staff for their personal contribution to the success of the field work mission. The DCF team showed in all cases a professional engagement with the objectives of the mission as well as a professional enthusiasm for improving their working procedures, while acknowledging their lack of resources.

Implementation of the mission (counterparts, calendar)

The agenda of the mission, shared with Mr Stoyan Urumov (National Correspondent for the DCF) prior to the mission, was implemented as planned and all the topics were revised according to the agenda (see Annex1). The team was unable to meet Dr Marina Panajotova from IO BAS who is responsible for the biological variables as she was working on sea survey. She was interviewed by phone.

The team worked in parallel during the first and second days of the mission, sharing afterwards the findings of the different meetings.

Participants from the Bulgarian Institutions involved in DCF:

1. **Ministry of Agriculture and Food**

I. **National Agency of Fisheries and Aquaculture (NAFA)**

- Mr Stoyan URUMOV , National Correspondent for the DCF, and Chief expert "Management and monitoring of fisheries and aquaculture";
- Mrs Tstvetana BELOMACHEVA, Chief expert on biological variables of Directorate Fisheries Management and Conservation of Fisheries Resources (D FMCFR). NAFA
- Mrs Ana DIMITROVA, Senior expert on economic variables of D FMCFR. NAFA
- Mrs Lydia RASHKOVA, Junior expert on biological variables of D FMCFR. NAFA
- Mrs Ksenya TUTUNAROVA, Chief expert on aquaculture and economic variables of D FMCFR. NAFA
- Mrs Katya GEORGIEVA, Chief expert on transversal variables of D FMCFR. NAFA
- Ms Albena Angelova, ISS-NAFA
- Ms Aneta Encheva, ISS-NAFA

2. **Institute of Oceanology. Bulgarian Academy of Sciences (IO BAS)**

As indicated above, the team of experts was unable met Dr Marina Panajotova, Chief Assistant from IO BAS Varna, expert on biological variables and surveys.

Structure of the report

The Country Report is organised according to the requirements of the Terms of Reference (ToR) and includes the following sections:

- Section 3: General Overview.
- Section 4: Biological data – Métier-related variables.
- Section 5: Biological data – Stock-related variables.
- Section 6: Recreational Fisheries.
- Section 7: Transversal data.
- Section 8: Research Survey at Sea.
- Section 9: Economic data – Catching sector.
- Section 10: Economic data – Aquaculture.
- Section 11: Economic data - Processing Industry.
- Section 12: Ecosystem data.
- Section 13: Conclusions.
- Section 14: Recommendations

The Country Report is accompanied by 9 Annexes.

3. GENERAL OVERVIEW

This chapter contains a presentation of the main Bulgarian institutions involved in DCF as well as their organization, management, IT infrastructure and inter-institutional coordination established between them.

3.1. ORGANIZATION AND MANAGEMENT

The National Agency of Fisheries and Aquaculture (NAFA) is the national counterpart for the exchange of information between the European Commission and Bulgaria regarding the DCF, with Mr Stoyan Urumov being the National Correspondent.

The main institutions involved in DCF in Bulgaria are described below.

A. NAFA – National Agency of Fisheries and Aquaculture

National Agency of Fisheries and Aquaculture (NAFA) is in charge of the overall coordination of the implementation of the National Data Collection Programme. DCF programme is funded at 50% by the Ministry of Agriculture and Food (MAF) and 50% by DG MARE (EC). The National Correspondent is Mr Stoyan Urumov, who has been appointed to this position in October 2011.

NAFA headquarters are based in Sofia, having a network of local offices.

Main tasks:

- To maintain communications and data collation gathered from different sources for transmission to the Commission and other parties;
- To promote coordination and harmonization of scientific data collection;
- To allocate cost and administrative information from the different Bulgarian institutions involved in the National Data Collection Programme;
- To ensure the activities are effectively carried out by the different Bulgarian organisations;
- To register:
    - Licenses for commercial and recreational fisheries;
    - Persons and companies engaged in fish farming, fishing vessels, fish markets/centres, registered customers, organisations of fish producers;
    - Licenses for catching fish for scientific purposes.

Human resources

All the activities carried out at NAFA in the framework of the DCF involve 5 persons from NAFA permanent staff (National Correspondent plus for persons working part time). Depending on the work and the type of data needed to process several persons from the D FMCFR may also be working.

A.1. ISS NAFA – Information System of NAFA

The Information System department of NAFA (ISS NAFA) is in charge of the collection and maintenance of registers, some of them used for the DCF, specifically data from logbooks, fleet register and sales notes.

Human resources

Two persons from ISS NAFA are indirectly involved (part-time) in the collection of data for the DCF.

A.2. MMF – Department of Fisheries Management and Monitoring

The Department of Fisheries Management and Monitoring of NAFA compiles economic, aquaculture and fish processing data from ISS.

MMF is also in charge of the Control Programme for Fisheries: licenses, registration, etc.

A.3. Regional Centres and Local Units

There are 4 Regional Centres from which local offices depends:

- Regional Centre "Fisheries and Control – South-Eastern Bulgaria" located in Bourgas
- Regional Centre "Fisheries and Control - Danube" located in Russe;
- Regional Centre "Fisheries and Control – North-Eastern Bulgaria" located in Varna;
- Regional Centre "Fisheries and Control – Central Bulgaria" located in Plovdiv.

The Regional Centres of Varna and Bourgas are dealing with marine fisheries. The centre Varna is supervising two administrative regions: Varna and Dobrich, which can be considered as the 3rd regional centre with responsibilities covering the marine fisheries.

There are also 28 Local Officers Units throughout Bulgaria.

B. IO BAS – Institute of Oceanology. Bulgarian Academy of Sciences

The Institute of Oceanology (IO) "Fridtjof Nansen" is one of the Institutes of the Bulgarian Academy of Sciences (BAS).

The IO represents the BAS as a co-ordinator of all studies related with the Black Sea and World Ocean by the National Oceanographic Commission (NOC) and successfully directs the research activity and international relations within the frame of the Intergovernmental Oceanographic Commission of UNESCO.

IO main tasks:

- To carry out monitoring of the Bulgarian part of the Black Sea;
- To develop consulting and expert activities
- To prepare qualified marine scientist

Surveys at sea are implemented by IOS staff under financing from the EC (through the DCF regulation) and the Ministry of Agriculture.

Human resources

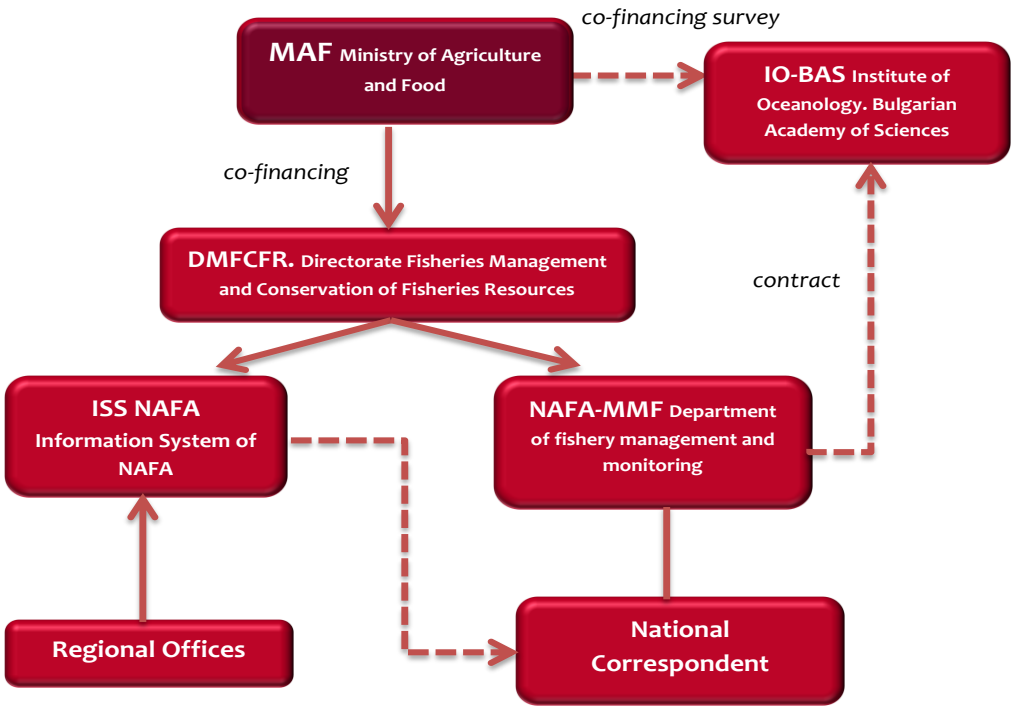
Two senior experts from IO are working for data collection.

Inter-Institutional coordination

The inter-institutional coordination between the partners involved in DCF in Bulgaria is established as presented as follows (see also figure 1).

1. Contract between the Ministry of Agriculture and Food (MAF) and the Directorate for Fisheries Management and Conservation of Fisheries Resources (DMFCFR) for responsibilities related to DCF data collection. MAF co-finances 50% of the DCF.
2. MAF cofinances IO for Surveys at Sea.
3. DMFCFR is in charge of management and monitoring of the DCF and supervises both the ISS and the Fisheries Management and Monitoring Department (MMF).
4. NAFA Regional centres fill data for logbooks, sales notes for ISS-NAFA. NAFA Regional centres and local units provide questionnaires (fulfilled by fishermen) to MMF for the production of economic data on catching sector, processing and aquaculture.
5. There is no formal relationship (coordination and collaboration in terms of operational relationships) between the National Statistics Institute (NIS) and NAFA due, among others, to the time lag between the data calls (March) and the collection of processing industry data by NIS (end of the year).

Figure 1. Inter-institutional coordination:



Source: Own production from NAFA sources

3.2. IT INFRASTRUCTURE AND FLOW OF INFORMATION

The standard definition for IT infrastructure consists of the equipment, systems, software, and services used in common across an organization, regardless of mission/program/project.

As indicated previously, the main actors involved in the DCF are:

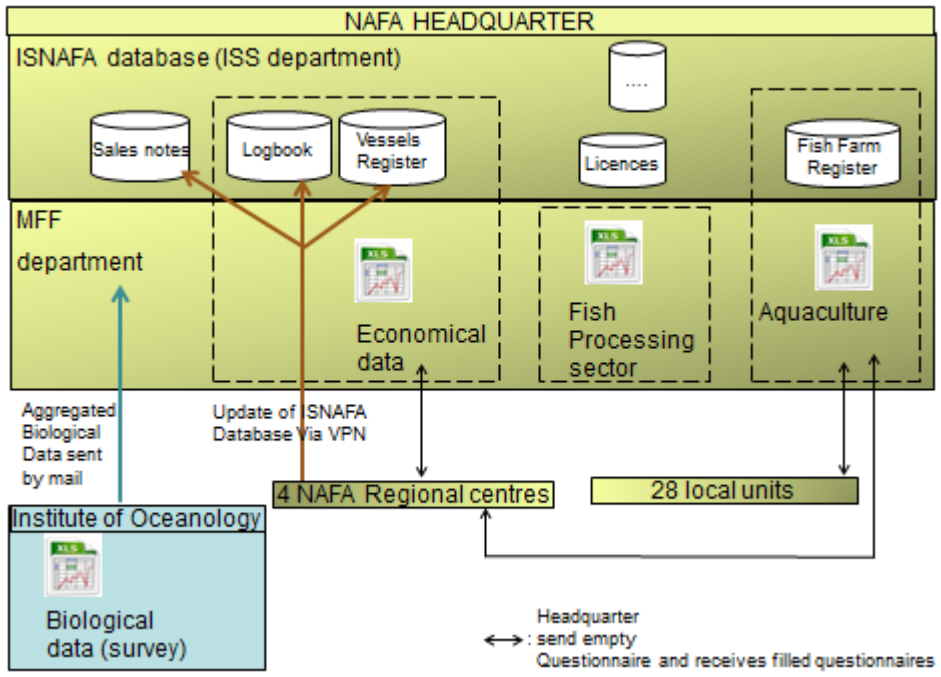
- **NAFA:** 1 Headquarter, 4 Regional Centres and 28 local units. The Regional Centres of Varna (covering the administrative regions of Varna and Dobrich) and Bourgas are dealing with marine fisheries.

  ISS department is in charge of the collection and maintenance of registers, among which some are used for the compilation of DCF transversal variables (fleet register, sales notes and logbook). Theses registers are stored in the ISNAFA system. The MMF department compiles economic data; aquaculture and fish processing data in excel files. A VMS system is hosted in Varna

- **IO-BAS** in Varna collects biological data from surveys at sea.

The flow of information between the involved institutions is summarised in the figure bellow.

Figure 2. Flow of information between NAFA and IO-BAS



Source: own production

NAFA

At NAFA's headquarter, 1 Linux server is used for the mail server, firewall, internet access and NAFA web site. In addition 8 Windows 2003 servers are used for accounting, backup, NAFA documentary system, ISNAFA database, fishing licences and fishing tickets, management of the connection with the regional centres and offices.

The regional centres and local units can connect to the headquarter databases using a virtual private network in order to update directly the fleet register, logbooks, sales notes.

Security: The ISNAFA users need a specific logging for using the ISNAFA application. This logging is configured to give them access or not to a list of modules (and related registers) and to identify what they are allowed to do on the data (reading, adding new records, updating). The access rights are given by register, not on a subset of data of the register meaning everybody having the access to a register can see the all registers. In the regional centre, the inspectors are entitled to capture logbook, sales notes, fleet register information but only one person per regional centre has also the right to apply corrections on already entered data.

Technical support/maintenance: There is no IT department at NAFA headquarters. Only one person is maintaining the infrastructure (servers, network, PC…), and is in charge of updating the NAFA web site. Hardware problems are outsourced to an external company.

As for the regional centres, a staff member from ISS department -on holiday during the mission - is apparently a more advanced user having more rights than the other users. If something is not working properly, he will be allowed to apply some deletion in the database to clean problems. This person does not have however an IT-specific profile.

At headquarters level, there is no internal support for the maintenance or the development of existing databases or IT applications. The current ISNAFA database was developed by the Technical University (TU) of Sofia. The database management systems used were open source SQL servers like Firebird and MySQL. NAFA is fully dependent on the technical university as the application was not taken over by NAFA due to lack of internal resources. The Technical University has still all administrator rights to intervene in case of problem and is the only one able to do it. For the moment, this organisation seems nevertheless to work, but any intervention from the TU is invoiced.

The upgrade of the database depends upon the existence of a contract with the University. The possibility to find internal IT skills inside NAFA could be evaluated in order to reduce the dependency with the TU, to be in a position to handover internally the application, to develop new functionalities and additional tests as well as to provide adhoc IT support to all NAFA staff when needed.

Documentation: the TU has provided a user manual on ISNAFA application but no technical manual. The project manager at TU could not be met during the mission; the request of information sent by mail remained unanswered.

Backup: backup of the databases are organised on a daily basis. No backup of the individual PC is organised but in each department, a PC is dedicated for the sharing of information among the department staff.

The Institute of Oceanology

The research vessel "AKADEMIK" with a LOA of 55m is used for research survey. It is owned by Bulgarian Academy of Sciences but is managed by Institute of Oceanology in Varna. The information collected during the different surveys is kept in separated excel files.

The institute of Oceanology is running an internal project in order to build a biological database combined with a GIS system being associated in a web portal aiming at disseminating oceanographic data. The biological data available in excel, will be imported in the biological database when it will be fully operational. A student is currently working on this project. At the moment, no biological data are displayed in the current version of the portal[1]. During the mission, there was a phone contact with Dr Panayotova who was on sea survey at sea and a few mails conversation. Consequently, it was not possible to see the database together.

3.3. USER REQUESTS MANAGEMENT

Dissemination: website

NAFA has a web site but it does not contain specific pages for the data collection programme.

Management of user requests

The National Coordinator is the focal point for the user requests related to DCF. Official data requests and answers are recorded in Documentary system (APIS) like any other mails received/issued from the NAFA.

The answer to data calls on biological data is provided to NAFA by Institute of Oceanology, which asks for the agreement of the National Correspondent before any release.

The main users are EU institutions. Requests for biological data by other scientific institutes are dealt with directly by the staff of IO and were not registered until now by the NC.

Transmission of data

- Data requested by JRC is either directly uploaded or submitted by email. All economic data must be prepared manually from the Excel files which contain individual data and aggregations.

User satisfaction

NAFA did not measure user satisfaction until now.

[1] *http://www.bgodc.io-bas.bg*

4. BIOLOGICAL DATA- MÉTIER-RELATED VARIABLES

The production of biological data is done by the IO-BAS in Varna. Biological data are exclusively obtained from the Scientific Surveys at sea. Aggregation by métiers is carried out by NAFA, requiring manual (not automated) work on the different files.

4.1. PROGRAMME MONITORING

Organisation for the production of métier-related data

ISS is in charge of the collection of information on vessel, logbook, sales notes and MMF in particular the NC is in charge of their compilation for the DCF. Regarding the organisation of data collection, there is no sampling at sea (except in research surveys), nor harbour sampling (due to budget restrictions). The only information usable for the allocation by métier is the logbooks and sales notes.

The allocation of trips to métiers is done "manually" by the NC. (The ISNAFA can manually allocate each trip to a métier, but the IS system cannot automatically allocate trips to métiers). The selection of métiers for sampling is based as said in the DCF on effort, landings and values.

For the selection of métiers that should be sampled, NAFA follows the recommendation of métier ranking by effort, landing and value. Effort and landings for each métier can be indeed taken from the logbook, but values are obtained manually from calculation through average prices for species obtained from sales notes. There is no automatically extraction linking logbook and sales notes.

In any case, the selection of métiers by ranking is not then used as no sampling at sea nor on shore is carried out.

Achievement of objectives with respect to sampling plans

As mentioned above, no samplings have been performed by métier (Table III_C_3) neither on board nor on shore. This is a major weak point of the implementation of the DCF in Bulgaria. Biological data are therefore only produced via research surveys.

Deviations in sampling achievements from the plans

According to the NP, NAFA planned to conduct market sampling for sprat, horse mackerel, and turbot. However, NAFA mentioned missing co-financing from national budget to implement this task.

Therefore, Table III_C_3 of the TR 2011 is only partly filled.

The team suggests that NAFA makes an effort in allocating the national co-financing budget to start collecting samples on board and on shore for the priority species.

4.2. DATA STORAGE AND ACCESS

There is no data on metiers yet, so no database also.

4.3. DATA PROCESSING

There is no data on metiers yet. Nevertheless, regarding the selection of metiers: the person in charge of preparing the file for assigning the métier was not present during the mission.

According to the person interviewed:

- The ISNAFA user interface does not allow extracting directly information combining logbooks and sales note information to have in a single file the gear, the species, the effort, landing and values. The ISS department is using the advanced query functionalities on the logbook to obtain the gear, the species, the effort, and landing volume. The landing value is based on an average prices deduced from the sales notes.
- The IS system cannot allocate automatically trips to métiers.

It would be useful to develop a view allowing combining the logbook and sales note information for data checking purpose as well as for specific uses like the definition of métier for example. The mission does not know the structure of the database, but we can expect that this would be possible as the necessary information seems to be available and well organised.

4.4. STATISTICAL QUALITY

Coverage: identification of métiers, fleet segmentation

Metiers were selected but were not used for sampling strategy. In order to reach the 90% threshold for all three criteria (volume and value of landings and effort) on the basis of Table III_C_1, three métiers should have been selected for sampling and not only 2 stated in table III_C_3: also FPO_MPD_12-16_0_0 should have been included.

Sample design: selection of métiers by ranking, merging métiers, sample sizes per métier

No information was given if métiers were merged or disaggregated for sampling purposes (Table III_C_2 empty). It is unclear, how the Table III_C_5 has been created, when no landing or discard samples have been taken. In any case, it has no additional implications on the achievement of the sampling programme, as no samples were taken.

Precision: calculation methods and achievements in precision

No specific evaluation about the precision can be made since, even though métiers have been chosen, no biological data (only transversal variables) have been collected by métier.

5. BIOLOGICAL DATA- STOCK

The biological data are collected during research surveys performed and analyzed by the Institute of Oceanography of the Bulgarian Academy of Sciences in Varna. The person in charge is Dr Marina Panayotova from IO BAS.

5.1. PROGRAMME MONITORING

Organisation for the production of stock- related data

No métier-related landing or by-catch analyses have been performed; therefore only research survey data are used to produce biological stock data. Stock-specific biological information is available for the demersal species turbot and for the pelagic species sprat. Two BTS targeting turbot per year are planned according NP and have been conducted in 2011. One pelagic trawling and hydro acoustic survey (following MEDIAS standards) has been completed in 2011.

The mission had limited access to raw data compiled in separate excel sheets with biological parameters collected during two of the three cruises.

According to the NP, Bulgaria decided to collect data for sprat and turbot on an annual basis due to the importance of these species for the Bulgarian commercial fisheries. But Bulgaria is obliged to sample this species group triennially (EC 199/2008 Appendix VII).

While reproducing stock-specific development of landing data over time as presented e.g. in the NP and the TR 2011, the mission detected a 10 times higher-than-average value of landings of Rapa whelk in 2008. After checking the DB of landings for Rapa whelk, the mission concluded that this extreme high value was wrong. It was suggested checking the database and correcting this. Cumulative landing data for horse mackerel in 2011 was also retraced and the value agreed reasonably well with the number mentioned in TR 2011.

Achievement of objectives

Qualitatively, all turbot stock specific data are collected on the research survey as mentioned in NP. Quantitatively, the actual numbers of sampled individuals does not match the planned numbers of fish, which of course can happen due to the nature of fishing. Numbers of hauls could be performed as planned, even if the numbers in the BTS cruise specific reports (40 & 37) do not match the numbers (36 & 36) presented in Table III_G_1. The mission suggests filling the table with the actual number of hauls performed on each survey.

Table 1. Reproduction of selected columns from Table III_E_3 includes the actually measured numbers of fish for specific biological variables as indicated in the respective 2011 cruise reports (BTS and Hydro acoustic). See legend below the table for origin of data.

C	D	J	K	M		Q	S
Sampling year	Species	Variable	Data sources	Planned minimum No of individuals to be measured at a national level	Reported No In Table III_E_3 Column "Q" Achieved No. national level	Achieved No of individuals at a national level	% achievement at national (100*Q/M)
2011	*Psetta maxima*	Age	surveys	100	200	[1)]38	38%
2011	*Sprattus sprattus*	Age	surveys	300	300	[2)]>200	>200/300
2011	*Trachurus mediterraneus*	Age	surveys	500	500	[3)]657	131%
2011	*Engraulis encrasicolus*	Age	surveys	500	500	0	0%
2011	*Sarda sarda*	Age	surveys	100	0	0	0%
2011	*Squalus acanthias*	Age	surveys	100	0	0	0%
2011	*Merlangius merlangus*	Age	surveys	NA		[3)]748	NA
2011	*Psetta maxima*	Weight	surveys	500	500	[4)]71	14%
2011	*Sprattus sprattus*	Weight	surveys	2500	2500	[3)]9316	373%
2011	*Trachurus mediterraneus*	Weight	surveys	1500	1500	[3)]657	44%
2011	*Engraulis encrasicolus*	Weight	surveys	1500	1500	0	0%
2011	*Sarda sarda*	Weight	surveys	500	0	0	0%
2011	*Squalus acanthias*	Weight	surveys	500	50	[5)]50	10%
2011	*Merlangius merlangus*	Weight	surveys	NA		[3)]748	NA
2011	*Psetta maxima*	Sex ratio	surveys	400	400	[4)]71	18%
2011	*Sprattus sprattus*	Sex ratio	surveys	2500	2500	0	0%
2011	*Trachurus mediterraneus*	Sex ratio	surveys	1500	1500	0	0%
2011	*Engraulis encrasicolus*	Sex ratio	surveys	1500	1500	0	0%
2011	*Sarda sarda*	Sex ratio	surveys	400	0	0	0%
2011	*Squalus acanthias*	Sex ratio	surveys	400	50	[5)]50	13%
2011	*Psetta maxima*	Maturity	surveys	100	100	[1)]38	38%
2011	*Sprattus sprattus*	Maturity	surveys	2500	2500	0	0%
2011	*Trachurus mediterraneus*	Maturity	surveys	1200	1200	0	0%
2011	*Engraulis encrasicolus*	Maturity	surveys	1200	1200	0	0%
2011	*Sarda sarda*	Maturity	surveys	100	0	0	0%
2011	*Squalus acanthias*	Maturity	surveys	100	50	[5)]50	50%

SOURCE: Own compilation based on 2011 cruise reports

Green – Additional information from cruise reports; Yellow – Specific numbers taken from cruise reports; Orange – origin of these numbers is unclear, as no information on any analyzes of Squalus has been found in any cruise reports; Red – no information

available (variables not measured).[1] BTS cruise reports 6 & 11 2011 – Sum of individuals (26 + 12) from which otoliths are available (presumably fish >45cm, which were dissected). [2] Hydroacoustic Survey report 2011 – Estimated minimum number of aged fish based on 19 haul-separated age structures assuming minimum 10 individuals per haul. [3] Hydroacoustic Survey report 2011. [4] BTS cruise reports 6 & 11 2011 – total turbot catch (39 + 32) [5].No information given in any report.

For sprat, not all biological variables mentioned in the NP could be collected. This was explained by Dr Panayatova due to methodological issues onboard the vessel. Sprat individuals are frozen after catch and all species-specific and single-fish related variables will be gained later on land. Under laboratory conditions fish are size-measured, weighted and the otoliths are removed. However, it is not reported how many otoliths have been taken and read.

The mission noted in the cruise report of the hydro acoustic survey that in 2011 additional information for whiting (*Merlangius merlangus*) and horse mackerel have been collected. Information about this sampling has not been given elsewhere, either in the TR 2011 or within the respective tables.

Compliance with methods and procedures and derogations

Comparing the Commission Decisions requirements to the maintained effort (EC 199/2008), some of the biological stock-related requirements are exceeding the request. For example, the sampling frequency for all species listed in Appendix VII for the Black Sea is every three years. According to the NP, an annual sampling will be performed specifically for sprat and for turbot. Based on the NP, annual determinations of sprat sex-ratio and maturation will be collected as important stock parameters. However, only length, weight and age (otoliths-based) are provided.

Measuring sex ratio and maturation state is according to Dr Marina Panayatova not possible on thawed individual fish (sprat). But freezing (directly onboard) is necessary since no sea disturbance dis-calculating balance is available onboard of the research vessels to accurately determine individual weight (Length-weight relationship). This shortcoming hampers the determination of other important stock characteristics (sex ratio) and the determination of the current reproductive state (maturation).

5.2. DATA STORAGE AND ACCESS

A web portal for biological data is under construction. For the moment all biological data (coming only from surveys at sea as explained above) are stored in Excel files organised by surveys.

5.3. DATA PROCESSING

The data are extracted manually from the different biological Excel data files.

5.4. STATISTICAL QUALITY

The statistical analysis in survey reports shows several important flaws with respect to turbot samples. Due to its small sample size (less than 40 individuals), physical measurements broken down by fish size (up to 20 size intervals) imply 1-2 individuals per interval. Thus, any graphical representation based on such a small subsample can be misleading. Disaggregating any sample of small size (for instance, by region or haul) has the same representativeness problems.

From BT cruise reports we found out that no calculation of von Bertelanfly Growth Function (VBGF) parameters and natural mortality coefficient M for turbot due to low sample size have been performed (which is reasonable given the sample size) separately for each survey. But the natural mortality coefficient M was estimated on the number (n=71 individual turbot) of the combined 2011 data sets.

6. RECREATIONAL FISHERIES

The NAFA is the responsible administrative institution for the recreational fisheries.

6.1. PROGRAMME MONITORING

Organisation for the production of recreational fisheries variables

For recreational fisheries in Bulgarian inland waters and rivers personal licenses are mandatory. This license can be either valid for 1 week, 1 month, 6 months or for one year and it is provided by NAFA or by one of the 28 local units and organizations registered for recreational fisheries. The recreational fisheries mainly target carp, trout and catfish.

No special licenses are needed for recreational fishery in the Black Sea. Main target species for the recreational fisheries within the Black Sea are gobies and horse mackerel.

According to NAFA no catches of eel are made either in inland or in Black Sea waters, therefore no special considerations for eel monitoring, conservation management plans or pilot studies targeting eel are made (European Eel Management Plan). According to NAFA the catch of sturgeon especially in Danube river system is prohibited. In summary, no DCF relevant species are considered or fished in Bulgarian legislative waters by recreational fisheries.

Achievement of objectives

NAFA did not provide the team with any table, or data (Table III.D.4)

Compliance with methods and procedures

NAFA did not mention any plan, survey or pilot study project with relevance to salmon, eel or other relevant species as these are not relevant in Bulgarian conditions.

6.2. DATA STORAGE AND ACCESS

NAFA registers the permissions and the corresponding catch in a database. The database was not shown during the mission as the data on registered recreational fisheries species are not relevant in the perspective of the DCF data collection.

6.3. DATA PROCESSING

The procedure about the recreational fisheries data collection was not further investigated as no recreational fisheries data have to be reported in the framework of the DCF in the context of Bulgaria.

6.4. STATISTICAL QUALITY

Completeness of variables with respect to DCF requirements

No DCF relevant species are fished in recreational fisheries

Precision: calculation methods and achievements in precision

No DCF relevant species are fished in recreational fisheries

7. TRANSVERSAL VARIABLES

7.1. PROGRAMME MONITORING

General

All transversal variables (fleet register, sales notes and logbooks) are collected in the same way. Not only that all fishing vessels must be on the fleet register, they must also all submit logbooks and sales notes, independently of their size.

Primary documentation in these three areas is collected in the regional centres and local units. The three regional centres are responsible for data entry to NAFA centralised database in Sofia.

Transversal variables on capacity

Organization of the production

Fishing capacity is monitored through the vessel register. Every fishing vessel is obliged to have a license. Licenses are valid indefinitely. However, to carry out commercial fishing, the vessel must also request a fishing permit, which is valid only for one year. Consequently, there are about 2,300 vessels on the fleet register, but only about 1,000 had a permit to fish in the recent years.

The requests for licenses and permits can be done either at one of the regional centres or in Sofia. Both documents are issued by the department of NAFA, which is in charge of monitoring and enforcement.

The EU fleet register is updated from the national database at least once in 3 months, as required by the regulation.

Achievement of objectives

All relevant data is in the database, as demonstrated by random checks on several individual vessels.

Compliance with methods and procedures

Methods and procedures are described in a format presented in Annex 2 (schema-ISS).

Transversal variables on effort

Organization of the production

Data on effort is compiled with the logbooks. All Bulgarian vessels are obliged to submit logbooks, even the vessels below 6m. Consequently, full data on effort is available.

Achievement of objectives

Random queries from the database demonstrated that the data is indeed available.

Compliance with methods and procedures

Methods and procedures are described in a format presented in Annex 2 (schema-ISS).

Transversal variables on landings

Organization of the production

Information on landings is compiled through the logbooks and sale notes. As already stated above, all vessels are subject to the sale notes and logbook obligations. Consequently, full information on landings is available

It should be noted that logbooks and sales notes cannot be linked automatically in the information system. This is clearly an area for improvement.

Achievement of objectives

Random queries from the logbook and sale notes database demonstrated that the data is indeed available.

Compliance with methods and procedures

Methods and procedures are described in a format presented in Annex 2 (schema-ISS).

Several minor inconsistencies were identified regarding the declaration of total landings according to different sources, as shown in the following two tables:

Table 2. Comparison of total landings according to different sources, 2008-10 (tons).

	DCF	NP	FAO
2008	9,218	7,430	7,666
2009	8,740	7,083	7,388
2010	10,410		9,683

Sources: DCF 2009 economic data, National Programme 2011-13, FAO FishStatJ 2012

Table 3. Comparison of total landings by species according to different sources, 2009 (tons).

	DCF	NP	FAO
European anchovy	61	42	42
Picked dogfish	24	10	9
Med. horse mackerel	314	177	177
Rapa whelk	2,913	2,214	2,214*
European sprat	5,217	4,551	4,551
Turbot		52	52
Other	211	37	343
Total	8,740	7,083	7,388

*Sources: DCF 2009 economic data, National Programme 2011-13, FAO FishStatJ 2012; *classified as 'sea snails'*

The main differences are:

- Total DCF landings are higher than the two other sources, mainly due to sprat and whelk.
- In 2009 DCF did not report any landings of turbot, which is commercially an important species.

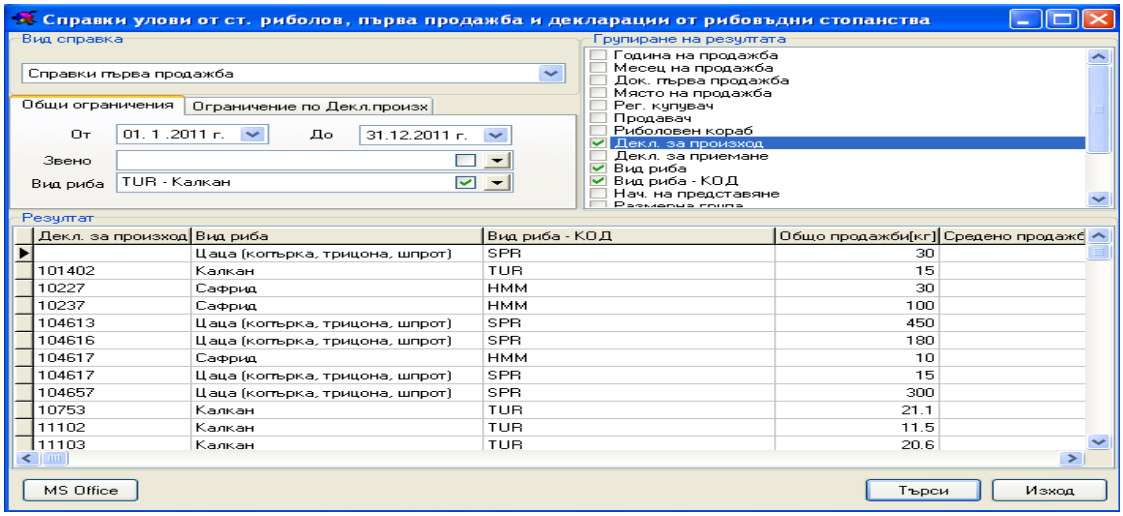
Furthermore, as mentioned previously, the NP 2011-13 (p.8) states that catches of rapa whelk amounted to 28,171 t. As this is highly disproportionate in comparison to all other year, it was agreed that this is a typing error and the correct value should be 2,817 t.

7.2. DATA STORAGE AND ACCESS

As mentioned before, only the technical university of Sofia is having administrator access to the databases and no technical documentation was available at NAFA.

During the mission, it was only possible to see the user interface for the extraction of sales notes and logbook information but not the structure of the database running behind the ISNAFA application. It seems that the user interface is applying predefined views: the user has many possibilities to define its search criteria for generating specific reports using advanced query panels.

Figure 3. User interface



Source: ISNAFA – sales note query interface

7.3. DATA PROCESSING

The user interface of the ISNAFA database is used to extract the transversal data from the ISNAFA database.

7.4. STATISTICAL QUALITY

The databases contain census of all transversal variables. The quality depends on the correctness of submitted information. As noted above, the database does not allow linking of logbook and sales notes data, so that consistency checks must be done manually.

8. RESEARCH SURVEYS AT SEA

The research cruise planning, conducting and analyses of the data sets is done by IO in Varna. The responsible person is Dr Panayatova. During the mission, she was on board on a research cruise in the Black Sea and therefore could not attend the meeting in Sofia in person, but the National Coordinator arranged a short telephone interview with members of the team.

8.1. PROGRAMME MONITORING

Organisation for the production of research surveys data.

Most of the information has been extracted from the three 2011 cruise reports (Annex 3, Annex 4 and Annex 5) and from a short telephone interview with Dr Panayatova. The team has seen three Excel files showing raw data derived by two of the 2011 research surveys.

Two bottom trawl research cruises targeting turbot are made, one during spring season (March-April) and one in late autumn (Nov-Dec). Since 2010, all bottom trawl surveys in Bulgarian and Romanian waters are carried out with the same research vessel and gear (RV "Steaua de Mare I"; owned by National Institute for Marine Research and Development (NIMRD) "Grigore Antipa", Constanta, Romania). For these cruises, 4-6 people are involved for DCF tasks on board, and at least 2 people are engaged in laboratory work in the IO in Varna following the cruises. Some data on biological variables and catch composition are created on board. However, other parameters are measured later in the laboratory. The national minimum landing size for turbot was also followed during these surveys. Turbots smaller 45cm were released to the sea after measuring length and weight. Data are filled in excel files and separate cruise reports for each survey are compiled taking results of previous surveys as comparative data into consideration. Data for the DCF tables are filled by Dr Panayatova and are forwarded to the NC upon data call from JRC.

One hydro acoustic, pelagic trawling research survey in late autumn (Nov-Dec 2011) with RV "Akademik" (operated by IO BAS Varna, Bulgaria) targeting sprat and whiting was performed. The reported survey is conducted to supply the National Data Collection Program of Bulgaria, STECF EWG Assessment of Black Sea stocks and National Agencies for Fisheries and Aquaculture of Bulgaria with the following information:

- Collect acoustic data on pelagic fish aggregations along the Bulgarian and Romanian coasts.
- Determine age and length stratified estimate of relative abundance and biomass of target species in surveyed area.
- Collect biological samples from direct trawling on fish echo traces to determine the length and age structure of target species.
- Collect oceanography data from vertical profiles from CTD system and zooplankton data.

During this cruise, 10-12 people are involved. This number includes graduating or non-graduating students and researchers. Sprats are frozen onboard and are thawed later for further analyses in the laboratory in the IO in Varna. Data are filled in Excel files and a cruise report is compiled including chapters on participants, methods, results, conclusions and recommendations. Data for the DCF tables are filled by Dr Panayatova.

Achievement of objectives: results and deviations from National Programmes

The BTS survey meets in general the objectives raised in the NP. The hydro acoustic survey also achieves most of these objectives. For exceptions refer to chapter 5.1 Biological data-Stock related.

Most deviations relate to methodological issues.

Comment on methodological issues:

Gear comparability: Biological information derived by BTS are of considerable high value, as this type of gear in combination with small mesh sizes usually covers a large part of the size classes of the target species turbot. Also, comparisons over time using the CPUE approach are possible, if gears and fished area remain unchanged to retain equal catch ability. However, using a gear type (bottom trawl) in the biological survey which is banned in the commercial fisheries (which uses mostly gill nets, pelagic trawls or long lines) in Bulgarian waters needs careful interpretation. Especially, as the research surveys constitute the only method to assess biological stock parameters of turbot.

Fish conservation: According to Dr Panayatova determination of sex ratio and maturation state is not possible on thawed individual fish (sprat). But freezing (directly onboard) is necessary since no sea disturbance dis-calculating balance is available onboard of the RV to accurately determine individual weight (Length-weight relationship). This shortcoming hampers the determination of other important stock characteristics (sex ratio) and the determination of the current reproductive state (maturation). The team would like to suggest to take random subsamples of sprat per haul and use formaldehyde (Borax buffered 4%) instead of freezing for fixation. This method has been successfully applied for fecundity analyses of Baltic Sea sprat (Haslob, 2011*) and might help to conserve necessary information needed to meet DCF regulations in terms of biological variables (maturity).

**http://oceanrep.geomar.de/12150/1/diss_haslob.pdf*

Compliance with methods and procedures

The hydro acoustic survey complies with the MEDIAS survey design. The data of the 2011 cruise have not yet been uploaded in MEDIAS database (Table III_G_1) as proposed in NP.

8.2. DATA STORAGE AND ACCESS

The surveys data are kept in Excel (one work sheet per survey) by each researcher. There is no centralised biological database yet but one is under construction.

8.3. DATA PROCESSING

The researchers send aggregated data to NAFA on request.

8.4. DATA QUALITY

As mentioned previously, biological data are only obtained through research surveys. The team did not have access to files with individual measurement records, which are not available at NAFA. However, based on the survey reports, the team can assess that mainly for turbot; the statistical quality suffers from the small sample size. Methods of estimation of relationship between length, age and weight may be subject to large sampling errors. Graphical representations of the resulting data which have been included in the reports can be seriously misleading since they are based in very small numbers of observed individuals. Furthermore, no calculation of precision is published.

9. ECONOMIC DATA - CATCHING SECTOR

9.1. PROGRAMME MONITORING

Organisation for the production of economic data of the catching sector

Data on the economic performance of the fishing fleet is collected with an anonymous annual questionnaire which is distributed by the staff of local NAFA offices to all active fishermen, i.e. fishermen having a permit for the previous year. List of the active fishermen is generated from the fleet register. The filled-in forms are received back approximately 20-30 days later. The data from the paper questionnaires is entered into Excel workbooks, using one sheet for every size category. After the first data entry, all entries are controlled to eliminate typing errors.

The response rate amounts to 42% of the census, which should, in principle, offer a good indication of the population. However, a check on the composition of the response to the population is not done.

Estimation of the population totals are done on the same sheets containing the individual data. Extrapolation is based on sample average and the number of vessels in each specific segment.

Along with the questionnaire, the fishermen are also given instructions for filling in the forms (see Annex 6)

The followed approach has a number of drawbacks, although their effect on the final results could not be evaluated within the limited time of the mission:

- All information provided in the questionnaires is taken at its face value. Consistency or other checks are not performed.
- Some figures are still open to different interpretations by the respondents (e.g. employment, see comments below).
- When certain fields are not filled in, it is not possible to determine whether the value is zero or should be considered as non-response.
- The anonymity of the questionnaires does not allow contacting the fishermen again when additional information is required.

- Most Bulgarian vessels are small scale, without a formal bookkeeping. Therefore the questionnaires have to rely on the memory of the respondents. This is a common problem in all small scale fisheries.

The NC recognizes these problems. He indicated that the Bulgarian Fisheries and Aquaculture Act is being reviewed and it intends to oblige ALL fishermen to be registered as companies. This would oblige them to maintain formal bookkeeping which will be a sound source of the data for DCF. In the opinion of the mission members, if such obligation is imposed only for the purpose of DCF, without other pressing arguments, this obligation will be an unnecessary administrative and financial burden for a large number of Bulgarian fishermen, whose average earnings are already very low.

Staffing

The questionnaires are distributed and recovered by the fisheries inspectors working in the local units. The processing of the data is done by 2-3 staff members of NAFA in Sofia.

Achievement of objectives

The tables III-B-1 and III-B-2 of the TR 2012 (May 2012, related to 2011 data) have not been correctly filled in. Table III-B-1 is related only to 126 vessels, omitting most of the small scale fleet. It does not provide the required overview of the segmentation of the total active fleet. Table III-B-2 covers the PMP segments above 6m, but it does not provide any information regarding the intended clustering. Although the segments over 12m in these two tables are related to the same vessels, there are differences in numbers and gear definitions (see table 4).

The Excel files containing the individual data for 2009-2011 were reviewed in detail. The year 2011 illustrates the discrepancies between the TR and the actually collected data (see table 4). There is good consistency for the fishing fleet over 12 m, but fleet below 12m is presented and treated in each 'source' differently.

Extrapolation of the survey to the total population is based on the number of questionnaires processed. However, by way of example, table 4 also presents the number of vessels declaring income. For the fleet <12m, this is only about 60% of the active population. From the anonymous questionnaires it cannot be determined whether the fishermen did not want to declare their income (e.g. for fiscal reasons) or whether they did not have any.

Table 4. Planned survey, compared to the data in the database, 2011.

	III-B-1				III-B-2		Database			
Size	Gear	Population	Sample Planned	Sample Achieved	Gear	Population	Population (a)	Number questionnaires (b)	Number vessels declaring income	b/a
0-6							341	180	103	0.53
6-12					PMP	498	585	201	124	0.34
0-12	PG/DFN	42	42	42						
12-18	TM	60	30	24	PMP	60	60	26	26	0.43
18-24	TM	12	6	6	PMP	12	12	7	7	0.58
24-40	TM	12	6	6	PMP	12	12	6	5	0.50
Total		126	84	78		582	1010	420	265	0.42

Sources: TR 2012, NAFA database

It follows also from table 4 that the achieved sample rates declared in the TR are different from the actually achieved sample rates. Overall response rate reached 42%, although only 26% declared any income from fishing.

Compliance with methods and procedures

Review of data submitted for 2009 shows several discrepancies (see Annex 7) for further details):

For size groups 0-6 and 6-12m, revenues and costs have been submitted under different gears and consequently profit and GVA could not be correctly calculated.

Technical parameters like number of vessels and effort (fishing days) are classified differently than the economic parameters.

The average crew costs / national FTE amounts only to 824 euro/year. This is about half of the minimum wage in Bulgaria (270 lv is about 140 euro in 2012). Furthermore, average number of sea days per vessel amounts only to 11 for the 0-6 and 6-12m segments. This is inconsistent with the notion of FTE. It seems likely that the number of FTE is highly overestimated, unless an error has been made in other parameters (costs and/or revenues) (see also Annex 7).

Capital costs are calculated as 10% of the market value of the vessel, as indicated by the fishermen, but only for vessels younger than 10 years. It is assumed that vessels over 10 year have been fully depreciated. In view of the nature of the Bulgarian fisheries this approach may be correct, but it is not consistent with the recommendations on common approach to the calculation of capital costs.

Valuation of 'unpaid labour costs' relies on the submissions in the questionnaires. Consequently, there is no unique valuation per hour or day.

For the segments 0-6 and 6-12m, the gears declared in the submission to JRC are not fully consistent with the NP and TR. It is evident that the responsible staff finds it difficult to determine the main gear and allocate vessels accordingly.

Derogations

No derogations have been requested.

9.2. DATA STORAGE AND ACCESS

Economic data are stored in a yearly Excel files. Questionnaires data are registered in one of the 5 following categories corresponding to 5 worksheets in the excel file: vessel 0-6m, vessel 6-12 m, vessel 12-18m, vessel 18-24m and vessel above 24m.

The following information is extracted from the questionnaire (see questionnaire in Annex 6) and stored in the corresponding category worksheets:

Figure 4. Excel file for economic data

	General information about the vessel												Variable costs				Fixed costs	Capital expenditure					Investment		Employment		Seasonal employment		Unpaid labour
Questionnaire No	territorial unit/R,C,B	Length	BT	Engine (D,H)	Fuel	Work carried out by individuals / companies	Main Gear	Days at sea	Income	other income: income from seasonal trasnportation fo people for	subsidies / direct payments from the state	Crew cost	energy: fuel and oil	Repair and maintenance	Other variable cost		Interests	Depreciation	Age of the vessel	Price of a new vessel as yours	Opportunity costs	Own capital	Foreign capital	Full time	Part time	Full time	Part time	
1																													
....																													
n																													
Totals for the n questionnaires																													
Average for the n questionnaire																													
Estimation of non response: average * (X-n)																													

Total number of active vessel	X
Questionnaire received	n
Non response	X-n

Source: NAFA

Aggregation of the category of vessels worksheets including estimation of non-response are done in a synthesis worksheet which is used for the compilation of data for the calls.

Figure 5. Economic and social indicators

Economic and social indicators for 2010 in euro

Indicator	to 6 m	6-12 m	12-18 m	18-24 m	24-40 m
INVESTMENT	417,062	0	628,218	111,257	380,898
INCOME	378,116	51,385	1,316,145	670,201	1,172,861
CREWCOST	79,667	20,452	411,516	225,326	417,728
REPCOST	53,395	1,534	161,409	142,921	104,861
VARCOST	116,363	15,850	427,961	222,696	313,561
FIXEDCOST	33,647	101	126,500	45,943	245,245
CAPCOST	49,101	0	117,013	34,972	66,233
FTE	584	3	135	81	69
PROFIT	45,944	13,448	71,746	-1,657	25,233
ROI	11%	#DIV/0!	11%	-1%	7%
FIXED COSTS	33,647	101	126,500	45,943	245,245
VARIABLE COSTS	249,425	37,836	1,000,886	590,943	836,150
BER	193,353	751	1,032,898	759,820	1,670,785
CR/BER	4	134	2	2	1
GVA	125,610	33,900	483,263	223,669	442,961
Crew wages per FTE	136	6,817	3,055	2,790	6,022

The table below presents a general overview of the state of the fisheries in the Black Sea.
The colours of the cells correspond to the reiommendations given into the ES"s Guideline.

	Technical indicator	Biological indicator	Economic indicators		Sosial indicator
			ROI	CR/BER	
to 6					
6-12					
12-18					
18-24					
24-40					

Source: NAFA

9.3. DATA PROCESSING

Data collection

The data collection steps are as follows

- The current data collection is based on a census of all active vessels, meaning vessel with a permit and a licence for the current year and having at least 1 day at sea.
- NAFA headquarter prepares the paper questionnaires (sample in Annex 3) and send them to the 3 regional centres with the list of active vessels to be included in the census (fishermen having a permit for the previous year).
- The staffs of the regional centres deliver the questionnaires in person to the fishermen. The addressees return back the filled questionnaire within 20-30 days to the regional centres.
- The response rate is about 42%. But as the questionnaires are completely anonymous, it is not possible to send a reminder to the non-respondent fishermen
- The regional centres return the paper questionnaires to the NAFA headquarter where the MMF department captures the information in the excel file described in previous chapter. The data capture job is splitted among the team and the national coordinator finalises the yearly excel files

Data Validation

- No check is performed on the data received. Only tipping errors checks are performed: they consist in manual comparison between the paper declarations and the data saved in excel is done.

Data weighting/aggregation

- As explained in 9.2, formulas are applied to estimate non response and prepare the set of economic data. Extrapolation is based on sample average and the number of vessels in each specific segment. Nevertheless the estimation formula will be revised as it does not include the calculation of an estimate for the missing values of the respondents..

Data publication

- When there is a data call, the information are extracted manually from the Excel worksheet and paste into the answer.

9.4. STATISTICAL QUALITY

Coverage

The coverage of the survey intends to be exhaustive but the non-response is ranged between 34 and 58% for different segments. In principle, as non-response rates are roughly similar, no significant bias is observed in the data.

Sample design, calculation methods and achieved precision.

There is no sample extraction for economic data as it is an exhaustive survey. In order to reduce the burden of response and obtain better quality estimates 2 sample selection strategies are suggested:

1. Selection of vessels with LOA above certain threshold (for instance 6m);
2. Random selection of vessels with probability of selection proportional to an economic variable (for instance effort taken from the log books). Vessels with higher effort would have higher probability of selection and therefore with smaller sample size similar precision will be achieved.

Precision is not measured by NAFA. However it is easy to calculate coefficients of variance for each variable based on the Excel sheets, in a way similar to our calculation in section 10.4.

Coherence of different surveys and administrative registers

Questionnaires are anonymously filled and no indication of the respondent is given. This prevents matching the individual questionnaires with any other administrative register such as balance sheet or logbooks. Thus, coherence at individual level cannot be checked.

Accessibility of data: possibilities to extract for user requests

Data is stored in Excel files which allow processing specific requests.

10. ECONOMIC DATA – AQUACULTURE

10.1. PROGRAMME MONITORING

Organization of data collection

The institution responsible for producing data on the aquaculture sector is the National Agency of Fisheries and Aquaculture (NAFA).

Data on aquaculture is collected as follows:

1. A list of aquaculture firms is put together on the basis of permits, which must be obtained by every fish farmer. The permits are issued by NAFA.
2. All aquaculture firms are visited by the local staff of NAFA and given a questionnaire along with instructions and an explanatory letter (see Annex 8). The questionnaires follow closely the requirements of the DCF and the original version has been included in the NP. Questionnaires have been adapted recently in order to obtain more detailed information on the type of output produced. In its turn this should allow a better classification.
3. The questionnaires are collected again about 20-30 days later by the local NAFA staff. The questionnaires are anonymous so that it is not possible to identify the farm(er). Consequently, it is also not possible to call back and ask for clarifications.

4. The questionnaires are sent to the NAFA office in Sofia, where all data is entered in Excel workbooks. Every book contains one year. All data is put into one sheet. Correctness of all entries is checked by second reading. No other checks are carried out.

5. Total value and volume of aquaculture production is based on a census carried out under statistical obligations to Eurostat, FAO and OECD. Total costs are extrapolated. Economic performance is calculated for the whole aquaculture sector, without distinguishing various segments, specified in the NP and the TR.

Achievement of objectives

Table IV_A_2 specifies nine different aquaculture activities. However, there are several inaccuracies regarding the total population and size of the response to the survey (table 5).

The TR 2012 specifies that the total population consists of 567 farms. However, this is only 334. The figure 567 double counts farms with different activities. There are possibly also some farms which are inactive. This means that the number of farms per activity is approximately correct, but the total is too high due to the double counting.

According to the TR 2012 the achieved sample rate is 100%, which is based on the number of distributed questionnaires. However, the non-response amounted in 2010-11 to 74%, so that in practice the achieved sample rate amounted to 26%.

As the questionnaires are anonymous and do not allow allocation of the farm to a principal activity, it is not possible to determine the response rates for the nine distinguished individual aquaculture activities.

Table 5. Consistency between the TRs and the database

	2010 (2010 data)	2011 (2011 data)
Source	**TR 2011 (21/11/2011)**	**TR 2012 (31/5/2012)**
Total population	318	567
Frame population	318	567
Planned sample	318	567
Achieved sample	318	567
Achieved response rate	Not specified	28%
Source	**NAFA data**	**NAFA data**
Number of active farms	347	334
Number of records in database	88	86
Corrected achieved sample rate	26%	26%

Sources: TR 2011 and 2012, NAFA Excel sheets on aquaculture

Compliance with methods and procedures

The anonymity of the questionnaires does not allow to ask additional questions to the respondents when certain values have not been filled in. This problem is illustrated in table 6. It cannot be ascertained whether some costs have been included in other items or simply not filled in.

Table 6. Number of responses by cost component in 88 questionnaires regarding 2010

Cost item	Number of responses
Wages	56
Value of unpaid labour	28
Energy	57
Fry	40
Meal-feed	67
Maintenance, repair	51
Other operating costs	17
Depreciation of capital	26
Interest expense	12
Unforeseen expenses	37

Source: NAFA

Staffing

The forms are distributed and collected by the local staff of the NAFA. 1-2 persons in Sofia offices are responsible for data entry, checks and further data processing.

10.2. DATA STORAGE AND ACCESS

Information found in the aquaculture questionnaires (see Annex 8) is stored in a single Excel files with one worksheet per year.

Production value and value on the following species is kept: grass carp, carp, trout, black mussels, silver carp, Wels catfish and a final category with others.

Figure 6. Economic statistics of aquaculture sector

ECONOMIC STATISTICS OF AQUACULTURE SECTOR IN 20XX

№	Unit	General information - employees		Total produced tons of fish, tonnes	Total revenue for species, levs	Operating expenses, levs									Capital, levs					Volume of sales by species in tonnes
		Men	Women	Categories of species: grass carp, carp,trout, black mussels , silver carp, wels catfish and others.	Categories of species: grass carp, carp,trout, black mussels , silver carp, wels catfish and others.	wages	value of unpaid labor	energy	fry	Meal-feed	Maintenance, repair	Other operating costs	Depreciation of capital	Interest expense	unforeseen expenses	Total assets	invest-ments	debts	Volume of raw fish, tonnes	Volume of raw materials to feed, tonnes	Categories of species: grass carp, carp,trout, black mussels , silver carp, wels catfish and others.
1																				
...																				
n																				

Source: NAFA

For aquaculture, extrapolation is done to complete the information collected.

10.3. DATA PROCESSING

Data collection

The data collection steps are as follows

- The NAFA can recover the list of active aquaculture farms from the fish farm register managed by ISS department.
- The current data collection is based on a census of all active farms.
- NAFA headquarter prepare the paper questionnaires (sample in Annex 8) and send them to all NAFA units within the country.
- The staffs of the local units deliver the questionnaires in person to the farmers. The questionnaires are collected again about 20-30 days later by the local NAFA staff.
- The Responses rate was about 26% in 2010-2011. But as the questionnaires are completely anonymous, it is not possible to remind the farmers.
- The local units return the paper questionnaires to the NAFA headquarter where the MMF department capture the information in the excel file described above. The data capture job is splitted among the team and the national coordinator finalises the yearly Excel worksheet

Data Validation

- No check is performed on the data received. Only tipping errors checks are performed: they consist in manual comparison between the paper declarations and the data saved in Excel is done.

Data weighting/aggregation

- Total costs are extrapolated but the method was not clarified during the mission

Data publication

- When there is a data call, the information are extracted manually from the Excel worksheet and paste into the answer.

10.4. STATISTICAL QUALITY

Non response is very high and this probably causes a large bias, however since questionnaires is anonymous it is not possible to assess which farms types are more represented in the sample.

The TR 2012 (table IV_A_3) specifies for all indicators a coefficient of variation of 0.15. From the data provided by NAFA we present the actual coefficient of variation for revenues and costs in table 7.

Table 7. Coefficient of variation for the revenues and costs in aquaculture

Indicator	CV[2]
Total revenue	0.27
Wages	0.18
Value of unpaid labour	0.11
Energy	0.19
Fry	0.46
Meal-feed	0.44
Maintenance, repair	0.26
Other operating costs	0.19
Depreciation of capital	0.19
Interest expense	0.15
Unforeseen expenses	0.14

Source: NAFA data.

The CV for each variable should be reported in Table IV_A_3.

Column E of Table IV_A_3 should be filled in with A meaning that the collection is intended to be exhaustive.

11. ECONOMIC DATA - PROCESSING INDUSTRY

Data on fish processing industry is primarily collected to cover the needs of the Bulgarian authorities in relation to the implementation of measures within the European Fisheries Fund (EFF).

11.1. PROGRAMME MONITORING

Organisation of the data collection

Data on fish processing is collected as follows:

1. A list of fish processing firms is provided by the Food Safety agency, as all firms must be registered there.
2. All processors are sent a questionnaire along with the guidelines by post. The questionnaires follow closely the requirements of the DCF.
3. The questionnaires are anonymously filled in and sent back to NAFA where all data is entered in Excel workbooks.
4. Extrapolation to the total of the sector is done on the bases of the average values of the indicators of the respondents.

[2] *CVs have been calculated with non-zero values; i.e. assuming that empty cells in the questionnaires are not equal to zero.*

Achievement of objectives

TR 2012 indicates that the total population is 33 firms and foresees to collect data from 40 firms. Considering the indicated sample rates, the columns on population and sample have been mixed up.

Questionnaires from 34 firms were received back, so that the planned sampling rate has been more than fully achieved. The table IV_B_2 reports a response rate of 75%, which is approximately correct – out of 38 firms, 34 responded, but 13 did not report any revenues and reported costs below 1000 lv (of which 3 had zero costs).

Compliance with methods and procedures

The procedure is simple and the number of fish processing firms is low. There is no formal description of the methods and procedures.

There is no cooperation between NAFA and INS. INS is not expected to offer value added as most firms have less than 10 employees and therefore fall outside the Structural Business Survey (SBS). Furthermore, production of data by INS takes a minimum of 18-24 months, while NAFA wishes to be able to report with a delay of 6-9 months. At the time of the mission data on 2011 was already collected.

Staff

2 – 3 persons are involved in the compilation and processing of this information.

11.2. DATA STORAGE AND ACCESS

Information found in the fish processing questionnaires is stored in an Excel files with one worksheet per year.

Figure 7. Excel file for fish processing

N	General information - employees																							
	Region	Men	Women	Total of employees	quantity of fish(tonnes)	number of enterprises	turnover for the year	subsidies	other revenue	total income	WAGES	value of unpaid labor	energy costs	raw material costs	Repair and maintenace	other operating costs	interests costs	net financial costs	unforeseen costs	total assets	invest-ment	capital	debt at the end of fiscal year	volume of raw materials

Source: NAFA

Extrapolation is done to complete the information collected.

11.3. DATA PROCESSING

The same following process is applied for fish processing data compilation: than for aquaculture regarding the compilation of data.

The response rate is 75%.

- The NAFA can recover the list of fish processing firms from the the Food Safety agency.
- The current data collection is based on a census of all active firms.
- NAFA headquarter prepare the paper questionnaires and send it by post
- The questionnaires are anonymously filled in and sent back to NAFA where the MMF department capture the information in the excel file described above. The data capture job is splitted among the team and the national coordinator finalises the yearly excel worksheet.
- The Responses rate is about 75%.

Data Validation

- Correctness of all entries is checked by second reading. No other checks are carried out.

Data weighting/aggregation

- Extrapolation to the total of the sector is done on the bases of the average values of the indicators of the respondents

Data publication

- When there is a data call, the information are extracted manually from the excel worksheet and paste into the answer.

11.4.STATISTICAL QUALITY

Overall statistical quality is uncertain for at least three reasons:

- Data is taken at its face value. No consistency checks exist.
- The indicators which have not been filled in by the respondents are considered as zero, but in fact the value may not have been filled in.
- Anonymity of the questionnaires does not allow to connect the respondents and ask additional questions and clarifications.

Table 8. Population figures.

Year	2008	2009	2010	2011
<=10	n.a.	n.a.	n.a.	30
11-49	n.a.	n.a.	n.a.	10
Total	32	50	n.a.	40
Source	Eurostat	TR 2010		TR 2011

Coverage

Given the small population size, exhaustive enumeration should be used (type of collection =A).

Tables IV_B_1 and IV_B_2 have to be revised:

- TR table IV_B_1 (2010) mentions type of collection A and planned sample rate = 50% which is incompatible (A means census). Achieved response rate is equal to 50% in table IV_B_2 (2010).
- TR table IV_B_1 (2011) gives planned samples (col 6) larger than population figures, which is impossible, planned sample rates are wrongly calculated and mentions type of collection = B which is not possible given the achieved sample. Non-sampling errors (bias due to non-response rate) is set at 75% in Table IV_B_2 (2011) while achieved sample equals population figures in table IV_B_1 (2011).

Accuracy of the estimates

Table IV-B-2 of TR 2012 reports a coefficient of variation of 0.15 for all indicators. Table 9 shows the CVs calculated on the basis of the provided data.

Table 9. Coefficient of variation for the revenues and costs in fish processing.

Indicator	CV[3]
Total revenue	0.13
Wages	0.17
Value of unpaid labour	0.06
Energy	0.14
Raw material	0.07
Maintenance, repair	0.10
Other operating costs	0.07
Interest expense	0.05
Unforeseen expenses	0.10

Source: NAFA data.

[3] *CVs have been calculated with non-zero values; i.e. assuming that empty cells in the questionnaires are not equal to zero.*

12. VARIABLES ON THE EFFECTS OF FISHERIES ON THE MARINE ECOSYSTEM

Organisation for the production of related data

The data required to calculate the indicators to measure effects of fisheries on the marine ecosystem are stored in three separate data bases. Data for assessing ecosystem indicators 1,2,3,4 are available according NAFA at IO BAS. The Vessel Monitoring System data base monitoring fishing activities is located in the VMS Centre in Varna (indicators 5, 6, (7-see compliance chapter)). All data required to assess discarding rates and fuel efficiency of fish capture are stored in a database at ISS NAFA.

Achievement of objectives

Since the team has not visited the IO BAS in Varna physically during our mission, the data base at IO BAS which contain the biological data necessary to calculate ecosystem indicators 1-4 could not be seen. Table V_1 refers to the Table III_G_1 which lists the planned ecosystem indicators to be covered with the respective research cruise. Despite maturity and sex ratio data, all relevant parameters are collected during the three research surveys for at least the key species turbot. Given that no maturity data are available for sprat, the indicator 4 "Size-at-maturity" cannot be calculated.

Ecosystem Indicator 8 (Discarding rates of commercially exploited species) needs information on discards. Discard is not monitored (compare section métier related biological variables) according TR. In addition, the NP proposes to calculate indicator 8 not only on trips, also based on survey data. The ratio behind is "based on the fact that during the survey the same trawl mesh size like the fishing vessels is used, [though] the discard of non-commercial species and the undersized commercial species could be evaluated" (NP page 41).

- ***This approach might be valuable during the pelagic trawling coupled to the hydro acoustic survey. However, the validation of this assumption concerning the BTS (using a method which is banned for the commercial fishing fleet) needs careful consideration due to potential different gear catch-abilities.***

Compliance with methods and procedures

According to the TR 2011 indicators 5 and 6 are part of the vessel monitoring system (VMS Centre in Varna), ecosystem indicators 7 and 8 are part of ISS NAFA. This listing might be not in agreement with Table V_1. No specific statement is made about Indicator 9 (fuel efficiency of fish capture).

In the NP (page 41) it is stated that "economic variables for fuel costs are described in Section III_B". This indicates that indicator 9 might be covered by ISS NAFA instead of the indicator 7 (Areas not impacted by mobile bottom gear) which usually demands geographical information (which might come from VMS data). This might be a typographical error but needs to be corrected.

13. CONCLUSIONS BY CHAPTER

Biological data

General comments

Biological data are exclusively obtained from the three scientific surveys at sea. The production of biological data is done by the IO BAS in Varna. For turbot, two annual surveys produce reliable information about *stock specific biological variables* even though samples sizes are extremely low due to an overall very low stock size. For sprat, length, weight and age data are sampled in large (higher than necessary) quantities, but sex-ratio and maturation state are missing. This is most likely related to the inappropriate fixation method and needs revision in the future. The CVs need to be calculated based on actual numbers of sampled and measured individuals

ISS is in charge of the collection of information on vessel, logbook, sales slip and MMF in particular the NC is in charge of their compilation for the DCF. Regarding the organisation of data collection, there was no métier-related analyses of biological variables. No sampling at sea, and no harbour sampling has been conducted due to financial issues, as stated in the TR and was communicated to the team by the NC. The NC mentioned missing co-financing from the MAF and that they will try to avoid such difficulties in the future. The missing important component of market/landing sampling is a problem which needs to be solved in the future. Also, no discards data has been collected.

Recreational fisheries

The NAFA is the responsible administrative institution for the recreational fisheries. In summary, no DCF relevant species are fished in Bulgarian l waters by recreational fisheries, as it targets mainly targets carp, trout and catfish. According to NAFA no catches of eel are made either in inland or in Black Sea waters and the catch of sturgeon especially in Danube river system is prohibited.

NAFA register all fishing permits (mandatory in freshwater only) in a database and should register the corresponding catch.

Research surveys at sea

The team appreciate the close collaboration and the integration of the hydro acoustic survey under the MEDIAS design umbrella. The 24-h working time onboard helps to save expensive ship time and is highlighted. All other abiotic parameters (temperature, salinity and oxygen measurements) and biotic (zooplankton, gut content) variables measured and conducted during DCF cruises should also be mentioned in the TR. This demonstrates the use of the opportunity to generate comprehensive ecological primary and secondary data needed to understand changes in the ecosystem or food web structure.

The weaknesses, however, of missing maturity stages and sex-ratios of sprat need to be solved, to comply with DCF (Appendix VII; 2008/949/EC). The team positively comments on the inclusion and the intensive biological sampling of whiting (2012_DCF Data call – Appendix 7 lists whiting as important species in the Black Sea –see Annex 9) during the hydro acoustic survey.

In the cruise report for this hydro acoustic survey it was recommended by the principal scientists to change the survey period (Nov-Dec) to May–July as the current time window would not be appropriate for a sprat acoustic stock assessment survey. The team comments to take this argument into considerations for future planning.

Evaluation of the effects of the fishing sector in the maritime ecosystem

The collection of necessary data is organized in three separate databases. Concerning the ecological indicators 1-4, the team comment that indicator 4 is probably not completely valid for sprat, as maturation measures and stock structure information are missing. To get the length/size at maturation for a species the team of course need information about maturity state. Currently, this information is not available.

No efforts were made to avoid shortfalls (see TR 2011– no comments) to overcome the shortage of discard analyses.

The indecisiveness between the Table V_1 code specification and the referring section in the TR, concerning the competences of the different institutions involved to collect the required data to compile the indicators, need revisions.

Economic data

General conclusions on economic data

Using anonymous questionnaires does not allow contacting the respondents and making corrections. It is not possible to distinguish between non-response and zero-values. There is too much room for interpretation by the respondents (despite provided guidelines), which makes e.g. calculation of employment questionable.

The quality of data (response rates and CVs) has not been correctly reported.

Catching sector

There are major inconsistencies in data submitted to JRC. It is surprising that these inconsistencies have not been noted by JRC and appropriate corrections have not been implemented.

Calculation of employment is not consistent with other indicators, particularly the average number of days at sea per vessel.

Aquaculture sector

Collected aquaculture data does not allow distinguishing the nine aquaculture activities, specified in the NP and TR.

Fish processing sector

No specific conclusions.

14. RECOMMENDATIONS BY CHAPTER

As a general recommendation from the IT point of view, it would be useful to have a general IT support that could help NAFA staff in all IT related matters. For the moment, there is an outsourced IT support given by TU limited to the ISNAFA database support.

IO seems to be in a process of building a biological database: this will be particularly important as for the moment researcher data are kept by researcher and there is no database for compiling all information available.

It is also recommended to keep an up to date documentation of the processes, application user manuals and database technical documentation even if the support is outsourced.

Regarding the management of user's requests, The team recommends recording the requests and answers in a specific directory for easy tracing and write some background information in a summary file (date of receipt, date of answer, acknowledgement of receipt, etc.). Furthermore, it is recommended to maintain records of the scientific requests in order to monitor and demonstrate the relevance of the data collected under DCF.

Biological data

Métier-related sampling

The main recommendation to generate biological information would be to conduct market/landing samples and send discard observer onboard of the two main métiers (GNS_DEF_400_0_0 and OTM_MPD_13_0_0) as proposed in the NP. The implementation of the whole proposed planned sampling would be desirable but in a first step occasional sampling of at least in some of the fleet population targeting turbot would be a starting point. Especially, given the obviously low turbot biomass mentioned in the 2011 cruise reports, a critical view on potential by-catch might be beneficial.

Stock-related variables

An intensified exchange of information between Bulgarian and Romanian DCF related issues should take place since the planned number of sampled fish by region is demanded in Table III_E_3. This would require sharing of information about the exact quantity of different analysed variables and species between the two MS. As a result, both MS have the opportunity to meet DCF regulations demanded for regional level in Table III_E_3.

Table III_E_3 should contain the exact numbers of analysed individuals of each species (as presented in Table 1 created in section 5.1). If additional parameters or information (e.g. gut content analyses or other fish species) are retrieved simultaneously, this should also be referred to in the TR. Indeed, Table III_E_3 shows in column "Achieved number of individuals at national level" round figures that do not correspond to actual samples collected in the research surveys. For instance, according to the aforementioned reports, the surveys sampled 9.316 individuals of sprat measured for length at age, 748 of whiting (Merlangius merlangus) – not even mentioned – and 657 of horse mackerel. The text

in the Technical Report section III.E.1 (page 11) should be accordingly modified and Table III_E_3 as described in Table 1 (% of achieved sample sizes with respect to planned numbers should be also corrected).

The team recommend not listing unmeasured variables (sex ratio and maturation) in the Table III_E_3 and include sample sizes coherent with the survey reports.

For turbot, the mean number of individuals caught during scientific surveys was decreasing from 2006 – 2009 from approximately 10 to about 4 fish per haul (Source: available BTS cruise reports). These numbers may probably have served as baseline during preparation of the NP 2011-2013. However, the actual mean number per haul is below 1 individual per haul, which sums to far less than 100 planned turbot individuals (2 cruises with 40 and 37 hauls, respectively). The team would suggest considering adjustments concerning planned samples sizes (although biological meaningful numbers should be envisioned).

Recreational fisheries

No particular recommendations since species relevant to DCF are not targeted by Bulgarian recreational fisheries.

Research surveys at sea

General recommendations

The major recommendation is to improve the methodology to sample sex-ratio and maturity stage data – The team suggest to perform maturity staging directly onboard on subsamples of the haul or use formaldehyde preserved sprat (to keep even quantitative samples for fecundity analyses, see H. Haslob (e.g. 2011). Compared to the envisioned and planned sample sizes for sprat you have exceeded their value by a factor of approximately three. This quantity provides opportunity to reserve subsamples for a special fixation treatments.

If not already in development, try to build up a centralized biological data base with the opportunity to import data from other MS (namely Romania) as the common species and questions are the same.

Economic data

General recommendations on Economic data

TR should reflect actual work carried out and not only approximations.

Anonymity of questionnaires should be reconsidered in order to allow contacts with the respondents. However, this will require strict procedures to meet privacy regulations and an explicit assurance to the respondents that their data will not be used for any other purpose.

Precision should be measured for all economic variables.

Catching sector

1. In view of the difficulties to determine principle gear for small scale vessels, it is recommended that all data for 0-6 and 6-12m segments are classified under PG. For the larger segment PMP should be used.
2. Calculation of employment and FTE should be scrutinized and cross-checked with other indicators like number of fishing days per vessel in order to make a more reliable estimate.
3. The team recommends to develop a sampling strategy to avoid excessive burden of response and possible bias due to including all the small vessels.

Aquaculture sector

The number of aquaculture activities should be reduced to 3-4, from the present 9. In order to allocate anonymous questionnaires to the activity, an appropriate question should be asked.

Fish processing sector

No specific recommendations.

Transversal variables

It would be useful to develop a query allowing combining the logbook and sales notes information for control, data checking as well as for specific uses like the definition of métier. The team does not know the structure of the database, but this is certainly possible as information is available and well organised.

Evaluation of the effects of the fishing sector in the marine ecosystem

The team recommends that the problems to estimate maturity stage and sex ratio could be solved given the several comments above on methodological issues. They are important data and should be collected, not only misleading labelled as collected (by "Y") in Table V_I.

Discard rates must be sampled to meet DCF requirements (and as proposed in NP) and the team recommends not to rely on by-catch data from research surveys at Sea considering gear compatibility problems and differences in the fishing strategy of the commercial fleet.

To keep coherence, check if in the TR the code specification meets the presentation in Table V_I.