



OpenAIR@RGU

The Open Access Institutional Repository at Robert Gordon University

<http://openair.rgu.ac.uk>

Citation Details

Citation for the version of the work held in 'OpenAIR@RGU':

ABDRASSILOVA, R., 2015. Understanding barriers and opportunities in agricultural information management in post-Soviet states: a case study of Kazakhstan. Available from *OpenAIR@RGU*. [online]. Available from: <http://openair.rgu.ac.uk>

Copyright

Items in 'OpenAIR@RGU', Robert Gordon University Open Access Institutional Repository, are protected by copyright and intellectual property law. If you believe that any material held in 'OpenAIR@RGU' infringes copyright, please contact openair-help@rgu.ac.uk with details. The item will be removed from the repository while the claim is investigated.

**UNDERSTANDING BARRIERS AND OPPORTUNITIES IN
AGRICULTURAL INFORMATION MANAGEMENT IN POST-
SOVIET STATES: A CASE STUDY OF KAZAKHSTAN**

RAIKHAN ABDRASSILOVA

**UNDERSTANDING BARRIERS AND OPPORTUNITIES IN
AGRICULTURAL INFORMATION MANAGEMENT IN POST-SOVIET
STATES: A CASE STUDY OF KAZAKHSTAN**

RAIKHAN ABDRASSILOVA

A thesis submitted in partial fulfilment of the requirements of
ROBERT GORDON UNIVERSITY
for the degree of DOCTOR OF PHILOSOPHY

October, 2015

CERTIFICATION

I, Raikhan Serikbayevna Abdassilova, declare that this thesis, submitted in fulfillment of the requirements of the award of Doctor of Philosophy, at the Aberdeen Business School of the Robert Gordon University, is wholly my own work unless otherwise referenced or acknowledged. The document has not been submitted for the qualifications at any other academic institution.

Raikhan Serikbayevna Abdassilova

Aberdeen, 2015

ABSTRACT

After the break-up of the former Soviet Union in 1991, several states declared independence, including the Republic of Kazakhstan. Under the centralised soviet system Kazakhstan provided mainly raw materials to the USSR, and agriculture operated under a Moscow-based command and control model. Kazakhstan possesses vast wealth of mineral and energy resources and its agricultural land is well able to ensure national food security. However, after independence the rapid and frequently unplanned state actions such as land reform, taken to move from socialism to a market economy, were not always successful and the state of agriculture was initially one of chaos. A major exodus from the land to the cities ensued. Gradually Kazakhstani agriculture recovered some of its productivity but still lags well behind developed nations in the use of ICT supported agricultural information management (AIM).

This research contributes to new knowledge in the area of ICT-based AIM by supplementing the limited statistical and scientific analyses of Kazakh agriculture by seeking to discover, through semi-structured interviews, the views and perceptions of agrarians who are both the customers and end users of ICT-based AIM in a post-soviet state. The researcher established that agrarian stakeholders were aware of the need for a centralised AIM system, but felt that to implement it, more assistance was required from the state. Kazakhstan can learn from the experiences of both developed and developing countries in furthering ICT-based AIM, and although its situation is unique, understanding of the perceptions of end users, who have had to make a series of flawed initiatives work, will arguably be relevant to policy makers in other post-soviet states.

ACKNOWLEDGEMENTS

This PhD is dedicated to my great father

who would have been proud of me

Serikbay Abdrassilov

1929 – 2004

This thesis would not have been possible without the endorsement from several people in many ways.

Firstly, I would like to show my endless and cordial appreciation to my supervisor, Professor Simon Burnett for his understanding, persistent support and precious guidance throughout writing my PhD. You have been a constant source of support and have provided constructive and valuable feedback throughout the dissertation process. Your timely reading, annotations and encouragement have been crucial to the completion of this study. Simon, thank you for your belief in me.

I am very thankful to professor Dorothy Williams, previously Head of the IMAGES Research Institute Aberdeen Business School, at the Robert Gordon University, for her continuous support during this study; for professors of the above named university - Professor Seonaidh McDonald for her great assistance, support and advice on the information and administration perspective of this study over time; Mr. Martin Simpson, the Research Officer, for his continued support during my study; the library staff, in particular Ms Anne Nichol, for her professional advice on using the databases and information searching; for Dr. Mary Brown, for her incredible patience in the process of correcting my Thesis. Mary, thanks for your invaluable assistance and support in the most critical moments for me.

My gratitude also goes to Professor Robert Newton for his help in the early stages of the study. I would like to express my commendation to the staff of Aberdeen Business School and Members of the Research Committee for their concern and constant encouragement all along the way.

My sincere appreciation also goes to the European Commission under the European Training Foundation (ETF) TEMPUS Project. Without their financial support, it would not have been possible for me to complete this project successfully. And in this context, I would also like to thank Professor David Lal who represented this Project in Kazakhstan, and express thanks for his friendly manner and assistance during my study.

I am indebted to employees of the Ministry of Agriculture of Republic of Kazakhstan, National Statistical Agency of the Republic of Kazakhstan, JSC National Holding “KazAgro”, National Holding “KazAgroMarketing”, research participants - agrarians from different regions of agriculture, who not only gave me insightful interviews but also arranged several trips to districts and farms, and

for their help in data collection which gave me the opportunity and inspiration to complete my research.

I wish to thank my parents: my mother BibiSara for her endless and unconditional love, and all-around understanding at all times; special thanks to my father-in-law Serikbay for his unreserved support through this study. Without their support and love, this dissertation would have never been accomplished.

My gratitude also goes to other family members - my sisters and brothers, my friends and colleagues for their encouragement.

Lastly, but by absolutely no means least, thanks go to my great family - husband and my sons for their concern, understanding, patience and moral support throughout the duration of this journey. Guess, I will miss their question - how is your Thesis? :)

This research would obviously not have been possible without all above mentioned people.

Thank you!

CONTENTS

| | |
|-----------------------|------|
| Title page | i |
| Certification | ii |
| Abstract | iii |
| Acknowledgments | iv |
| Contents | vi |
| List of Tables | x |
| List of Figures | xi |
| List of Appendices | xii |
| List of Abbreviations | xiii |

CHAPTER I: INTRODUCTION

| | |
|---|----|
| 1.1 Overview | 1 |
| 1.2 Background to the Study | 3 |
| 1.3 Statement of the research issues | 4 |
| 1.4 Significance of the problem | 8 |
| 1.5 Study aim and associated objectives | 10 |
| 1.6 Organization of the Study | 12 |
| 1.7 Definitions of Key Terms used in the thesis used in the thesis (in alphabetical order) and acronyms | 14 |

CHAPTER 2: REVIEW OF THE LITERATURE

| | |
|--|----|
| 2.1 Introduction | 17 |
| 2.2 The role of agricultural policy (AP) in the country's development | 19 |
| 2.3 Theoretical foundations and framework for agricultural policy analysis | 22 |
| 2.4 Objects, structural elements and subjects of agricultural policy | 24 |
| 2.5 Evaluation of ICT-based AIM in support of agricultural policy development | 25 |
| 2.6 IM strategy and the role of international organizations in agricultural development | 33 |
| 2.6.1 Farm Agriculture Organization (FAO) | 35 |
| 2.6.2 The International Information System for the Agricultural Sciences and Technology (AGRIS) | 35 |
| 2.6.3 European Network for Rural Development (ENRD) | 36 |
| 2.6.4 World Agriculture Information Centre (WAICENT) | 36 |
| 2.6.5 Transparency index in auditing agricultural policy | 39 |
| 2.7 Rationale for the selection of Germany, UK, USA and Russia as examples of a nation's use of AIM to support agricultural policy development | 40 |

| | |
|--|----|
| 2.7.1 Germany | 40 |
| 2.7.2 The United Kingdom | 41 |
| 2.7.3 The United States of America | 41 |
| 2.7.4 Russian Federation | 42 |
| 2.8 A comparison of the role of ICT-based AIM to support agricultural policy in Germany, UK, USA and Russia (as a post-Soviet state) | 43 |
| 2.8.1 The Common Agriculture Policy's influence on agricultural development in Europe | 46 |
| 2.8.2 The role of the CAP in German agricultural development | 50 |
| 2.8.3 The role of ICT-based AIM in support of German agricultural policy development | 53 |
| 2.8.4 The United Kingdom: the CAP in agricultural development | 54 |
| 2.8.5 The United Kingdom: the role of ICT-based AIM in supporting agricultural policy development | 56 |
| 2.8.6 The role of agricultural policy in the USA's agriculture development | 57 |
| 2.8.7 The role of ICT-based AIM in support of USA's agricultural policy development | 63 |
| 2.8.8 Barriers to adopting developed nations' strategy of ICT-based AIM in the developing world | 65 |
| 2.9 Developing countries: the role of ICT-based AIM in supporting agricultural development | 67 |
| 2.9.1 AIM development in supporting Russian agricultural policy since independence | 78 |
| 2.10 Agricultural policy and ICT in Kazakhstan: brief overview and relevant comparisons | 85 |
| 2.10.1 Brief Background to Kazakhstan | 86 |
| 2.10.2 Kazakhstan: challenges and opportunities | 87 |
| 2.11 Summary of literature and gaps which the current thesis sets out to fill | 88 |

CHAPTER 3: RESEARCH METHODOLOGY

| | |
|--|-----|
| 3.1 Introduction | 91 |
| 3.2 Philosophy choice: research strategy and theory building | 92 |
| 3.3 Epistemological considerations and rationale for research paradigm | 92 |
| 3.4 Deductive or inductive approaches | 94 |
| 3.5 Qualitative and quantitative research data | 96 |
| 3.6 Qualitative research methods – introducing Grounded Theory | 99 |
| 3.6.1 Principles of Grounded Theory research | 100 |
| 3.6.2 Procedures of Grounded Theory research | 101 |
| 3.6.3 Coding techniques for data analysis | 102 |
| 3.6.4 Applying new codes | 104 |
| 3.7 Sample size and saturation | 105 |
| 3.8 Validity, Reliability and Research Ethics | 106 |
| 3.9 Summing up of research philosophy and strategy | 107 |

| | |
|---|-----|
| 3.10. The research project in practice | 107 |
| 3.10.1 Kazakh data sample | 107 |
| 3.10.2 Qualitative data collection | 109 |
| 3.10.3 Types of interviews: semi-structured interview | 110 |
| 3.10.4 Process of selection of the potential respondents and organization of interviews | 112 |
| 3.10.5 Research participants during the discussions | 114 |
| 3.11 Data management and analysis | 117 |
| 3.11.1 Analyzing collected primary data | 118 |
| 3.11.2 Data interpretation and analysis | 119 |
| 3.11.3 Data analysis: coding and grouping | 120 |
| 3.12 Summary of Methodology | 121 |

CHAPTER 4: DATA ANALYSIS AND DISCUSSION

| | |
|---|-----|
| 4.1. Introduction | 123 |
| 4.2 Theory and practice of agricultural policy | 124 |
| 4.2.1 Agricultural policy: analysis of problems at the initial stages of independence | 127 |
| 4.2.2 The role of rural citizens in the process of new agricultural policy implementation | 130 |
| 4.2.3 Kazakhstan: The State's role in agriculture in comparison with other spheres of the economy | 132 |
| 4.2.4 The state's role in Kazakh agriculture policy in comparison with developed countries | 135 |
| 4.2.5 Summing up: theory and practice of Kazakh agricultural policy | 138 |
| 4.3 Evolution of agricultural policy and its contribution to economic development | 141 |
| 4.3.1 First phase - initial structural reforms and new policy implementation | 142 |
| 4.3.2 The evolution of policy and its influence on the stabilization of agriculture | 146 |
| 4.3.3 Since 2003: the third stage of agricultural policy development | 148 |
| 4.3.4 Land reforms and the privatization process | 149 |
| 4.3.5. Financial investments and subsidies in supporting agriculture | 151 |
| 4.3.6 The role of stakeholders in agriculture policy creation and monitoring | 153 |
| 4.3.7 Summing up | 154 |
| 4.4 The role and management of information in agriculture | 157 |
| 4.4.1 Classification and the role of information in agriculture | 157 |
| 4.4.2 Information management in the agriculture of Kazakhstan and its evolution since 1991 | 161 |
| 4.4.3 The role of information management in decision-making processes | 162 |
| 4.4.4 The problems in current agricultural information management | 164 |
| 4.4.5 Summing up | 168 |

| | |
|---|-----|
| 4.5 The respondents' reactions to the process of IM system improvement within the Kazakh agricultural economy | 170 |
| 4.5.1 The key stakeholders' concerns about AIM improvement based on ICT introduction | 171 |
| 4.5.2 Current information management in rural regions of Kazakhstan | 172 |
| 4.5.3 Respondents' views about improvement of existing IM based on new technologies | 175 |
| 4.5.4 Information and consultative centres (ICCs) in agriculture | 178 |
| 4.5.5 Summing up | 180 |
| 4.6 Respondents' views on a framework to improve current IMS | 181 |
| 4.6.1 Current IM improvement for influencing decision making processes in agriculture | 181 |
| 4.6.2 The role of knowledge management in rural agricultural IM | 183 |
| 4.6.3 Implementation of network connectivity and ICT-based technology infrastructure to support the agricultural policy of Kazakhstan | 184 |
| 4.6.4 Proposals for a framework for effective ICT-based information management | 186 |
| 4.6.5 Summing up | 188 |
| 4.6.5.1 Framework for development of ICT-supported AIM | 190 |
| 4.7 Summary of analysis and discussion | 190 |

CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS

| | |
|--|-----|
| 5.1 Introduction and structure of chapter | 194 |
| 5.2 General Conclusions | 194 |
| 5.3 Conclusions relating to the research objectives | 195 |
| 5.3.1 To what extent were the objectives met? | 198 |
| 5.4 Contribution to new knowledge | 198 |
| 5.4.1 New knowledge derived from discussions of the barriers to ICT-based AIM | 200 |
| 5.4.2 New knowledge derived from discussions of the opportunities for ICT-based AIM | 201 |
| 5.4.3 New knowledge derived from discussions of the development of ICCs: the positive impact of ICT-based AIM to assist successful agricultural policy | 202 |
| 5.4.4 New knowledge derived from discussions of the Kazakh context | 203 |
| 5.5 Limitations, and proposals for future research and strategic planning | 204 |

| | |
|-----------------------|-----|
| REFERENCE LIST | 207 |
|-----------------------|-----|

| | |
|---------------------|-----|
| BIBLIOGRAPHY | 230 |
|---------------------|-----|

| | |
|-------------------|-----|
| APPENDICES | 235 |
|-------------------|-----|

LIST of TABLES

| | | |
|-----------|---|-----|
| Table 1: | Structural measures aimed to stimulate the competitiveness of farmers and rural communities | 47 |
| Table 2: | CAP evolution for the period of 1980-2012 | 48 |
| Table 3: | The use of information technology in farms of UK, Germany and Russia | 65 |
| Table 4: | Some common contrasts between quantitative and qualitative research | 97 |
| Table 5: | Choice of qualitative approaches for data collection and analysis. | 98 |
| Table 6: | Comparative characteristics of different types of qualitative research | 99 |
| Table 7: | Non-agriculture oriented regions | 114 |
| Table 8: | The list of topics considered during the interviewing process | 116 |
| Table 9: | Data recording list | 118 |
| Table 10: | Connectivity and technology infrastructure score for selected Asian and Pacific countries and areas | 185 |

LIST of FIGURES

| | | |
|------------|---|-----|
| Figure 1. | Information strategy and management | 34 |
| Figure 2. | Global ICT development for 2000–2010 | 38 |
| Figure 3. | Agriculture for the period of 1935-2009 | 59 |
| Figure 4. | Proportion between the dynamics of state agriculture support and export of agriculture products, U.S. (million dollars) | 59 |
| Figure 5. | Reduction of number of farms with the increase of their average size | 61 |
| Figure 6. | Commodities per Diem | 61 |
| Figure 7. | Information in innovation processes: main information flows in agricultural technology innovation process | 70 |
| Figure 8. | New codes application | 104 |
| Figure 9. | The Methodological Journey of this Study | 122 |
| Figure 10. | Sales of state agricultural land, 2004-2010 (thousand hectares) | 150 |
| Figure 11. | Classification of Information | 159 |
| Figure 12. | Structure of Ministry of Agriculture of the Republic of Kazakhstan (2012) | 246 |
| Figure 13. | Dynamics of GDP volume indices for the period 1991-2008, in percentage | 248 |
| Figure 14. | Agriculture's share in GDP and total employment during 1990-2011 | 249 |
| Figure 15. | Percentage ration of GDP in Kazakhstan since 1990s | 249 |
| Figure 16. | Structure of GDP in current prices, in % to the result | 250 |
| Figure 17. | Urban and Rural Population in Kazakhstan | 256 |
| Figure 18. | The change in sale prices for agriculture products in Kazakhstan | 257 |
| Figure 19. | The volume indices of gross production (services) agriculture | 258 |
| Figure 20. | Investments in agriculture of Kazakhstan, 1995-2011 | 261 |

LIST of APPENDICES

| | |
|---|-----|
| Appendix I. Overview of Kazakhstan | 235 |
| 1. History of Kazakhstan | 235 |
| 2. Kazakhstan's agriculture during the transition period to market economy | 235 |
| 3. The initial stage of the reforms in the former USSR | 237 |
| Appendix II. An examination and analysis of the reforms and agricultural policy of Kazakhstan since independence in 1991 | 241 |
| 1. Introduction | 241 |
| 2. Agricultural reforms within the frame of the agricultural policy (AP) of Kazakhstan | 241 |
| 3. Features of the agricultural policy of the Republic of Kazakhstan: directions, mechanisms, methods | 245 |
| 4. The structure of Kazakhstan's GDP and dynamics of its volume indices since the 1990's | 247 |
| 5. The theory and practice of agricultural policies during independence period | 250 |
| 6. Theory and practice of land reforms in Kazakhstan | 251 |
| 7. Food Security policy since independence | 253 |
| 8. The result of the agriculture policy's influence on agriculture of Kazakhstan since 1991 | 254 |
| 9. Obstacles and unrealized provisions in agricultural policy. | 258 |
| 10. The factors of agricultural policy's negative impact on agriculture | 262 |
| 11. Agricultural policy development for effective integration to World Trade Organization | 264 |
| 12. Summary | 266 |
| Appendix III. Description of organizations which provided respondents who participated in the interviews | 267 |
| Appendix IV. Research participants' views in relation to agriculture development of Kazakhstan | 270 |
| Appendix V. Interview arrangements | 273 |
| Appendix VI. A summary of interviewed research participants | 276 |
| Appendix VII. Tables of code sheet and axial code sheet | 284 |

LIST of ABBREVIATIONS

| | |
|-------------|---|
| AIM | Agriculture Information Management |
| AIMS | Agriculture Information Management System |
| AIS | Agricultural Information Systems |
| AP | Agricultural Policy |
| ASTI | Agricultural Science and Technology Indicators |
| BMP | Best Management Practices |
| CAP | Common Agriculture Policy |
| CIS | Commonwealth of Independence States |
| COAIM | Consultation on Agriculture Information Management |
| Defra | Treasury and Department for Environment, Food and Rural Affairs |
| EC | European Commission |
| ECOSOC | Economic and Social Council |
| EEC | European Economic Commission |
| EFITA | European Federation for Information Technology in Agriculture, Food and the Environment |
| EIU | Economist Intelligence Unit |
| EU | European Union |
| FAO | Food and Agriculture Organization |
| FIVIMS | Food Insecurity and Vulnerability Information and Mapping Systems |
| FORAGRO | Forum for the Americans on Agriculture Research and Technology Development |
| FSO | Farm Subsidy Organization |
| GDP | Gross Development of Productivity |
| GFAR | Global Forum for Agriculture Research |
| HDR | Human Development Report |
| ICC | Informational and Consultative Centers |
| ICT | Information and Communication Technology |
| IFPRI | International Food Policy Research Institute |
| IGP | Internal Gross Production |
| IICD | International Institute for Communication and Development |
| IM | Information Management |
| IM&S Centre | Information Maintenance and Study Centre |
| IMF | International Monetary Fund |
| IMS | Information Management Systems |
| IS | Information System |
| IT | Information Technology |

| | |
|--------------|---|
| ITAFE | Information Technology in Agriculture, Food and the Environment |
| JSC | Joint Stock Company |
| KazRI of A&P | Kazakh Research Institute of Agriculture and Plant |
| KISS | Kazakhstan Institute for Strategic Studies |
| LLP | Limited Liability Partnership |
| MA of RK | Ministry of Agriculture of the Republic of Kazakhstan |
| MIS | Management Information System |
| MSE | Medium and Small Enterprises |
| NAIS | National Agriculture Information Strategies |
| NARS | National Agricultural Research Systems |
| NSAOK | The National Statistics Agency of Kazakhstan |
| OM | Operational Management |
| OECD | Organization of Economic Co-operation and Development |
| OREXCA | Oriental Express Central Asia |
| RAIS | Regional Agriculture Information System |
| RK | The Republic of Kazakhstan |
| RP | Research Participants |
| RML | Reuters Market Light |
| SADC | South African Development Community |
| S&T | Science and Technology |
| SPFS | Special Programme for Food Security |
| SM | Strategic Management |
| SMEs | Small and Medium-sized Enterprises |
| SU | Soviet Union |
| TM | Tactical Management |
| TCARC | Technical Centre for Agricultural and Rural Co-operation |
| TCP | Technical Cooperation Programs |
| UNDP | United National Development Program |
| USDA | United States Department of Agriculture |
| USSR | Union of the Soviet Socialistic Republics |
| VERCON | Virtual Extension Research Communication Network |
| WAICENT | World Agriculture Information Centre |
| WTO | World Trade Organization |
| UNEP | United Nations Environment Programme |

CHAPTER 1: INTRODUCTION

1.1 Overview

The researcher here justifies the relevance of the area of investigation, formulates the purpose and research objectives of the study, and discusses its original contribution to academic research and knowledge.

Since the 2000's the researcher has participated in the International European project TEMPUS (TEMPUS in Kazakhstan 1995-2010), which was set up to develop the agricultural economy in former Soviet Union countries. The current study originated from the researcher's several roles as a database specialist, lecturer, researcher and adviser in the field of management and business information systems. Contrasting the agriculture of Kazakhstan with other spheres of the economy, the researcher regularly observed a skills and knowledge gap in the area of new technology, which existed for information management specialists, agrarians at different levels of management, and professionals in agriculture. Agriculture in Kazakhstan is one of the main sectors of the country's economy, yet there are very few academic research papers on this topic, apart from examples such as Maulenkulov, 2001; Kaliev, 2003; Bergenov, 2004; Sagadiev et al., 2006; Aimurzina, 2010; Kurmanova, 2010; Karbayev, 2011; Orazgalieva and Urazalinov, 2011. The researcher discovered that for a number of key reasons which will be identified in the course of the thesis, the implementation of economic management functions in Kazakhstan is underdeveloped, and that there are significant opportunities for improving external information and internal information management systems to support the Agricultural Policy (AP) of Kazakhstan. Addressing the barriers to the development of effective agricultural information management (AIM) appears to be a proven way to influence decisions in a positive direction and to develop constructive strategies for further development of the agrarian sector of Kazakhstan.

Thus, the relevance of the theme of this study is defined by the urgent need for in-depth investigation of the theoretical and practical aspects of AIM solutions in the management of economic agricultural industry, and to discover the barriers and opportunities which exist in the context of the development of the agricultural policy of Kazakhstan since its independence in the 1990's. It is noteworthy that the majority of studies in the field of AIM in the USSR took place in the 1970's and 1980's of the twentieth century (Kutsenko et al., 1972; Mozhin, 1974; Ushacheva, 1988), and research from that period could not take into account the currently prevailing economic realities that are associated with the transition to the new market relations, and specifically changes in the socio-economic structure of Kazakhstan. Modern solutions for IM cannot be implemented in the practical activities of Kazakh agricultural enterprises, as they are based on the extensive use of computers, whereas in developed countries the use of new technology has already led to fundamental changes of the role of IM in agriculture. The current study involved discussions with key players in the Kazakh agrarian industry

to understand the barriers in current AIM that prevent its successful development, and to determine specifically what opportunities exist for the further development of AIM in post-Soviet states.

It is clear that the dynamic development of AIM requires acceleration in the processes for collecting and processing information, to enable solutions to complex problems requiring difficult time consuming manual calculations, associated with the huge cost of time for their execution (Kabanova 2001 p.4). These circumstances identified the need to consider improving AIM through the introduction of more sophisticated information and communication technologies (ICT) to support the development of Kazakhstan's agricultural policy. It is suggested that the lessons learned from the case study of Kazakhstan may provide new and useable explanatory theory, and thus positively influence the development of AIM systems in other former Soviet states.

In view of the lack of studies in the AIM area of Kazakhstan's agriculture since independence, a central topic for this thesis will address an understanding of the barriers and opportunities of IM based on new technology to support agricultural policy in developing countries, including the post-Soviet state of Russia. This topic is central to the literature review and the discussion with interviewees. It will be argued that these issues require a more detailed and expanded investigation, not only by specialists of the agricultural sector and policy makers, but by academic researchers who are uniquely placed to develop explanatory theory around the barriers and opportunities for development of AIM in the former Soviet bloc.

The subject of the research was identified as the information processes in agriculture management which influenced the implementation of effective economic decisions for further development of this sphere of Kazakhstan's economy during the period of the transition to a market economy since independence in 1991. It was considered particularly important to investigate the existing relationship between the characteristics of the role and management of information and its organizational consequences at all levels of agricultural management. This would in turn enable the focus on existing problems for this issue, and, in particular, the implementation of different approaches for agricultural information's systematization and automation. The opportunities for development of ICT-based AIM in Kazakhstan, and the barriers to its effective development have not been adequately considered by previous scholars. Thus, the academic novelty of the research lies in the fact that few, if any, studies have gone beyond a conceptual analysis of the issues facing key players in the agriculture sector of former Soviet states. The current study, on the other hand, has consulted a wide range of individuals from strategic, tactical and operational levels of Kazakh agriculture, and has compared their unique experiences both of the barriers to the effective implementation of AIM in Kazakhstan and the unique opportunities for its further development in a way that maximizes its contribution to the success of the agricultural sector.

1.2 Background to the Study

The use of information management in business units and organizations is essentially a managerial issue rather than a purely technical one (Shanchenko, 2006 p.3). The focus of this study will be on organizational and managerial aspects of IM rather than its technical dimension.

The theoretical and methodological approaches to this study were based on the works of foreign and domestic scholars on management problems, agriculture reforms, and implementation of new technology to support agricultural policies, reforms and regulations (Demiryurek, 2000; Paarlberg et al., 2000; Kabanova, 2001; Zobbe, 2002; Sagadiev et al., 2006; Beck, 2008; Smailov, 2008, 2009, 2010; Aimurzina, 2010; Koester, 2000; McNamara et al., 2011; Ashurov et al., 2012; Khasanov, 2012; Kaigorodtseva, 2013). Research was conducted into implemented official state programs, that is, legislative and regulatory legal acts which were initiated by the President of the Republic of Kazakhstan and agreed by the Government of Kazakhstan and the Ministry of Agriculture on issues related to the improvement of agricultural policy (Nazarbayev, 1992). The theoretical and methodological basis of the research is built on the fundamental principles of modern economic theory, and represents a systematic approach to the study of investigations of socio-economic phenomena and processes in the Kazakhstan economy in comparison with western economic theory and practice. Furthermore, the studies of leading domestic and foreign economists reveal the patterns of development of the market economy in the agricultural sector, and, particularly, the formation and implementation of public agricultural policy in Kazakhstan since independence.

Essential to this examination of Kazakhstan's agricultural policy is an analysis of the influence of AIM on the development of Kazakhstan's agriculture. Shanchenko (2006), and Yusuf et al. (2014) indicate that a Management Information System (MIS) exploits the integrative nature of information flow, including the structuring of the organization around decision centres and the state, and aids the functioning and monitoring of an organization. *It is also a formalized procedure to provide management at all levels and in all functions with appropriate information from all relevant source to enable them make timely and effective decisions for planning, directing, evaluating, and controlling the activities for which they are responsible* (Yusuf et al. 2014 p.76-77).

In addition, Demiryurek et al. (2010 p.209) elaborate that agricultural information is an important factor that interacts with other agricultural production factors, including land, labour, capital and managerial ability, and that: *The productivity of these factors can arguably be improved by relevant, reliable and useful information and knowledge.*

In the case of Kazakhstan, this concept is important in understanding the barriers and possibilities relating to the development of AIM for planning and scheduling decisions for agricultural development. Consequently, to take advantage of market-led changes since independence, and to capitalize on any opportunities in the Kazakhstani agrarian production systems, this study will seek to

understand the barriers in the current state of AIM in Kazakhstan, whilst examining the opportunities to develop existing information management systems in agriculture. The conclusions drawn from this study will fill the gap in the existing academic studies based on a better understanding of the most relevant issues in AIM development in the process of decision making and management - in line with the agrarian policies of Kazakhstan and other post-Soviet states. Specifically, the study will obtain the views of key agrarian managers in strategic and operational roles, who are arguably best placed to comment on the experience of AIM at the grassroots level.

Various companies, governmental and non-governmental organizations, enterprises, the United Nations, and World Bank bodies are aware of the need to construct a global information society to improve the conditions of people living in rural areas in developing countries (Keniston, 2003; Sood, 2003; Tongia et al, 2005). Effective use of AIM can provide policy makers with vital information to aid this important aim.

1.3 Statement of the research issues

In the early 1990's, the breakup of the Union of Soviet Socialist Republics (USSR) was followed by political and economic crisis in all ex-Soviet countries. The collapse of the Soviet Union led to the emergence of independent sovereign states; radically changed the geopolitical situation in Europe and worldwide; and the rupture of economic ties has become one of the main causes of deep economic, socio-economic and political crisis in post-Soviet countries (Yanovski and Poznyak, 2005). As Kazakhstan had been a part of the USSR, it could hardly avoid those political and economic problems. Safronov (1998) notes that the planned-command economy system did not create the required conditions for efficient functioning of national enterprises for several reasons, such as: absence of competition between agencies, freedom of action in business, underdeveloped credit and financial relations, as well as excessive state involvement in the activities of enterprises. These issues will be discussed in detail in the literature review and in detail in Appendix I and II. Thus, under the planned Soviet-influenced economy, enterprises were not focused on the production of high-quality products, as there was virtually no competition and businesses knew that marketing of products was always guaranteed (Safronov, 1998 p.13).

There was a degree of uncertainty across the post-Soviet counties in terms of how to recognize and accept market development as a set of nation states and how to move from a common centrally planned economy structure towards a market-led structure (Yanovski and Poznyak, 2005). As a result, each country from the Commonwealth of Independent States (CIS) chose its own approach to regulate its respective economy, and defined and created its development differently. Following the collapse of socialism in the Soviet republics in 1991, it was observed that policy was ahead of the economy: for instance, new instructions were difficult to understand and follow by individuals in agricultural enterprises and farms due to their limited experience in implementing of policies and reforms in new

market-based economic conditions, and it would appear that time was needed to heal the wounds of change (Gaydar, 1992).

In practice this meant that reforms and policies were implemented without proper examination and understanding of current economic problems and thus failed to meet the new conditions of the market economy. Moreover, following independence and the euphoria of gaining some degree of sovereignty, the new CIS states had to build independent economic systems, autonomous from the former Soviet system. The transition to a market-based economy for countries which were part of the economic consortium of Soviet Union (SU) was inevitable, but the choice of model of transformation was one of the most difficult issues on the agenda of each country. Kazakhstan became an independent state in 1991, and consequently the problems of developing the Kazakhstani economy became a high priority for authorities. According to Fedoseev (2014 p.11) the transition from the administrative-command-control system to more of a market-based economy was a simple and painless process neither for citizens nor policy makers. Furthermore, Fedoseev (2014 p.11) highlights that for all the shortcomings of the former Soviet economy, one of its significant advantages was the well-established economic ties between enterprises within each state and between states. With the collapse of the USSR the organized economic ties which had existed for many years between businesses and between regions, began to disintegrate (Fedoseev, 2014 p.12). In this context, he claims that the process of state-political disintegration did not mean the inevitable commencement of economic crisis with further socio-economic catastrophe. Nevertheless, at first glance, this is what happened with the collapse of the USSR (Fedoseev, 2014 p.12).

On this subject, the President of Kazakhstan noted that the effectiveness of the policies and practices of the state in the transition period to a market economy was reduced because of inconsistency and, in some cases, ill-considered actions and decisions, or mistakes in tactical actions (Nazarbayev, 1996 p.32). Changing the socio-political systems of Kazakhstan was never going to be straightforward, and this led to a significant transformation – thereby reforming the economy, with raging inflation, and an initial recession. Given the difficult economic situation in the country, it was necessary to attract foreign capital and investments in order to build market confidence, create a competitive environment and sustainable, stable economy (Sabdenov, 1997; Arystanbekov, 2002). Danilov (1994) refers to many viewpoints developed by theorists and practitioners on the subject of creating a market economy, e.g. Ryzhkov-Abalkin (1989), Ryzhkov (1999), and Gaydar (1992). In terms of changing the political conditions of the independent post-Soviet republics, it was clearly very important for these nation states to implement systems which were both effective and efficient. Thus, taking into account the role of agriculture in the Kazakhstan economy, which takes an especially important place in ensuring viability of the population's food needs, it was essential to understand the agricultural policy evolution with its implementation at different stages of agricultural development, and the role of agricultural policies for developed countries, for the purpose of understanding the best practices of agriculture internationally. In the global community, amongst the various important economic spheres,

agricultural economy, with its goal to ensure viability of the population's food supply, takes an especially important place. In this context, the Greek scholar Xenophon (cited in Lapina and Chumakova, 2013 p.126) said:

Agriculture is the breadwinner and the mother of all other crafts. When agriculture is well controlled, then all other crafts thrive, but when agriculture is not paid enough attention all other crafts decline.

These words have not lost their relevance today and agricultural economy occupies an especially important position across the globe. This issue is predominant in shaping the structure and direction of societal activities, for example in regional food security. Furthermore, in the formation of the agricultural policy of Kazakhstan the global trends of agricultural development with their achievements in the global agriculture economy need to be taken into account. In most countries, agricultural support is recognized as a national priority where an effective agricultural policy of state regulation is implemented. Agricultural policy as an integral part of economic policy is one of the directions of the state's social and economic policies. These are usually aimed at sustainable socio-economic development of rural areas, increase in agricultural production, improving the efficiency of agriculture, increase in rural employment and increase in the standard of living of rural dwellers, together with rational use of land resources (Antamoshkina, 2012 p.188).

Thus, post-Soviet countries had to develop new ways of organizing agriculture from a low baseline, given the previous centralization of the sector. Examining the case of Kazakhstan, it appears that the lack of a solid theoretical base for agricultural policy in Kazakhstan at the beginning of the transitional period led to a systemic crisis for the following ten years and more (Khasanov and Yarullin, 2012 p.19). Different approaches and measures to overcome the crisis in the agricultural sector of Kazakhstan, such as new reforms and regulations, were developed by state and agrarian policymakers to adapt to a new economic system and to improve the overall situation in the agriculture of Kazakhstan. Some examples include: land reform, privatization program, "Village of 2003-2005", "Agricultural and Food Program for 2003-2005", "State Program for Rural Development of the Republic of Kazakhstan for 2004-2010" and so on. These reforms, with their role and influence for Kazakhstan's agricultural development since independence in the 1990's, are further considered in Appendix I and II. Essentially, Ospanov (2002), Sagadiev (2006), and Khasanov et al. (2012) characterize that period as one of crisis and stagnation, with poor breeding cattle without the necessary amount of fodder, together with huge acreages with very low yields to cover the needs of the country's grain; all these problems at the time influenced the slow development of agricultural economy in Kazakhstan. The low availability of agricultural material, technical and informational resources, inability to pay producers, a difficult credit system, and lack of investments and weak development of domestic machine-building remain still serious obstacles to the development of the agricultural sector in Kazakhstan. Nazarbayev (2003) stated that the *production efficiency and product quality*

improvement will depend on the degree of development and utilization of applied agricultural research, by adapting existing technologies and the transfer of new technologies to producers.

Nazarbayev (2003) suggests the development of agriculture in Kazakhstan should use technologies and scientific research, to achieve integration into global society. On the basis of observation of the situation in the agriculture of Kazakhstan in different regions, and analyzing the existing barriers and opportunities, the researcher examined the possibilities for the development of current AIM to support agricultural policy. Thus, in the current thesis, the statement of the research issue was formulated as: **a review of the role of AIM in the evolution of Kazakhstan's agricultural policies and reforms since independence from the USSR in the 1990s, with the aim of understanding the opportunities for, and barriers to, AIM development in the country based on the implementation of new technologies.**

It appears that Kazakhstan's agriculture since independence in 1991 has faced complications and problems due to the lack of systematic data and information, lack of planned development areas of agriculture, lack of knowledge and lack of effective management practices, and shortage of professionals and managers in this sphere (Sagadiev, 2006; Asanbayev, 2009). At the same time, the role of IM based on implementation of Information and Communication Technology (ICT) in agriculture takes an especially important place in this study. Kabanova (2001 p.6) claims that practical activities of agricultural enterprises in Kazakhstan cannot be successfully implemented as they are not based on the comprehensive use of computer technology: thus, change on the basis of these information and communication processes must become an issue for investigation. Nevertheless, the evolving market situation requires speeding up of the collection of information, and the development of its core solutions to complex problems that require multivariate calculations and currently a huge investment of time to carry them out manually. So, all these conditions demonstrate the importance and the practical significance of the issue. On this issue, Nienke suggests:

Successful innovation in agriculture depends on the provision of new and improved technologies that are well targeted; which in turn depend on well-funded agricultural research systems with appropriate research capacity and infrastructure (Nienke et al., 2008 p.1)

Information is critical to understand the important contribution of agricultural Science & Technology (S&T) in promoting agricultural growth, and sound S&T policies require access to up-to-date and reliable data, according to Nienke et al., (2008 p.1). In accordance with the requirements of the global market, the task of ensuring the population's demand for agricultural products is one of the most important problems in the world (ibid.). The solution to the problem depends not only on investments, grants, equipment selection, the productivity of labour, weather conditions, and the use of fertilizers, but also on proper understanding and effective use of information and data in support of strategic decision making and agricultural policy implementation for the development of the agricultural

economy. An effective AIM is thus one of the priority issues for investigation in the current agricultural economy due to the lack of studies on this issue in Kazakhstan.

In conducting the current study the regulations of Kazakhstan on the economic development of the agro-industrial complex have been widely used. Information data on domestic and international methodological and reference materials, data of the Ministry of Agriculture of Republic of Kazakhstan and other official sources, data of 14 regions of Kazakhstan and RK Agency on Statistics, JSC KazAgroMarketing were also used in this study. The implemented agricultural reforms and policies since independence are discussed in detail at Appendix I and II.

1.4 Significance of the problem

Of Kazakhstan's specific problems in AIM, some, but not all, are common to other post-Soviet states whereas others are unique. As a consequence, it is important to understand the barriers and opportunities in the current use of agricultural information management system to theorize on these issues and recommend solutions. The significance of the problem is based on the fact that key players in the agricultural sector need to make effective economic decisions which can assist in stabilizing the sector and supporting the overall Kazakh agricultural policy. To enable their decisions to be effective, good, accurate, and timely, management information systems are needed, yet most of the evidence (Kabanova, 2010) suggests that there are still significant barriers as well as opportunities involved in the development of MIS in post-Soviet countries. At the beginning of the 1990's, following the break-up of the USSR, fifteen nation-states was separated from the USSR, and therefore, independent policies were required for the shift from a centrally planned economy, towards separate market-led economies. Why the USSR collapsed is a question argued over to this day, but in many ways all politicians' opinions are similar. According to Maltseva (2011 p.1) in 1991, the Soviet Union was in a state of deep economic crisis. Since the Soviet economy was of a distributional nature, under a general shortage, many republics thought that they contributed to the total 'pot' much more than they received from it, and, as a result, the formation of independent countries with the transition to new market based economic systems forced the nation-states to manage their own destiny and to develop their respective economies by themselves. Consequently, this study focuses on the case of Republic of Kazakhstan (RK) because the Kazakhstani case is not fully understood by global economists, and Kazakh agricultural policy and its associated agricultural management with adaptation to the new economic system is under-researched. It will be suggested that although some of Kazakhstan's challenges are shared by other post-Soviet nations, others are unique to the country, and it can learn both from developed and developing countries' experiences. The study will specifically focus on the opportunities for development of AIM in Kazakhstan, and the potential barriers to that development.

Since independence from the Soviet Union in 1991, the need to increase agricultural productivity, combined with the aim of further participation in a global market, has become a significant issue for

agricultural businesses in Kazakhstan. This is particularly obvious when implementing a proper program and model, and when considering the specifics of the agricultural context, such as remoteness of the agricultural farms, the use of old machinery and product processing technology, the lack of qualified personnel for agriculture industry, and weak state support (Bergenov, 2004; Korotnev, 2004; Aimurzina, 2010; Tasbulatov, 2013). According to Wapakala (1982); Chifwepa (1993); Zhogoleva (1996); Richardson (1997); and Kirshke (2000) agricultural policy, with its internal procedures and requirements, and an openness towards the global economy, has a significant effect on long term economic growth and the country's economic efficiency. The move to a market economy in Kazakhstan, however, has led to fundamental changes in agricultural management associated with the transition from a centralized command-and-control system to a market economy. On this note, Kabanova (2001 p.7) states that management in an information-rich environment can be effective and transparent if it has appropriate tools for qualitative and quantitative analysis and improved decision making.

The concept of the development of agriculture is one of the main issues for the construction and strengthening of market economy principles in Kazakhstan (Ismuratov, 2000 p.12). A key point of this development is the issue of management. Researchers from the Commonwealth of Independent States (CIS) countries (e.g., Bautin, 1996; Gataulin, 1997), focus on a number of questions related to AIM and evolution of its relationship with the economy. Characteristically, they highlighted that information systems and knowledge are the items of a single process in which information has to be considered as a part of knowledge. Indeed, Bautin (1990), and Kabanova (2001) emphasized that an effective management of information flow in agriculture affects the planning and further development of the agriculture sphere. Characteristically, agricultural planning in the short term, together with statistical reporting on agriculture in the period of transition to a market economy in Kazakhstan, is not fully considered in academic studies and research, or statistical publications. As a result, the lack of detailed information creates several difficulties encountered in AIM.

According to Demiryurek (2010 p.210), the concept of agricultural IS reflects:

The components in the system of the information related processes (generation, transformation, storage, retrieval, integration, diffusion and utilization), system mechanisms (interfaces and networks) and system operations (control and management).

In agreement with this perspective, Spedding (cited Demiryurek in 2010 p.210) claims that *a system is a group of interacting components, operating together for a common purpose*. Cavallo, in the research quoted by Demiryurek (2010 p.210) states that *the system approach has also shown a high potential for offering a conceptual framework to analyse, manage and improve a current system and to design a better one*.

Roling (cited in Demiryurek 2010) defends the usefulness of the systems approach to analyze agricultural information and defines an agricultural information system as *a system in which*

agricultural information is generated, transformed, consolidated, received and fed back to underpin knowledge utilization by agricultural producers. At the same time, Shanchenko (2006 p.3) indicates that information management, appearing as part of management theory, quickly became quite independent in its meaning and shape as a promising research area in the Information Society. In this context, IM performs strategic, operational and administrative tasks and as the result it was identified as an important topic for investigation in this study.

However, despite the perspective presented above, research into IM in agricultural policy in Kazakhstan with its influence on agriculture development, has been insufficiently developed. The current study is significant as it presents a means of understanding the barriers and the opportunities in effective AIM based on the implementation of new ICT to support AP and reforms in Kazakhstan.

1.5 Study aim and associated objectives

This study concerns the nature of information management systems in the agrarian sphere of Kazakhstan. The purpose of the study involves an investigation of agricultural policy, theory and practice, the interactions and information exchanges between agrarians and policy-makers, to understand the barriers and problems in current AIM with opportunities for its development on the basis of the implementation of new technologies.

Checkland and Holwell (1998), Ramirez (1997), Garforth and Usher (1996) all highlight the effect of reliable AIM on farmers' decision-making. Although research regarding IM is vital for sound policy recommendation and requirements, providing support for agrarians, and influence on developing the agrarian sphere – it is nevertheless considered in relatively few studies (Ramkumar et al., 1995; Rolls et al., 1999; Demiryurek et al., 2008).

The theory and practice of economic monitoring and analysis, including the organization of IM, the current approaches and methods of analysis, and management tools in agricultural development in a regulated market economy form the subject of this study and enable the definition and formulation the research questions. Thus, the aims of the study may be summarised as follows:

1. to conduct a review of Agricultural Information Management (AIM) based on the implementation of new technology in developed countries, to enable better understanding of the barriers to effective development of current AIM in Kazakhstan since its independence in 1991;
2. to identify the barriers and opportunities that affect the development of existing AIM systems in Kazakhstan and other former Soviet countries, including Russia, with a similar socio-economic system of development;
3. to develop a best practice model, based on the experiences of Kazakh key stakeholders, and taking into account the strategies of both developed and developing states, for the effective improvement of AIM in Kazakhstan in the post-Soviet era.

To meet the three study aims, the thesis sets out to achieve the following objectives:

Objective 1: to describe and critically discuss the history of agriculture and agricultural policy in Kazakhstan since independence in 1991;

Objective 2: to investigate the experiences of developed countries in order better to understand the theory and practice of agricultural policy development in these areas;

Objective 3: to theorize on the experience of developed countries of using AIM successfully, to discover relevant factors for identifying and understanding the barriers in current AIM in supporting agriculture policy for developing countries;

Objective 4: to identify key players in the agricultural sector of Kazakhstan to determine their views from all levels of management on the barriers and opportunities for AIM in the country;

Objective 5: to analyze the situation in post-Soviet states regarding new ways of organizing agriculture from its low baseline in the 1990's, and thus to develop effective understanding of the evolution of Kazakh agricultural policy reforms and their contributions to economic development since independence;

Objective 6: to propose a framework for AIM development in Kazakhstan based on the implementation of new technology which both recognizes the nation's unique problems and opportunities, but seeks also to learn from the experiences of both developing and developed countries.

These research objectives relate to the following **research questions:**

1. Does Kazakhstan face unique problems and challenges in developing current AIM to support agricultural policy development, and if so, what might these involve?
2. How did the implementation of new technologies develop and improve AIM systems in developed countries?
3. How can the current AIM in post-Soviet states with similar socio-economic conditions be improved?
4. What kind of experience in AIM of developed countries might be adapted for developing countries to improve current AIM to support Kazakhstan's state agricultural policy?
5. How might it be possible to improve the current AIM in agricultural sector of Kazakhstan on the basis of implementation of new ICT, covering all regions and all levels of agriculture management for efficient decision-making, for close cooperation between farmers and agrarians, and for participation in the global agriculture market?

The current AIM used by agrarians in Kazakhstan, together with the components of the systems with their interaction and links between agricultural units, will all be critically considered during this study. Additionally, the explanatory theory developed during the research process is argued to be useful for understanding the situation in other developing countries within the former Soviet Union that have gone through similar socio-economic changes, and thus assist in finding new opportunities for AIM development.

1.6 Organization of the Study

This research thesis consists of five chapters, and the contents of each chapter can be summarised in the following descriptions:

Chapter One provides general information which focuses on the background, statement of the problem and significance of the study, research aim, and associated objectives, questions and tasks.

Chapter Two focuses on the review of extant literature in related fields for this particular research topic, in order to understand the theory and practice of agrarian policies for developed and developing countries, and examine the experience of agriculture policy in different countries with the theoretical foundations and framework for agriculture policy analysis. Chapter Two is structured as follows: first, it considers the role of agricultural policies in general, and how they have influenced and continue to influence agricultural development globally. Next, it examines the role of AIM in decision making processes with its influence on agricultural strategy development. The chapter then considers agricultural policies in developed countries, that is, agricultural reforms and policies with the focus on the impacts on the country's economic growth, in Germany, the United Kingdom (UK), and the USA. For understanding the barriers to effective AIM in developing countries, where AIM takes an especially important place on the basis of implementation of new technologies with remote access for agrarians to database and Internet sources (FAO, 2003), the situation of Russia, as the leading country among the former Soviet states, is critically discussed. Finally, the situation in Kazakhstan is considered in relation to these example nations, and the gaps in the literature, which the thesis aims to fill, are identified.

Chapter Three focuses on the research methodology. This chapter represents the methodological journey of this study where the methods that were selected for data collection and further analysis were examined. With theoretical considerations, practical issues and opportunities within the researcher's experience, Chapter Three examines the main approaches for data analysis in qualitative research with the selection of a suitable technique and defines the study design aimed at addressing research objectives and questions set out above at 1.5 of the introduction.

Chapter Four presents the qualitative data obtained from semi-structured interviews with respondents, and, in particular, the issues of causality between agricultural policy and AIM of Kazakhstan since independence in the 1990's. It examines the effects of IM on agricultural policy development from the

viewpoint of key players in the agrarian sector. The empirical investigation provides the background to examine the current AIM which can efficiently support agricultural policy for further development of agriculture of Kazakhstan. Thus, the research methodology for this study was designed to generate new data in the agricultural sphere. Qualitative data gathering was expected to produce quality data, ensuring that the researcher did not miss vital information that might come from interviews and secondary sources, which are here compared and contrasted. The chapter also discusses the implications of the data to generate explanatory theory. It points to the development of new knowledge derived from discussions of the barriers to ICT-based AIM, of the opportunities for ICT-based AIM, of ICC development, and investigation into the Kazakh context.

Chapter Five represents concluding thoughts on the key findings, on the basis of the data discussed in Chapter 4. With regard to the barriers in existing AIM, research participants considered the opportunities for improving the current information management based on the introduction of new ICT in agriculture of Kazakhstan, and the barriers to its development. Generally, the improvement of current AIM based on ICT has to be considered as a piece of research based on the conjunction of two disciplines: Agriculture, and Information Management based on ICT. The chapter sums up the explanatory theory generated from the data, and concludes the study by presenting its key contributions to the academic literature (as signposted in the previous chapter and developed in Section 5.4), its limitations, and the researcher's recommendations for further research.

Appendices

Appendix I and II are important for understanding the historical development of Kazakhstan since independence in 1991, and provide background information about Kazakhstan's agriculture, which is essential for understanding the influence of agricultural policy for development of this sector. For understanding the role of agricultural policy in Kazakhstan's agricultural development, Appendix I sets out to consider the recent history of the Republic of Kazakhstan – *the ninth largest country in the world by land area* (Lee and Tai, 2008 p.185).

Appendix II analyzes the evolution of various reforms and agricultural policy implementation since independence, and their contributions to the economic development of Kazakhstan. Additionally, agricultural policy evolution, the theory and practice of agrarian reforms and regulations for agriculture development with effective integration to World Trade Organization are all examined and discussed in Appendix II.

Appendix III reflects the description of organizations which provided respondents for participation in interviews.

Appendix IV describes the research participants' vision in relation to Kazakhstani agriculture development during the independence since 1991.

Appendix V contains the letters which were created by researcher and sent to the different regions of Kazakhstan with invitation to participate in the interview process. Brief information about the research topics, together with several questions to give an opportunity for the agrarians to introduce themselves before the interviews, was included.

Appendix VI presents a summary of interviewed research participants during the semi-structured interviews.

Appendix VII contains the tables of codes and axial codes which were created during the qualitative data analysis of primary sources which were collected by author during the interview with respondents.

1.7 Definitions of Key Terms used in the thesis (in alphabetical order) and acronyms

Adaptive Management considers as a tool which could be used not only to change a system, but also to learn about the system (Holling, 1978).

AGRIS: The International Information System for the Agricultural Sciences and Technology identifies and stores world literature dealing with all aspects of agriculture.

Common Agricultural Policy (CAP): This is the set of legislation, policies and practices adopted by the European Union to provide a common, unified policy on agriculture. The initial measures were introduced in 1962. Since then, the policy has been adapted and developed and has undergone a number of reforms (Glossary of the Common Agricultural Policy, 2014 p.7)

A Developed country is one that *allows all its citizens to enjoy a free and healthy life in a safe environment* (Kofi Annan, former Secretary General of the United Nations, 2000). The **developed countries** - the countries that provide economic development on the basis of accumulating more technically advanced capital and the availability of a highly skilled labour force. These include the U.S., Canada, Japan and most of Western Europe (Borisov, 2003 p.139).

ENRD: European Network for Rural Development. The Network was established in 2008 by the European Commission (EU) to help member states implement their Rural Development programmes in an efficient manner. The network provides a forum for connecting rural Europe

European Commission (EC): subsidiary of European Union that handles enforcement of treaties made by the union, proposed legislation, and a variety of general executive actions. The commission was founded in 1951 and is comprised of 27 Commissioners. Members are selected by their member governments, but are required to act as independents. The European Commission is the only

branch of the European Union that can formally propose legislation (EU BusinessDictionary.com, 2015).

European Union (EU): an association of European nations formed in 1993 for the purposes of achieving political and economic integration. Incorporating the European Community, the European Union's member states are Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, and United Kingdom (EU Dictionary.com. 2015)

FAO: Farm Agriculture Organization. Worldwide, the FAO operates both for developed and developing states and acts as a nonaligned forum where representatives of different countries negotiate and negotiate bilateral and multilateral agreements.

FAOSTAT: FAO Statistical Database - is an online multilingual database currently containing over one million time-series records from over 210 countries and territories covering statistics on agriculture, nutrition, fisheries, forestry, food aid, land use and population. The FAO's biggest agricultural information databases (FAO, 2004).

A Land-grant college or university is an institution that has been designated by its state legislature or Congress to receive the benefits of the Morrill Acts of 1862 and 1890. The original mission of these institutions, as set forth in the first Morrill Act, was to teach agriculture, military tactics, and the mechanic arts as well as classical studies so members of the working classes could obtain a liberal, practical education (L-G Tradition, 2012 p.1)

Oblast/ Regional center - part of the country, including several areas, settlements, formed and operated for the benefit of the country. Oblast/ Regional center is the main element of the national administrative-territorial structure. There are three levels of administrative division of the Republic of Kazakhstan: the first level includes the oblasts/ regional centers and cities; total - 14 oblasts/regional centers and 2 cities of republican values (LAW OF THE REPUBLIC OF KAZAKHSTAN on the administrative-territorial structure of the RK).

Path dependency is the view that technological change in a society depends quantitatively and/or qualitatively on its own past. *A variety of mechanisms for the autocorrelation can be proposed. One of them, due to David (1975) is that technological change tends to be 'local,' that is, learning occurs primarily around techniques in use, and thus more advanced economies will learn more about advanced techniques and stay at the cutting edge of progress (Mokyr, 1990 p.163).*

A Supranational union is a type of multi-national organization where negotiated power is delegated to an authority by governments of member states. The concept of supranational union is sometimes used to describe the European Union (EU), as a new type of political entity (Kiljunen, 2004 p.21).

WAICENT: World Agriculture Information Centre was organized to arrange and integrate strategy for the benefit of agriculture specialists and whole agriculture sectors, as a corporate framework to integrate and harmonize standards, tools and procedures for agriculture. Characteristically, WAICENT is an integrated information strategy which includes the use of fast changing technologies

Union of Soviet Socialist Republics (USSR): a former federal union of 15 constituent republics. European-Asian communist federation that lasted from 1924 to 1991 and comprised of 12 main republics (Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kirgizstan, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan) and three Baltic republics (Estonia, Latvia, and Lithuania). Then also called Soviet (from Russian ‘sovet,’ council) Union, it was the largest state in the world and had a population of some 300 million. Now called Former Soviet Union (FSU) (EU BusinessDictionary.com, 2015).

The thesis now moves to a critical discussion of extant literature and the identification of gaps in the literature which the current thesis aspires to fill.

CHAPTER 2: REVIEW OF THE LITERATURE

2.1 Introduction

The primary goal of the current chapter is to critically discuss and evaluate what academics and agricultural policymakers have written about the key themes which have emerged around the question of AIM and its influence on agricultural policy, and to indicate where the current study makes an original contribution to the literature. The first part of the Review (Sections 2.2 to 2.4) considers the nature and history of agricultural policy in general, together with the impact of ICT-based agricultural management systems (Sections 2.5 to 2.6). After this, the review focuses on specific global examples of agricultural policy and what light these might shed on the situation of Kazakhstan (Sections 2.7 to 2.13). The review is therefore structured as follows:

- i) The role of agricultural policy in a country's development, in order to understand the set of principles and actions in solving complex problems related to the efficient functioning of agriculture (Section 2.2);
- ii) The theoretical foundations and framework for agricultural policy analysis, demonstrating its linkages with the state's overall economic system (Section 2.3);
- iii) The objects, structural elements and subjects of agricultural policy, and their role in the various directions of agriculture's economic development, together with the influence of agricultural policy on economic regulation (Section 2.4);
- iv) An evaluation of ICT-based agricultural information management systems in supporting agricultural policy development (Section 2.5);
- v) The influence of IM strategy on agricultural development, with an examination of the components and activities involved in management strategy in agriculture, and the role of international organizations in AIM development (Section 2.6);
- vi) The reasons for the selection of the Germany, the UK, USA and Russia (the last as a post-Soviet state) as examples of a nation's use of AIM to support agricultural development (Section 2.7);
- viii) A comparison of the role of ICT based AIM to support agricultural policy in Germany, the UK and the USA as examples of developed countries (Section 2.8)
- ix) Taking into account the existing barriers to effective AIM for developing countries, the role of ICT-based AIM in supporting agriculture in developing countries and post-Soviet states, in particular Russia (Section 2.9).

x) Agricultural policy and the role of ICT in Kazakhstan in comparison with the example nations, to establish how these might shed light on the situation of Kazakhstan, and to consider the barriers and opportunities for agriculture policy development in the country (Section 2.10).

xii) Summing up of the extant literature, together with a statement of gaps that the current thesis aims to fill (Section 2.11).

The review is structured in this way in order to firstly consider the general role of ICT-based AIM in supporting the development of agriculture generally and internationally, then to compare and contrast the situation in developed countries and the developing world, specifically in the post-Soviet Bloc. As will be seen during the literature review and later in discussions with research participants, AIM plays a significant role in the agricultural development of developed countries and the cases of Germany, UK and USA are considered below in order to understand the opportunities in current AIM in these nations. Remote access to agricultural information and data, and Internet access to different international sources, in these states give opportunities for agrarians and policy makers in decision making, in planning and developing the agricultural business sector. As will be argued in this chapter, the unique challenges facing Kazakhstan in its use of AIM may benefit from better understanding of the experiences both of developed and developing nations. What has so far been absent from the literature is explanatory theory developed from detailed discussion with key stakeholders in the Kazakh agrarian sector, and this will be explored in the later chapters of the thesis.

The chapter begins by considering extant global research in AIM and related fields. Consequently, when studying the role of AIM in terms of its influence on agriculture policy development, it is necessary to evaluate the theories which consider the positions of agricultural economies and the role of AIM from an international viewpoint. Critical review of the theory and practice of agriculture policies for developed and developing countries must be an important issue when considering the impact of agriculture on the country's economic growth. For instance, one of the major problems in agriculture is the lack of appreciation of the influence of agricultural policy for a country's economic development as a whole (IA K-Z, 2011). It is thus essential to understand how to support agricultural growth with the further development of the national economy and the achievement of strategies for some degree of economic progress (KISS, 2008).

The current investigation compares the various opinions of scholars in the agricultural sphere with those of policymakers, and considers how their suggested strategies influence agricultural policies on the basis of new technology. The review considers the influence of these strategies on the institution of the state economy and accomplishment of economic progress. At the same time, this chapter presents a critical evaluation of AIM based on the implementation of new technology. The researcher's aim is to develop an overall understanding of the opportunities for technology-based AIM and the barriers to its development in countries with different histories of socio-economic development. Thus, the researcher aims to examine the theoretical foundations and framework for agricultural policy (AP)

analysis, together with the agricultural objects, structural elements and subjects of agricultural policy, and compare these with the experience of agricultural policy in different countries. The role of developed and developing nations in constructing dedicated agricultural policy is considered, in order to identify literature with important IM lessons. Examples include the organization of remote access for rural citizens, and cooperation between agrarians from different regions on the basis of implemented network and Internet connection, with consequent access to automated databases and agriculture information. In this context, among the post-Soviet developing countries the Russian Federation was chosen for critical investigation, given its role as former leader of the Soviet Bloc. Ultimately, it appears that opportunities for developed technology-based IM in agriculture are balanced by the barriers to its development in a post-Soviet economy like Kazakhstan, but given the country's unique challenges, consideration of the experiences of developed and developing nations is argued to be relevant in establishing a best-practice model.

2.2 The role of agricultural policy (AP) in a country's development

The development of any society is possible only on the basis of close and harmonious interaction of the main spheres of life – the political, economic and social (Serova, 1999). In the global community, amongst the various directions in the economic sphere, agriculture has occupied an especially important place in the process of countries' economic growth. FAO Director-General, Jacques Diouf, at the 27th FAO Regional Conference for Europe states:

The Europe and Central Asia region has achieved striking success in fighting poverty and food security over the last ten years...And since 1998 some 50 million people in Europe and Central Asia region have succeeded in moving out of poverty – a striking example of success in fighting poverty and food insecurity (FAO, 2010).

Jacques Diouf highlighted the key positive role of agriculture in Central Asia, noting that *the number of people suffering from hunger in these countries fell by 38 percent, from 9.3 million in 2000-2002 to 5.8 million in 2004-2006 (FAO, 2010).*

In understanding the purpose of agricultural policy, Ziyabekov (2007) suggests that, as part of overall economic policy, it is a sequencing activity of the state and authorized socio-legal institutions on the formation of cultural, social, legal and economic conditions of the rural population. On the other hand, Scott and other scholars described the role of agricultural policy as one of the instruments that *governments can use to change economic outcomes. Strategies are the sets of policy instruments that government officials can use to achieve their objectives... Policies are government actions intended to change the behavior of producers and consumers (Scott et al., 2003 p.7).* According to Khasanov and Yarullin (2012 p.19) agricultural policy is a fundamental part of economic and general policy, as it is formed in imminent connection with other policy elements: *industrial, environmental, social and foreign trade.* Consequently, agricultural policy can be defined as a system of *goals, objectives, and activities* aimed at the development of the agriculture sector. Agricultural policy was identified by

several writers (Scott et al., 2003; Ziyabekov, 2007; Khasanov and Yarullin, 2012) as possibly the main instrument to bring about changes in the agricultural sphere. In this context, it may be argued that agricultural policy is aimed at the dynamic and effective development of the agricultural sphere and thereby ensuring the growth of living standards and the social process in the country (Novichkov et al. 2001 p.8). Both statements indicate the importance these writers attribute to agricultural policy in the development of agriculture. Additionally, Zhogoleva (1996 p.41) suggests that allocation of agricultural policy is relatively independent in overall economic policy, due to the peculiarities of agriculture production and the specific regulation of agrarian relations. Among the peculiarities of the issue she suggests: *the geographical-climatic conditions, soil structure, weather conditions and location of agriculture units with access to water sources*. On the other hand, Malysheva (2013) systematized the main factors of agriculture development as: *land* (a major factor in agricultural production), *state support* (funding), *natural and weather conditions*, *scientific and technological progress*, *the price of products*, *products' competitiveness* (that is, promotion of agricultural products on the market). It appears that writers are generally in agreement as to the key features impacting significantly on agricultural development.

John and Brice (1984) note that the role of agriculture is highly relevant *to determining the appropriate 'balance' between agriculture and other sectors*. The economic life of society develops in specific laws: on agricultural processing and rural industry, on agricultural finance, agricultural marketing law, agricultural insurance law, and farming rights, for example. Agricultural policy as a part of economic policy takes an especially important place in the life of society, because agricultural products around the world are not just commodities; they are strategic commodities, one of the foundations of a normal existence and progress of society. Indeed, support of agricultural productivity is a major objective of economic policy in the wider world and the role of agriculture in the wider economy is vital. Taking into account studies of interventions of the state in the field of agriculture production, distribution, exchange and consumption of agriculture products, it is important to analyze the working and living standards and conditions in rural regions, and to understand agrarian relations on different levels. All these areas perform the main directions of agricultural policy which influence a country's economic development as a whole.

A relevant example of agricultural policy development is the Common Agricultural Policy (CAP), which represents the agricultural policy of the European Union (EU). It is discussed in detail at Section 2.6 and 2.7 below. The main aim of the CAP is to implement a range of subsidies and other programmes intended to maximize production and ensure competitive pricing among member states. It grew from the efforts of European states to redevelop the agricultural economy of Europe after World War Two. Fennel (1997) refers to *the struggle to introduce a structural policy and its subsequent unsatisfactory record, the uneasy relationship between market policy and trade policy, the question of agricultural incomes, and the broadening of policy horizons since the mid-1980s*. On the other hand, new approaches to CAP development were suggested by Ackrill (2000) who focused on certain aspects of CAP, among them: *market intervention, aimed in supporting incomes earned from farming*,

the relationships between the CAP and the EU budget. Characteristically, the themes and directions from experts were defined as a system of goals and activities directed to the development of agriculture in such developed countries as the EU members.

With regard to agricultural policy in post-Soviet states, Miloserdov et al. (2002 p.29) claim that *agricultural policy can be defined as a set of principles and actions that holds the state in solving complex problems related to the functioning of agriculture (the actual agriculture production structures, agribusiness, the agriculture market, consumption, development of rural communities).* Ackrill (2000) and Miloserdov et al. (2002) both suggest that the goals and activities of agricultural policy are generally directed to a state's agricultural development. Kirsche et al. (cited by Kuenkel in 2004 p.2) also note that agricultural policy can be defined as *the public policies developed to achieve specific objectives desired for agriculture. The fields of action in Agricultural Policy are price policy, structural policy, and social policy.*

Koester (2000) has researched agricultural market analysis and market policy, international trade in agricultural commodities and the transition of Eastern European and Central Asian economies. He suggests that upon its creation the Europe Union's CAP was designed to be a major engine of European market integration and that positive integration in agriculture would be followed by other sectors of the economy of the EU. Nevertheless, these expectations have not been fulfilled. Koester (2000 p.1) claims that disagreements in the EU, in particular touching on national interests of member states, were evidenced by yearly agriculture product price negotiations: *the annual price negotiations for agricultural products made evident the divergence in the national interests of EU Member States. Decisions were dominated by compromises between member countries rather than EU-wide interests.*

Koester (2000 p.2) adds that countries *can only be exceptional if [their] domestic political market differs from that in other countries, and if the institutional framework of decision making on the EU level allows for pursuing a particular national interest.* Furthermore, the political market does not fully grasp the situation as it fails to note that present policy decisions significantly depend on past judgments, while path dependency (see definition in Chapter 1.7) suggests that economic policies alter little by little unless there is a cardinal change, as happened in the United States' Great Depression in the 1930's. So, taking into account that policies are highly dependent on past decisions and the CAP role from the start has to mirror the national interests of EU Member States, Koester notes *how each country policy makers managed to shape the CAP in their interests and they can influence major changes in the CAP* and adds *It is important to reduce the country's influence on the further evolution of the CAP* (Koester 2000 p.2).

It seems that Koester is suggesting that individual state policy makers' influence ought to be reduced to ensure a fair role for the CAP in the agricultural development of all member states. There seems to be a general opinion that the CAP is effective *as a set of principles and actions that holds the state in solving complex problems related to the functioning of agriculture.* However, it also appears that the CAP has disadvantages in its implementation, for example, *expectations about the positive integration*

in agriculture to force other sectors to follow the same route did not materialize (Koester, 2000 p.1). EU individual Member States policy makers have managed to shape the CAP and can influence major changes in their interests. It is thus understandable, that due to the vested interests of all EU member countries, the CAP implementation mechanisms have to be constantly reviewed and where necessary challenged.

Nevertheless, the importance and significance of the CAP in Europe is evident, and several authors (Ackrill 2000, Koester 2000, Miloserdov et al., 2002) have examined its relationship with agricultural development. The situation in the former Soviet Union states will be examined below, but there is a relevant comparison between the situation in Europe after the Second World War and the break-up of the Soviet Union – in both cases there was a need for rapid change to regenerate agricultural production, which could often be difficult to implement and a frequent cause of conflict. But in the case of Europe after World War II, states were coming together on agricultural policy initiatives. In the case of the former Soviet Union, a collectivist arrangement was breaking up.

In order to more fully understand the role of agricultural policy in global society, it was considered essential to investigate the theoretical foundations and framework for agricultural policy analysis.

2.3 Theoretical foundations and framework for agricultural policy analysis

A framework of agricultural policy analysis is an organized and consistent approach for understanding the linkages in economic systems. *Most goals of government policy fall under one of three fundamental objectives – efficiency, equity, or security* (Scott et al. 2003 p.8). Scott et al. described these as follows:

Efficiency is achieved when the allocation of resources produces the maximum amount of income and the allocation of goods and services brings highest consumer satisfaction.

Equity refers to the distribution of income among groups or regions that are targeted policy makers. Typically, greater equity is achieved by more even distribution of income.

Security is furthered when political and economic stability allows producers and consumers to minimize adjustment costs. Food security refers to the availability of food supplies at affordable and reasonably stable prices (Scott et al. 2003 p.8).

Given the example of the CAP's introduction in several European countries, Scott and colleagues appear to suggest that all countries are equal participants in the process of implementing the principles and objectives of this policy. Hence, the CAP's objectives: *efficiency, equity and security* which were listed above by Scott and others (2003 p.8) should contribute to agricultural development in Europe by providing food security for the population, efficiency in the allocation of resources with maximum

amount of income, with equity in the distribution of income among participants. In practice, such a fair and equitable system is difficult to achieve, as writers such as Koester (2000) have suggested.

However, the European CAP is the instrument of action that EU governments employ to effect change in the agrarian sector, and there are three common principal categories of agrarian policies that are used to bring about change in agriculture. First is agriculture price policy; the second category is macro-economic policies (nation-wide) which *affect all commodities simultaneously*; and in addition, public investment policy, governments influence their agriculture sectors through their public investment decisions. The critical discussion and evaluation of these principal categories which were suggested by scholars (Niles and Orden 1996; Mollett, 1988; Scott et al., 2003; Cuffaro, 2003) follow below.

Agriculture price policies are commodity specific and can also influence agriculture inputs. *All price policy instruments create transfers either to or from the producers or consumers of the affected commodity and the government budget. Some price policies affect only two of these three groups, whereas other instruments affect all three groups. In all instances, at least one group loses and at least one other group benefits* (Scott et al. 2003 p.9). It seems that Scott et al. are describing the interrelation of these three categories. Mollett (1988 p.19) adds that agricultural price policy normally carries a significant impact on farm and food prices. Therefore, it is not difficult to depict the objectives and measures to achieve the performance of agricultural or food economy. It has been claimed (Cuffaro 2003) that agriculture price policy instruments create transfers between producers and consumers, and contain the following instruments:

- *taxes and subsidies*: transfers between public budget – consumers – producers
- *international trade restrictions*: taxes and quotas limiting imports - exports
- *direct controls*: regulation of marketing prices, cropping choices

Additionally, Cuffaro (2003 p.13) proposes that governments influence agriculture directly through *sector-specific measures including tariffs, inputs and credit subsidies, price controls, quantitative restrictions, and government expenditures and taxes* and indirectly their influence on agriculture has unintended effects. So, taking into account all the above listed specific measures which form the agriculture price policies, and the interrelation and influence of this category of agricultural policy with macro-economic policies and public investment policy (Scott et al. 2003 p.9), it appears that wider government decisions indirectly influence agricultural development.

Another important category of agricultural policy is **macro-economic policy** that affects all commodities simultaneously: *agricultural producers and consumers are heavily influenced by macro-economic policies even though they often have little influence over the setting of these nation-wide policies. Three categories of macro-economic policies affecting agriculture are: monetary and fiscal policies; foreign exchange rate policies and factor price (interest, wage, land rental rates); natural*

resource and land use policies (Scott, 2003 p.10). Scholars define macroeconomic policy tools based on *fiscal policies - the level of government spending and the balance between taxation and spending- and monetary policies-the control of the availability of money and access to credit*” (Niles and Orden 1996 p.1). This source appears to suggest that the role of *macro-economic policy* affects not only *monetary and fiscal policies; foreign exchange rate policies and factor price; natural resource and land use policies* but agriculture development as a whole.

The third category of agricultural policy is **public investment policy**. *Public investment policies are capital expenditures from the public budget and they can affect various agriculture groups – producers, traders, and consumers – differently* and include the following categories: human capital – education, training, knowledge, health; infrastructure –transportation, irrigation; research and technology – production and processing technologies (Scott et al. 2003 p.9). Investment from the public budget in infrastructure is an investment in specific regions; it benefits mainly the producers and consumers who live in these regions. Thus it appears that public investment policy is complicated by the fact that the infrastructure must be maintained and reviewed on a regular basis, and also because it is based on public budget that usually depends on the amount of public funds’ allocation and budget.

While Scott et al. (2003), and Agulin (1997) described the effect of these policies on agricultural development, Skidan (2010 p.59) indicates that the theoretical foundation of agricultural policy is built up from a set of legal acts, principles, methods, controls and fundamental determinants which form agrarian policy of states and their regions. The theoretical foundations and framework for agriculture policy analysis demonstrate the linkages in the whole state’s economic system on the basis of agricultural policy.

2.4 Objects, structural elements and subjects of agricultural policy

So far it appears that agricultural policy can be defined as a system of goals, objectives, and activities aimed at the development of the agriculture sector. Khasanov and Yarullin (2012 p.35) stressed that agricultural policy includes the following activities:

1. The activities of the state to create economic and financial policy in the agriculture sector by affecting its place in the economic processes through the forms and methods which are the most effective in the agricultural economy: *agriculture price policies, public investment policy and other regulations on subsidies and loans distribution.*
2. A set of actions for the state in solving complex problems related to the functioning of agriculture, for example, agriculture production structures such as *agribusiness, agriculture market, and development of rural regions.*

Moreover, some scholars add that the agriculture sector has accumulated many serious issues to be resolved, including, in Europe, at the legislative level working with other EU countries to find new

approaches to the formation of the CAP and its impact on economic processes (Khasanov and Yarullin 2012 p.35).

Agricultural enterprises and organizations as the objects of agricultural policy provide resources for production and processing of agricultural products. At the same time, to the subjects of agricultural policy belong the state and public institutions, and policy makers with their decisions in agriculture development (Nazarenko 2000 p.95). According to Kirshke (2000 p.9) *the decision making on policy is the prerogative of the highest officials and the relevant structures of the legislative and executive branches of the State. They also monitor the implementation of decisions.* It could be said, though, that decision making on policy cannot be the prerogative of only the most senior officials; it is also important for stakeholders, agrarians and farmers to be involved. For example, OECD (2013 p.115) experts proposed increasing involvement and consultation of stakeholders in the review and monitoring policy-making process. In their opinion, this will result in a balance of interests of different stakeholder groups.

Turning to the role of other subjects of agriculture policy which can influence agricultural development, Serova (1999) claims that agricultural policy should be based on scientific research, on the principle of information and data analysis, again suggesting that properly supported by adequate data, agricultural policy is a positive influence on many aspects of a nation's prosperity.

2.5 Evaluation of ICT-based AIM in support of agricultural policy development

In developed countries, the growth of an intensive and efficient agricultural production is provided today by means of the introduction of new manufacturing processes, and by improving the information and technological base in the management of these processes. Frequently a major factor in the efficiency of agricultural production is the use of modern information technologies (Lukianov, 2009). Examining the role of AIM based on the implementation of new technology, research articles and review papers have focused on investigation of recent developments in process automation, networking technology and software systems in terms of collecting and producing information related to agricultural production and the agricultural sector (Suprem et al. 2013 p.356). According to Kloudová (cited in Jarolimek and Ulman, 2014 p.13) *one of the principles that the European civilization is built upon is the equal access of its inhabitants to resources, services and generally to all results of human activity.*

In comparison with developed countries, it appears that in developing nations there are number of places and groups that do not have access to these resources, among them people living in rural areas (Tausova cited in Jarolimek and Ulman, 2014 p.13). Tausova notes that *the imbalance of economic and social relationships between cities and rural areas is generally accepted and caused by many historical, geographical, political and economical phenomena.* Thus, the development of AIM in rural regions appears to be directly related to the introduction of new ICT (Kabanova 2001, p.87). Tausova

(cited in Jarolimek and Ulman, 2014 p.13) notes that one of the key tools in rural development and exploitation of its potential is the use of the information and communication technologies (ICT).

Regarding the evolution of ICT-based AIM, scholars have stressed that throughout the 1970's the role and management of information was limited to files, file maintenance, the life cycle management of paper files, data-records and so on. According to Shanchenko (2006 p.7) Information Management (IM) is a system to collect and manage information from one or more than one source. Management means the gathering, planning, controlling, processing, evaluating and reporting of information activities in order to meet client objectives. Thus, examining the role of information and data in AIM, several scholars (Shanchenko 2006, Blandford 2007) point out that agriculture is a sector with a large volume of data in many OECD countries. Furthermore, the detailed data and information on the use of inputs or outputs as well as on the farm structure is usually collected by means of agricultural census or surveys; therefore, it presents the focus of public policy development on the significance of the agriculture sector (Kabanova 2001). Even a steady decline in the share of agriculture in gross domestic product should not affect its status. Furthermore, Blandford (2007 p.10) adds that provision of information requires understanding of policies by providers of data and understanding data supplied by policymakers as effective provision can be accomplished by constant and intense interaction between providers and users. Further, on the challenge of obtaining improved information for the decision making process, Kabanova (2001) adds that expansion of problems and goals in AIM, and difficulties in acquiring quality and precise information, is one of the main obstacles for agriculture policymakers. Information is the major element of any technological innovative process and considering information as a key component of all innovation and research processes, it is clear that information retrieval has been affected by major and rapid changes in recent years (Palmieri and Rivas, 2007 p.18).

Development of ICT, as well as information itself, is essential for the organization of scientific and technological research in the agricultural sphere. Blandford (2007 p.2) indicates that information needs to contain guides for formation, implementation, monitoring and evaluation of agricultural policy. Good information indicates deficiencies, improvements in data, quality and relevance of policy priorities. It may also propose solutions to the design and introduction of policies in such a way as to reduce the costs of gathering the information necessary to supervise the effect and efficiency of agriculture, to discover the balance between economic incentives, retrieve the requisite information and to identify the role of new technologies and ways of obtaining data. Additionally, improved information reduces policy uncertainty by identifying the importance of policy measures and ways to evaluate effectiveness in achieving their aims (Kabanova 2001 p.27). Moreover, *improved information can help to identify the impact of policy measures and to assess how effective these in achieving the policy's goals* (Blandford 2007 p.10). With regard to the areas for potential growth of rural regions and development of ICT, Jarolimek and Ulman argue that technologies are necessary for Information Management:

Information is needed for decision making while services are needed for creation of economic assets. As the IM in enterprises is described theoretically and practically, the similar structures for IM in regions need to be found (Jarolimek and Ulman, 2014 p.15).

They go on to suggest that *the contribution for the countryside is in better accessibility of information, quality communication, accessibility of services and education. And these general facts cannot bring required results by themselves without development of mutual relations and participation of all relevant regional subjects (Jarolimek and Ulman, 2014 p.13).* In this context, sharing Jarolimek and Ulman's point of view, Valdes (cited in Palmieri and Rivas 2007 p.21) claimed that:

The activities regarded as IM are very broad in nature and place particular emphasis on the development of capacities that allow institutions to create, prepare and implement top-quality information products and services that are highly creative and consistent with the dynamic of social change.

Discussing the main factors influencing the improvement of policymaking and obtaining information, Blandford (2007 p. 10) identifies two possibilities: firstly, the increase of scope of policy interest and goals related to agriculture; and secondly, the peculiar difficulties in gathering correct information associated with some of these goals, as some difficulties arise from the lack of expertise in the field of technical relationships and monitoring received information substantially in developing countries. Precise and absolute information, both qualitative and quantitative, is essential to direct the foundation, realization, observation and assessment of agricultural policy. In this context, Jelonek (cited in Jarolimek and Ulman 2014 p.15) adds *technologies provide necessary infrastructure for data and IM. And the tool for rural development is the accessibility and transfer of the information and the development of services based on the network technologies and the net economy (Liu cited Jarolimek and Ulman 2014 p.15).* These authors add:

Information is needed for decision making while services are needed for creation of economic assets. As the IM in enterprises is described theoretically and practically, the similar structures for IM in regions need to be found (Jarolimek and Ulman 2014 p.15).

According to Kaloxylas et al. (2013 p.52) *information management is compounded by specific characteristics of the agricultural sector.* These authors suggest that one of the most significant challenges is the very large number of participants in agricultural production and its supply chain. Additionally, Blandford (2007 p.12) highlights that *supplying information to policymakers is not costless*, noting that much of the data and information necessary to inform agricultural policy is provided by farmers and landowners, therefore the demands on agriculture are increased in part by provision of information. Examining the problems in agricultural information distribution, Blandford notes:

- “**information asymmetry**”, suggesting one of the problems of policy analysts is that they do not receive *proper information, as farmers are not usually supportive in providing it. This information asymmetry is an aspect of the principal-agent problem in policy implementation* (Blandford 2007 p.47).
- “**incomplete information**”, another problem in the information generated process. **Adaptive management** was considered by scholars (Holling, 1978; Allan and Stankey, 2009; Williams, 2010) as the way to deal with the challenges posed by incomplete information on complex systems. Holling (1978) considers adaptive management as a tool which could be used not only to change a system, but also to learn about the system. The National Research Council in 2004 (cited in Williams 2010 p. 1347) defines adaptive management as: flexible decision making that can be adjusted in the face of uncertainties as outcomes from management actions and other events become better understood. Careful monitoring of these outcomes both advances scientific understanding and helps adjust policies or operations as part of an iterative learning process. Later, Allan and Stankey (2009) formulated the definition of adaptive management as something which improves long-run management outcomes. The challenge in using the adaptive management approach lies in finding the correct balance between gaining knowledge to improve management in the future and achieving the best short-term outcome based on current knowledge.

Blandford (2007 p.19) claims that information gained in the process of policy implementation can be used to review objectives and methods of implementing policy on an active basis, as the idea of *learning while doing* can help to overcome issues caused by incomplete information. OECD experts note that *several innovations and developments of the existing statistical apparatus are needed if policy making is to be better informed*:

Mainly in the 1980s, waves of financial-market liberalization and product market deregulation greatly enhanced the potential efficiency of OECD economies, and also accelerated the pace of change. All these developments challenged the capacity of economies and societies to adapt. At the same time, the need to adapt was heightened by pervasive technological change, especially as the new information technologies appeared; and by the trend towards globalization (OECD, 1994).

In the late 1990's information was regularly disseminated across computer, network and communication systems using different types of operational systems and software, and by other electronic means. Individuals found themselves in a situation of increasingly complex tasks, hardware and software introduction. IM is a special area of management (Shanchenko, 2006 p.6) and this author highlights it as an independent direction in recent years, covering all aspects of management in the creation and use of information resources. The scope of IM exists in the narrow sense as the circle of control problems of production and technological nature based on the core of the organization's

activities using IS based on ICT implementation; and in a broad sense as a set of management tasks at all stages of the life cycle of the organization, including the actions and operations as information in its various forms and states, and as a whole based on information (Shanchenko 2006 p.6).

Thus, considering the role of AIM in developed countries, Blandford (2007 p. 16) claimed that both government and non-government institutions can become involved in data collection in agriculture, as consulting and non-governmental agencies have become largely involved in collecting and scattering information related to market and policy, especially in the environmental area. On the other hand, the Intersecretariat Working Group Study refer to the difficulties (both legal and technical) in trying to adapt the European Union's system on the issue of agricultural farms account, for providing more complete information on the well-being of farm households. Blandford (2007 p.40) claims that such sources of information as household budget surveys or related sources of data from research panels are useful in provision of information for further agricultural policy development. But inferring theory from this data would require the expansion of the data gathered on incomes and assets of the households. Thus, under the EU's rural development programming for 2000-2006 a process was created for monitoring the implementation of policies by EU members and for evaluating outcomes. Blandford (2007 p. 16) highlighted the influence of missing data for agricultural policy effectiveness. Such data may increase the uncertainty and even impossibility of policy implementation if there is absence of thorough information on the sources of income of farmer households.

There is no doubt that technological and methodological developments have opened up the possibility of using new methods to obtain information that can help to meet the needs of policymakers (Kabanova, 2010). Agriculture is a major user of land, water and other natural resources, so it will be necessary to monitor and evaluate policy in key areas of land use of agriculture which require information from specific locations and also to obtain and process the geo-referenced data for policy analysis. For this purpose it appears that the latest advances in technology, particularly remote sensing using satellites, have made it technically feasible and cost effective. Exploring the use of technologies for providing information, some scholars suggest that *ICT enabled services often use multiple technologies to provide information* (McNamara et al. 2011 p.5).

With regard to developed countries, it seems that *the change of conditions for managerial tasks on the farm has necessitated the introduction of more advanced activities, monitoring systems and ISs to secure compliance with the restrictions and standards in terms of specific production guidelines, provisions for environmental compliance and management standards as prerequisites for subsidies* (Sorensen et al., 2010 p.37). Farmers have often dealt with increased managerial load *by trying to handle manually a mass of information in order to make correct decisions* (ibid.). At the same time, the increasing use of computers and Internet have improved and eased the task of handling and processing of internal and external information. However, according to Sorensen et al. (2007, p.37) the collection and analysis of data still proves a demanding task: information is produced from many

sources and can be located on many different sites; information can be separate and not interrelated. *The potential of using these data will reach its full extent when suitable information systems are developed to achieve beneficial management practices* (Blackmore et al. cited in Sorensen et al, 2010 p.37).

In terms of future priorities, addressing deficiencies due to IM problems, the increased use of computers and Internet by farmers' households in many OECD states opens the possibility of collecting data for policy purposes using these technologies. This was first proposed in the fulfillment of the 2007 Census of Agriculture in the USA (Blandford 2007 p.17). Sæbø et al. note that *during the next few years it is expected that data collection will undergo corresponding changes. Electronic data collection should promote a reduction of both absolute and perceived response burden, by enabling automatic data collection from administrative data systems within the companies and by motivating the data providers by for example providing them with relevant statistics* (Sæbø et al. 2002 p.5). Regarding the situation in post-Soviet states, Ananyev and Ukhtinsky (2013 p.7) add that new directions gradually develop with the formation of information resources that include the collection, compilation and adaptation of databases, software applications and recommendations for improving the efficiency of agriculture. All of this information is brought to the regional, district, rural information and counseling centers (ICCs – see 4.5.4).

It is important to mention that writers such as Sæbø et al. (2002) and Ananyev and Ukhtinsky, (2013 p.7) have highlighted the increase of IT systems in supporting agriculture. Using electronic submission of information will lessen the response burden from respondents, increase effectiveness of data collection and processing for the development and implementation of policies (Blandford, 2007 p.46). It is clear that updated information will allow farmers to cooperate and communicate whilst challenging their knowledge and practice in agriculture with access to informational sources, knowledge base database, and statistical datasets. It provides the practice in different spheres of the economy with successful implementation of ICT to support IM. Examining the role of ICT in rural development, Jarolimek and Ulman (2014 p.14) suggest:

*The line connecting all directions of rural development is represented by the ICTs
(sometimes called with all-embracing term the Internet)*

Therefore, it is evident that the role of ICT in a country's economy takes a particularly important place. Activities under AIM include *the development of networks for timely collection of information for early warning of disasters, vulnerability assessments, food security and monitoring of weather patterns in the region; the establishment of an effective monitoring system; and the establishment of a Food, Agriculture and Natural Resources' integrated database and Networks in regions* (SADC 2010).

According to Jarolimek and Ulman (2014 p.15) *the innovative use of modern technologies of the knowledge society* is one of the ways to reduce remote rural regions' isolation, to achieve high performance activities in agricultural productivity. In this context, they suggest:

Systematic innovations with concurrence of policy, technology and social implementation are demanded to reach these goals. The goal of the ICT development in rural areas should be to reach higher quality of life and sustainable development, but not only the implementation of ICT (Jarolimek and Ulman 2014 p.15)

Scutter (cited in Mahmoodi et al. 2011 p.981) describes *the technology of production, storage, and communication of information using computer hardware and software systems and microelectronics*, suggesting that the use of ICT means *the use and maintenance of computer hardware and software systems (including webpage design software, programming software, graphical software, statistical software, scanner, printer, webcam, and videoconference software and hardware) and use of Internet to organize and communicate information electronically* (Mahmoodi et al. 2011 p.981). McNamara et al. (2011 p.4) note that wealthier industrial producers can use improved means of technologies and infrastructure: Internet, phones, vehicles, access to prices, markets, production techniques, storage, while smallholders are dependent on the word of mouth, previous experience and local leadership. European farmers are experiencing changes in managerial tasks for rural regions and farming systems. Increased attention is now given to countries' economic situation and the interaction with environmental impact. Consequently, *an integration of ISs is needed to advise managers of formal instructions, recommended guidelines and documentation requirements for various decision making processes* (Sorensen et al., 2010 p.37).

McCown (cited in Sorensen et al., 2010 p.37) argued that in designing an IS, the emphasis should be less on design and more on learning what the farmers do and how they act, so not just letting researchers design their own views of farm management decisions. Thus, specific attempts to improve this situation have included the launch of *web-based collaborative information systems*, combining different information components (models, data, text, graphics) from different but collaborating sources (Jensen et al. cited in Sorensen et al., 2010 p.37). However, according to Sorensen and colleagues, *such systems still have to be enhanced in terms of collaboration with automated acquisition of operational farm data and integration with the overall Farm Management Information System (FMIS)* Sorensen et al. (2010 p.37).

At the same time, the agricultural industry in developed countries has demonstrated how effective an integrated control of work operations can be, based on on-line measurements combined with database and decision support information (McCarthy, Riezebos et al., cited in Sorensen et al, 2010 p.38). Gunasekaran and Nagai (cited in Sorensen et al., 2010 p.38) add *this is especially the case in terms of integrating IT and ISs in supply chain activities*. Sorensen et al. also suggest that *the functional requirements surrounding the use of such technologies must be explicitly specified and add by specifying in detail the information provided and the information required for the information handling processes, the design and functionalities of the individual IS components can be derived*

(Sorensen et al., 2010 p.38). Furthermore, *the information flows may be contextualized on different levels and in different details* (Fountas et al. cited in Sorensen et al., 2010 p.38).

With regard to the development of IM in agriculture based on new technology, Attonaty et al. and Ohlmer et al. (cited in Sorensen et al., 2010 p.38) consider the execution of farm operations and plan generation. They note that *plan generation and farm operations must be linked with a system monitoring effects of actions, unexpected events and any new information that can contribute to a validation, refinement, or reconsideration of the plan or goal*. On the other hand, Kaloxylos et al. (2013 p.51) claim that *the future Internet is expected to greatly influence how the food and agriculture sector is currently operating*. These writers suggest that *the overall vision for data integration along the supply chain as well as the development and federation of Future Internet services are expected to revolutionize the agriculture sector*. AIM based on the implementation of new technology is constantly developing. According to Suprem et al. (2013 p.363) there is tremendous potential for development of IMS in the agricultural sector. It must be said, however, that there are several challenges to this happening in the case of Kazakhstan, among them: insufficient state financial support in the process of implementation of new technologies in agriculture, dispersion and remoteness of the regions and farms in Kazakhstan, the lack of qualified personnel in IT sphere in rural regions, for operational management and agrarians - the lack of knowledge in the use of computers. These issues will be fully examined in discussions with key stakeholders, as presented in Chapters 4 and 5.

Commenting on the introduction of ICT in supporting agricultural IM over the past thirty years, Murakami et al. (cited in Kaloxylos et al., 2013 p.52) highlighted the positive influence of new AIM with improvement of food production and its transportation to the end consumers. *However, the uptake of these solutions has been slow due to a number of important yet unresolved issues. Some of the key challenges for ICT in the agri-food sector are related to IM* (Kaloxylos et al. 2013 p.52). With regard to the potential development of ICT implementation in the Kazakh case, for more than 20 years since independence, and during years of reforms to eliminate the agrarian crisis, the executive and legislative authorities have taken many policy decisions. However, most were unsystematic, often directed at eliminating the consequences rather than the causes of the crisis (Shcherbak 2014 p.131). Among the unresolved issues which influenced ICT implementation in post-Soviet countries and in particularly in the Kazakhstani case, the following are argued to be relevant: costliness of the project, the lack of qualified agrarians in ICT and lack of knowledge in the use of computers, together with difficulties in implementing tele- and net- communications in rural areas due to their remoteness and dispersion (Anayev and Ukhtinsky (2013 p.4). These authors also note the lack of interest of agricultural producers in information technology and its application due to the lack of financial resources. These unresolved issues will be subsequently discussed with key Kazakh agrarians in this study in Chapters 4 and 5.

Taking into account that the agriculture sphere has been traditionally dependent on human labour and application of different mechanical equipment and agricultural machines, *the applications of advanced technology such as embedded computing, robotics, wireless technology, GPS/GIS (Geographical Positioning System/Geographical Information System) and DBMS (Database Management System) software are seen to be recent developments* (Suprem et al., 2013 p.355). Additionally, there has been significant application of standards for distributed automation, management and control, technology for the record and assessment of real-time data, and the use of GPS. The application of technology in the agricultural sector has been enormous (Suprem et al., 2013 p.356). According to these writers: *software plays an important role in food and agriculture. An efficient supply chain management strategy right from procurement to distribution is indispensable in this industry. This provides numerous benefits such as improved quality, better process control and better use of raw materials* (Suprem et al., 2013 p.356). These authors note the accelerating evolution of AIM based on the implementation of new technology. On the other hand, some scholars (Ananyev and Ukhtinsky 2013 p.1), describing the current situation in post-Soviet states, suggest that while the global and European experience of agricultural work has directly been related to IT, in Russia this trend has not been replicated. Thus, according to experts' estimates, the overall level of informatization of agriculture in current conditions is insufficient (Ananyev and Ukhtinsky (2013 p.2). They suggest the following reasons: low efficiency of economic entities, state influence on the formation processes of material-technical base and organizational-economic situation of system information; lack of information infrastructure of domestic agribusiness; low interest of economic entities in the development of information systems and the use of its products due to insufficient stimulation of production of information technology systems (ibid.). Scholars have identified that automation, comprehensive mechanization and the development of IT, allowing each unit of resources used to gain greater number and variety of high quality food, make up overall the most effective way of developing agriculture (Ananyev and Ukhtinsky 2013 p.1). Given the fact that agriculture is the largest consumer and user of natural resources and land, the sector retains an important policy status. If the policy measures are to be efficient, accurate and targeted AIM has to be provided by agricultural units.

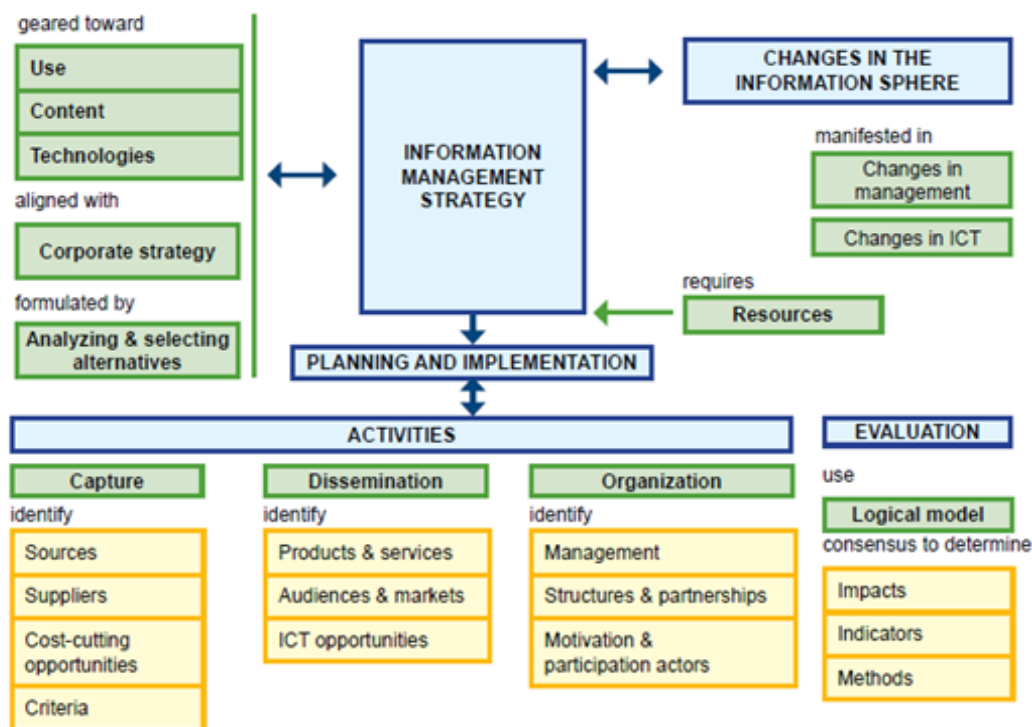
2.6 IM strategy and the role of international organizations in agricultural development

The thesis now moves to consider the role of IM strategy with its influence on agricultural development, examination of the components and activities involved in management strategy in agriculture, and the role of international organizations in promoting AIM development. Valdes (cited in Palmieri and Rivas 2007 p.21) claimed that:

The activities regarded as IM are very broad in nature and place particular emphasis on the development of capacities that allow institutions to create, prepare and implement top-quality information products and services that are highly creative and consistent with the dynamic of social change.

Palmieri and Rivas (2007 p.22) indicate that all information strategies have to be based on a set of goals and the ways to achieve them in a logical and coordinated way. While building up information strategy it is essential to allow stakeholders into the strategic thinking process as well as giving them opportunity to follow the stages of analysis, identify the alternatives and select possible options. Palmieri and Rivas (2007) claim that *the strategy is the road map of the information manager, determining the processes it will spearhead*, and reflect it in Figure 1.

Figure 1. Information strategy and management.



Source: Adapted from IMARK 2006 (presented in Palmieri & Rivas 2007 p.20)

Finally, different programs are initiated within the framework of strategic priority *to promote the incorporation of technology and innovation for the modernization of agriculture and rural development* on the basis of direct technical cooperation. In this context, IICA has an Area of Concentration for the promotion of IM to support the technological innovation processes. A number of global organizations are collaborating in this area, e.g. in capacity development and managing a system for sharing technological information on line under the aegis of the Forum for the Americas on Agriculture Research and Technology Development (FORAGRO, 2011); and the cooperation with the Global Forum for Agriculture Research to develop a strategy for attracting policymakers' attention to the importance of investing in information management systems (GFAR, 2011). Researchers suggest:

With everyone's active participation in these efforts, it will be possible to meet the challenges posed (Palmieri and Rivas, 2007 p.25).

Exploring the challenges of IM strategy, Palmieri and Rivas (2007 p.24) note that the majority of organizations have not developed a proper information management strategy as part of consistent investment policy. They rather propose several isolated, unconnected initiatives that cannot be integrated in the institutions' programming process. Thus, it was clear that to integrate the agricultural strategies and policies for the efficient and effective management of agriculture in both developed and developing countries, different international organizations and centers were established in the world, such as: FAO, AGRIS and WAICENT.

2.6.1 Farm Agriculture Organization (FAO) Worldwide, the FAO operates both for developed and developing states and acts as a nonaligned forum where representatives of different countries negotiate and renegotiate bilateral and multilateral agreements. The FAO has the biggest agricultural information databases and FAO Statistical Database (FAOSTAT) is an online multilingual database currently containing over one million time-series records from over 210 countries and territories covering statistics on agriculture, nutrition, fisheries, forestry, food aid, land use and population (FAO, 2004). Another function of the FAO is to act as a source of information and experience that aims to promote the smooth transition of developing states to a more improved agriculture, forestry and other fields to assure food security and inadmissibility of bad nutrition (FAO, 1996). The FAO has accumulated more than 50 years of information capital, one of the largest agriculture knowledge resources in existence. FAO's Strategic Framework focuses on food security and sustainable development through improvement of opportunities to increase their incomes and improve food security. The organization is also committed to the *improving of decision-making through the provision of information and assessments and fostering of Knowledge Management for food and agriculture*. FAO reported:

For the efficient and effective management and dissemination of high-quality information products which includes reliable statistics, texts and other resources and enables FAO members and others to access agriculture information. Agriculture information is essential for reducing poverty and to gain food security and sustainable rural development. (FAO, 2004)

At the same time, O'Farrell and Treinen (2002 p.2) claim that the *FAO has been developing a strategic approach to improving the efficacy of information and communication technologies and addressing the digital divide in support of enhanced food security and agricultural development*.

2.6.2 The International Information System for the Agricultural Sciences and Technology (AGRIS) identifies and stores world literature dealing with all aspects of agriculture. Operational since 1975, AGRIS has accumulated a database of more than 2.7 million references. AGRIS is a cooperative system in which participating countries input references to the literature produced within their boundaries and, in return, draw on the information provided by the other participants. At the

beginning of the 21st century, 200 national, international and intergovernmental centres participated and submitted around 14,000 items per month (Ozcatalbas et al., 2004 p.98).

2.6.3 European Network for Rural Development (ENRD): The Network was established in 2008 by the European Commission (EU) to help member states implement their Rural Development programmes in an efficient manner. The network provides a forum for connecting rural Europe. It also serves as a platform for sharing ideas and experiences as to how Rural Development programmes work in practice and how they can be improved. Its main stakeholders include national rural networks, member state authorities, local action groups and other Rural Development organisations with an EU perspective. The network shares information with stakeholders in a variety of ways, including through its publications and its participation in events and fairs across Europe (Glossary of the CAP, 2014 p.12).

2.6.4 World Agriculture Information Centre (WAICENT) was organized to arrange and integrate strategy for the benefit of agriculture specialists and whole agriculture sectors, as a corporate framework to integrate and harmonize standards, tools and procedures for agriculture. Characteristically, WAICENT is an integrated information strategy which includes the use of fast changing technologies. The main objective of WAICENT is to create and improve policies and solve problems related to AIM. Secretariat of GFAR Chaparro (1999 p.10) highlights that WAICENT is the most efficient world-wide information system that can offer access to different databases including documentary and statistical. Chaparro emphasizes the importance of CGIAR, CABI and WAICENT and addresses the importance of these players in facilitating knowledge of agricultural development as well as increasing access to agriculture information through marketing.

Chaparro (1999 p.4) adds that the rapid information flows among stakeholders can be achieved by progressive information, communication technologies and management practices, as well as reducing communication costs. An active participation in national and human awareness and education development in agriculture, particularly in the IM sphere, was identified as one of the major objectives of WAICENT. WAICENT formulate their main priority as *to educate a high number of well qualified information technologies specialists, to improve their conceptual and practical skills by providing them professional trainings and educational programs* (FAO, 1998). WAICENT supervises *Consultation on Agriculture Information Management (COAIM)* as an outreach programme. Characteristically, the major goal of COAIM was formulated as: to gather together policymakers from various Member States, also non-governmental agencies, United Nations Representatives who meet twice a year to discuss matters of decision-making in AIM (COAIM, 2000). The COAIM is focused on implementation and carrying out the goals of FAO related to food and AIM, including creation of standards and building efforts of the program to increase information and communication usage convenience (FAO, 1998).

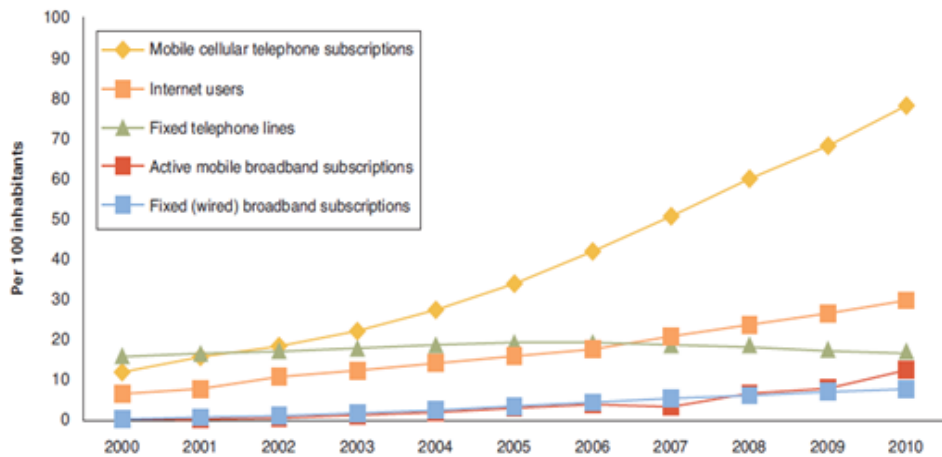
Thus, examining the activities of the above listed organizations and centres, it is evident that all directly relate and deal with the implementation of IM based on new ICT to support agricultural development. FAO recognize that *the digital divide is not just a problem of technological issues such as infrastructure and connectivity, but also a problem of effective content development, information exchange, human resources and institutional capacity, all compounded by a shortage of financial resources*. As a result, FAO identified four major priority areas where WAICENT related activities can focus to *increase the impact of information on improving the agriculture, food security and sustainable development, namely, Information Content, Information Systems, Community Development and Human Resources*. (FAO, 1998):

- a) **Information Content** is the future success factor for nations, organizations and individuals is not high-level technology but rather innovative and well-managed content and it is noted that *there are many barriers to information such as having to learn how to use the various media effectively and how to find or disseminate relevant content effectively*.
- b) **Information Systems** to develop of information systems based on non-proprietary standards, and systems that are decentralized for data ownership and quality control. FAO itself is developing specialist applications in agriculture to serves the unmet needs of this field (e.g. WebAGRIS, WAICENT Information Management Resource Kit)
- c) **Community Development** has to be effective in improving food security, and it is essential that the capacity of communities to manage and utilize knowledge be improved. Integral to this approach is the use of appropriate mixes of technology (both new and traditional), the declining cost of ICT and new technologies, and the involvement of the private sector.
- d) **Human Resource** has to be improved through the changes in policy and strategy by influencing decision-makers, and by promoting policy reform to accelerate growth of the information economy and the free flow of knowledge. FAO indicate WAICENT Outreach is actively involved in capacity building to increase the number of Information Management / Information Technologies professionals, to improve information-relevant understanding and skills in general, to coordinate training between institutions and organizations, to improve partnerships and to develop new mechanisms for collaboration. (FAO, 1998)

Considering the important role of the introduction of ICT in agriculture for developing countries such as Kazakhstan, McNamara et al. (2011 p.3) note that ICT is one of the relevant solutions to improve agriculture in developing states as neither public and private sector could otherwise find solutions to challenges in the agricultural sphere, including the issue of information needs of farmers. Additionally, McNamara et al. (2011 p.3) suggest that with development of technology, ICT now can be accessed even in small rural areas via vastly developing mobile, wireless and Internet industries. In this context, O'Farrell and Treinen (2002 p.1) claim that *ICTs are no longer considered a luxury but an essential instrument for achieving sustainable development*.

O' Farrel and Treinen (2002 p. 6) highlight that *ICT offers remarkable opportunities for the cost-effective production and dissemination of information products tailored to the specific needs of local and global audiences. FAO is well placed to fully capitalize on developments in the ICT sector. The organization will continue to make available modern tools and systems to enable the production of information products using a variety of media, such as: radio, video, CD-ROMs, as well as traditional print materials.* Development of Global ICT for the period of 2000–2010 was presented in Figure 2.

Figure 2. Global ICT development for 2000–2010.



Source:

International Telecommunications Union World Telecommunication/ICT Indicators database.

Thus, examining the barriers to ICT-based IM for rural regions in both developed and developing countries it is clear that ICT-based technologies that offer new and multiple perspectives and faster access to information take an especially important place. NARS Secretariat of GFAR Fernando Chaparro (1999 p.10) during the Conference (EFITA) presented the purpose of AIS, claiming that it assists centralized admission to the data that is located at decentralized data systems. Therefore, it forms a source of interdependent databases and services that present all necessary information to the interested users. In the context of extant literature it was clear that the new ICT tools are becoming more accessible for agrarians, and at the same time, they can obtain information, data and knowledge from various sources. Furthermore, one computer can provide information and data for a large rural community.

Electronic mail is the most commonly used new ICT and has caused a cultural revolution in the way individuals and organisations interact, in terms of time, cost and distance. The second most significant use of new ICTs is the World Wide Web, which enables people to access information on millions of other computers. (Munyua 2000 p.1-2)

The significance of modern ICT in agriculture information management is evident. Scholars highlighted that technology has taken an enormous leap in the process of storing, collecting and analyzing of agriculture and scientific-agricultural data and information.

2.6.5 Transparency index in auditing agricultural policy

A good example of current use of shared IT systems in agricultural policy development is the case of the EU's CAP. It appears that EU countries usually use the calculation of transparency index which is based on statistical data and information. For auditing purposes of agriculture business in European countries, the EU member states usually use the calculation of transparency indices.

Transparency index is a way of comparing how well EU member states are doing at providing information on who gets what from the Common Agricultural Policy (FSO, 2011).

The transparency scores are required by law to be submitted to the European Commission for audit purposes. Moreover, to calculate the transparency index, these procedures usually take into account average weighted estimates based on a number of criteria, including: the period of time for which the data were collected, the amount of detail in the data, such as geographic location, description of subsidy schemes, date, and currency (FSO, 2011). All these data are regularly updated and calculated. The EC provides the annual checking and controlling financial and economic activities of agriculture co-operations and units in European countries, provided by controlling audit and inspection committees. Additionally, a special place in the auditing process is given to the issue of farm subsidies. Thus, on the basis of data sources from non-profit organization Farmsubsidy.org (a project of EU Transparency) in 2008 Germany received €6,580 Million in EU farm subsidies or approximately €17,735 per farm, United Kingdom received €3,755 Million or its €12,517 per farm. Furthermore, the list of farm subsidy payments for each country is published directly by the government of governance or may be sourced via freedom of information requests. According to the agricultural policy goals and transparency of farm subsidies process, the detailed information of amount of EU farm subsidies has to be published on the official site of the farm subsidy organization (FSO, 2011).

The mechanisms and procedures in the process of agriculture policy implementations in EU countries demonstrate the openness and transparency of the CAP. Koester (2000 p.16) claims that institutional agreements founded in the CAP increased discrepancies in local interests but at the same time aided member states to defend their national interests. Regarding the role of a transparency index in the agriculture of Kazakhstan, Gabitov (2012) claims that much of the damage in the agriculture of Kazakhstan is caused by a general lack of transparency and openness, and it is true that the availability of information in the agricultural sector in Kazakhstan will increase the transparency of the economy of the whole country.

According to the Farm Subsidy Organization (FSO), the mechanisms and procedures to manage agriculture business in European Union countries are based on the regular inspection and auditing of information and data. The goal is to provide agrarians with consultations and recommendations, to

control the farm subsidies' procedures – and this issue demonstrates the need to manage information and data in agriculture of EU countries on a regular basis. At the same time, taking into account the aim of this study to understand barriers in the IM of Kazakhstan, and to study the ways of improving current IM on the basis of implementation of new technology to support the agricultural policy of Kazakhstan, the practice of developed countries can be a very important source of comparison.

The evolution of the CAP in EU countries demonstrates successful development of selected countries in agriculture and also highlights the role and management of information and data in the process of calculation of the transparency indexes, with the purpose of auditing the EU countries. The experience of developed countries will potentially be a useful comparator with post-Soviet states in the process of controlling and auditing agricultural development.

2.7 Rationale for the selection of Germany, UK, USA and Russia as examples of a nation's use of AIM to support agricultural policy development

To learn more about appropriate comparators it is necessary to consider the historical and geographical development of agricultural policy. Subsequently the thesis will focus on a comparison of the role of AIM-supported agricultural policy in a selected group of developed and developing countries, in order to discover how these may potentially shed light on the situation of Kazakhstan.

The current thesis aims to understand how the experiences of both developed and developing nations can be relevant in understanding opportunities for, and barriers to, AIM in Kazakhstan. In this context, many years' experience of agrarian reforms originated through the establishment of a system of state regulation of the agricultural sector in the most developed countries in the world: Germany, the United Kingdom, and the United States of America were investigated by the researcher, as well as the situation of Russia, former head of the Soviet Union. Thus, in the context of a project about Kazakhstan, this study focused on examination and comparison of agricultural development, agricultural information management (AIM) based on implementation of new technology in supporting agricultural policy development. To justify the focus on the selection of Germany, UK and USA among the developed countries, and Russia among the former Soviet states, it was important to understand and analyze each country's experience in the context of agriculture policy development and ICT-based AIM. The rationale for these choices is discussed below.

2.7.1 Germany was determined by the following criteria: this country's economic development influences the development of other EU partner countries and the world economy as a whole; according to Achalova (2007 p.11-12), in terms of GDP, industrial production, the level of economic development and other key indicators, Germany is among the top three countries in the world behind only the U.S. and Japan. The choice of Germany is also determined by significant social and economic characteristics of the country's economy, especially the combining of the Federal Republic of Germany with the German Democratic Republic, states with different socio-economic systems and levels of development, as a result of the formation, then breakup, of the USSR. According to Achalova

(2007 p.37) the collapse of the socialist regime and fall of Berlin Wall completely changed the economic position of Eastern Germany when it re-joined with West Germany. In contrast to Kazakhstan, Germany is not rich in minerals; however, it has become the largest economic power in the European region through the introduction and use of innovative technologies in various sectors of its economy, including the agricultural sector. All this suggests innovation as a key factor in the development of the German economy (World Geography, 2015). Moreover, in comparison with Kazakhstan, German agriculture fully supports the needs of the domestic market in the production of the agricultural sector (about 90% of food needs), thereby ensuring the country's food security (World Geography, 2015). The fact that German agriculture has a leading place in world agriculture after a chaotic beginning after the fall of the Berlin Wall in 1987 makes the country a good example of positive experience to compare with developing countries.

2.7.2 The United Kingdom was chosen for examination for the following reasons: the UK's agriculture now is one of the most productive and mechanized in the world. The share of employment in the industry is 2% of total employment in the country. The total area of agricultural land in the UK is 58.3 million hectares and it is 77% of all land in the country (Agriculture in Great Britain, 2015). In the case of Kazakhstan, it is relevant that farmlands make up 81.6 % of the land mass, which is nearly the same percentage as in the UK. But in comparison with the UK, about a third of the population in Kazakhstan is involved in the agriculture sphere (Pomfret, 2009), whereas in Britain the figure is around 1%. This means that most of the land in both countries, UK and Kazakhstan, is reserved for farmlands, but with a significant difference in the amount of employment for agricultural business. Moreover, the volumes of agriculture production exceed level of demand in Britain, and agriculture there can be characterized by a high level of scientific-technical progress and productivity. Thus, agriculture in Britain is one of the factors of state security which makes UK less dependent on food provision from other countries. Furthermore, *the UK becomes a world leader in agricultural technology, innovation and sustainability; exploits opportunities to develop and adopt new and existing technologies, products and services to increase productivity; and thereby contributes to global food security and international development* (Industrial Strategy, UK Government, 2015). Thus, the implementation of new technologies in UK agriculture takes an especially important place in supporting agricultural policy development (IA K-Z, 2011).

2.7.3 The United States of America is one of the most developed countries in the world; in terms of GDP, industrial production, the level of economic development and other key indicators, USA is in the first place in the world (Achalova 2007 p.11-12). According to Ovchinnikov (1999 p.3) the United States is the undisputable leader in global agricultural sector. Formation of one of the most efficient sectors of the economy over the past seven decades has been achieved by a variety of internal and external factors (Ovchinnikov 1999 p.5). In general, the effectiveness of agri-business in the US involves a high level of technology in production, processing, storage and transportation of agricultural products, ensuring high productivity. Other related conditions for success include qualified personnel, high return agricultural research, and rational specialization, allowing the best use

of bioclimatic potential of the country. The optimal structure of the agro-industrial complex virtually eliminates loss products, provides its high quality, reduces the cost of raw materials and resources per unit of the final product (Miloserdov, 1992 p.25).

On the basis of official statistics it is evident that AIM in USA, based on the implementation of new technologies, provides opportunities for USA agrarians with remote access to daily operational internal and external information for timely and correct decision making processes (Ovchinnikov 1999 p.5). Moreover, agrarians from different remote rural regions, on the basis of existing AIM, have possibilities for on-line and remote cooperation. Agricultural companies in USA receive daily operational information and have access to an informational network system about the millions of potential suppliers and consumers, among them credit rating, the dynamics of sales, productivity and profitability, product quality, as well as the income and purchases of tens of millions of households (NY City, 2013).

Summarizing the reasons for selection of these developed countries:

According to Ovchinnikov (1999 p.3) to adopt the experiences of other nations without thorough examination is impossible, and may even lead to negative consequences. This writer suggests that some of the measures, mechanisms, even programs that were used in Germany, the UK and the USA cannot necessarily be applied in the Kazakhstani context, but the basic principles of agricultural policy of advanced countries, through their experience in reforming the agriculture system, and state agriculture regulation, in general, can be useful in understanding the successful features of these developed states.

2.7.4 Russian Federation Among the developing countries, the most developed post-Soviet country, Russia, was selected for the following reasons: the state takes a leading position in economic development including agricultural economic development in comparison with other former Soviet countries; during the USSR's collapse, and since independence in the 1990's Kazakhstan continued close cooperation with Russia in many spheres of the economy; currently Kazakhstan, Russia and Belarus have created a single economic zone, and now all of these countries are members of Eurasian Economic Union (EAEU, 2015). Moreover, Russia is a close neighbor of Kazakhstan and has the longest border with Kazakhstan (the total length of the republic's borders is 13,394 km; to the west, north and north-east of the border with Russia is 6,467 km). Both countries have gone through similar socio-economic changes (Panfilova, 2013). At the same time, examining the role of ICT-based AIM in these post-Soviet countries: Russia and Kazakhstan, it was important to find similarities and differences in understanding of the barriers and opportunities in AIM development in supporting of agricultural policy in these and other former Soviet states.

2.8 A comparison of the role of ICT-based AIM to support agricultural policy in Germany, UK, USA and Russia (as a post-Soviet state)

The focus on the examination of these countries was presented in the previous section. This section will seek to discover explanations about the barriers to agricultural policy development and its influence on agricultural development in developed countries, to understand the barriers in the process of agricultural policy implementation, and to reflect on the problems that might prevent lessons being transferred from these contexts from developed countries to Kazakhstan or other former Soviet countries. The criteria of classification of the country as *developed or developing* was presented in different official sources. The definition of ‘developed country’ was described and presented in Section 1.7. Thus, in 2011 the International Monetary Fund on the basis of World Economic and Financial Surveys identified the ten largest advanced economies with highest index of Gross Development of Productivity (GDP) and listed: *the United States of America, Japan, Germany, France, the UK, Italy, Canada, Spain, Republic of Korea, and Australia* (IMF, 2011).

Examining the experience of European countries, it is pertinent to note that agricultural units, including all agricultural corporations, farms and production cooperatives, have valuable financial injections to export their products to other countries where agriculture is weak or under developed. It is evident that noticeable and systematic national help and support in the agriculture sector plays a significant role in the development of the agricultural sectors in Western and European countries. Ashurov et al. (2012 p.63) state that the developed countries act by stimulating the main lines of agricultural policy and development programs embodying the agriculture sector. It appears that, in comparison with post-Soviet countries, Western and European countries’ agriculture has developed through state incentives and according to Maltseva (2010 p.3) these governments reoriented their effort to stimulate and support domestic and foreign demand, and the protection of local farm producers. Maltseva (2010 p.2) claims that the USA financial support of their agriculture sector has become one of the important priorities in agriculture policies and this can be verified on the basis of statistical data. The sharp increase in state incentives for agriculture which began at the junction of 1970-1980 did not accidentally coincided with the rise of exports of agricultural raw materials and food from the United States (Maltseva 2010).

According to Tuimebayev (2007 p.1) food security is an international problem that is recognized as an important element of national security and is in practical terms available for each state. Developed agriculture which provides food security is one of the factors of a country’s security, since it makes it less dependent on other countries. At the same time, taking into account the achievements of these countries based on food security, the case of developed countries is relevant for this study, because their experience can be applied for understanding the barriers in agriculture development of post-soviet countries including Kazakhstan. The stages of formation and evolution of agricultural policy in EU countries are especially important not only for Russia, but also in terms of attempts to create a single market for food in the territory of the former USSR (Stepanov, 2001 p.3).

The highest level in agriculture was reached in the developed countries in Europe and North America that have joined the post-industrial age, and, moreover, agriculture in these countries employed 2.6% of the economically active population (Ashurov et al., 2012 p.65). Agriculture in developed countries is characterized by a science-based organization, increased productivity, application of new technologies and systems, agricultural machinery, pesticides and fertilizers, robotics and electronics, that is developing in an intensive way (Ashurov et al., 2012 p.65).

The experience of the European Union and its CAP over three decades can be called a ‘success story’. The general objectives of a CAP for participating European nations were defined in 1957. The late 1950s and early 1960s, following the rebuilding of western Europe after World War II, was defined as a period for discussions and creation of a common policy for agrarian sectors in Europe only for six states: Belgium, France, Italy, Luxembourg, the Netherlands and West Germany. Historically, *the creation of a Common Agricultural Policy was proposed in 1960 by the European Commission and it was followed the signing of the Treaty of Rome in 1957, which established the Common Market* (Vasilescu, 2008 p.566). CAP mechanisms with two important issues were adopted for six founding Member States, of which the first was to ensure the security of food supplies, and the second was the question of security of income for farmers (Zobbe, 2001 p.3-4).

It may be asked why only these six European countries originally participated in the CAP establishment. The European Coal and Steel Community (ECSC) was an international organisation serving to unify European countries after World War II. It was formally established by the Treaty of Paris (1951), which was signed by Belgium, France, West Germany, Italy, the Netherlands and Luxembourg. The ECSC was the first international organisation to be based on the principles of supranationalism (or supranational union, see definition in Section 1.7), and would ultimately lead the way to the founding of the European Union (ECSC, 2015).

Vasilescu (2008 p.566) adds that by 1962 three major principles were established to navigate the CAP: **market unity, community preference and financial solidarity**. Since that time the CAP has been an essential element in the European institutional system. These three principles were identified by the European Commission (EC) to guide the CAP in supporting the main directions of the six participating European countries’ agricultural development. All were established “to navigate the CAP” and aimed for successful realization of the CAP’s principles based on the creation of *market unity*, which means that agricultural products move throughout the Member States under similar conditions and supposes common agricultural prices. *Community preference* is another basic principle, in order to protect the common market against low-priced imports and fluctuations in world prices. Community preference signifies that agricultural products of European origin are bought in preference to imported products. And the third basic principle, *financial solidarity*, means that the EU Member States are jointly liable as regards the financial consequences of the common agricultural market’s policy.

Zobbe (2001 p.5) points out that agriculture is covered in articles 38 to 47 of the Treaty of Rome. These articles were about the establishment and development of the common market for agricultural products among the Member States, and approval of a new list of “agricultural products”, such as “the products of the soil, of stock-farming and of fisheries and products of first-stage processing directly related to these products”. Descriptions of the objectives of the CAP were included, together with other directions in agriculture development for participant states (The Treaty of Rome, 1957, pp.16-17). In practice, the CAP aimed to stabilize the agriculture market and find ways to increase productivity for developing this sphere of the economy. In working out the CAP the following special methods and recommendations in the process of creating it were recommended by policy makers at Article 39, point 2:

(a) the particular character of agricultural activities, arising from the social structure of agriculture and from structural and natural disparities between the various agriculture regions; (b) the need to make the appropriate adjustments gradually; and (c) the fact that in Member States agriculture constitutes a sector which is closely linked with the economy as a whole (EEC CAP, 1957).

It appears then that the CAP was intended by policymakers to be an instrument to achieve agricultural objectives and agricultural economic development. According to Stepanov (2001 p.12) EU countries historically established themselves as importers of food and Western Europe has become one of the leading (along with the U.S.) food exporters, while covering the main part of domestic demand through domestic production. Characteristically, in many developed countries, the state of agriculture defines the food security of the country (Stepanov 2001 p.12). Ulakov (2008 p.2) claims that worldwide food security is the basis of national security and an important direction of development of the agricultural sector. Food security is an integral part of the economic well-being and a fundamental vector of national security of any state. It should be borne in mind that food security is a priority for public policy, as it covers a wide range of national, economic, social, demographic and environmental factors (Ulakov 2008 p.2). Examining the experience of developed countries, Tuimebayev (2007 p.2) shows that food security is closely linked with the problem of food independence and requires economic, organizational and legal measures for its implementation. In Germany laws were passed requiring the state to consider the problem of supplying the population with food as a strategic issue. To implement this strategy, a set of measures was put in place for the formation of state food banks and to protect the domestic market food of the population. The United States also adopted a series of measures to ensure their own food security. These countries actively promote economic policy to ensure food self-sufficiency. Thus, food security is determined by the level of development of the agricultural sector (Tuimebayev 2007 p.2).

In the long term, (Tuimebayev 2007 p.2) the policy of these nations aims to overcome dependence on imported food and secure a sustainable supply of food for their own population. In assessing the success of an agricultural policy the following significant factors have therefore to be included:

increasing internal agriculture production, and overcoming dependence on food from foreign countries.

Considering this issue at the level of economic analysis, Kaliev (2003), and Dodabaev (2007) have emphasized the fact that developing countries that ignore their own agricultural development and do not produce enough food for their population will never overcome the dependence on food from other countries. Ulakov (2008 p.3) and Tuimebayev (2007 p.3) stressed that agricultural development should be considered as a mandatory requirement, even for states which lead the world community; furthermore, agriculture policy has to be a country's priority strategic policy.

Indeed, it is important to note that agriculture is the main sector of material production and takes a special place regarding specific conditions and activities in the economic sphere (Zagaitkatov and Kolesnikova 2008 p.99). According to Zagaitkatov and Kolesnikova (2008 p.99), agricultural policy in developed countries employs a strategy to combine small commodities, farms and producers of agriculture in large farms and enterprises. In line with this strategy, overseas agriculture enterprises and corporates have been created. Experience of countries such as USA, UK, and Germany demonstrate the labour capacity in big agricultural enterprises in comparison with the small farms is 1.5-2 times higher and the product's prime costs are lower. For this reason only the big ranches and agriculture corporations have become the main suppliers of agriculture products. Thus work in the agricultural sector and agricultural policy in these developed countries demonstrates the permanent national concern about new economy and technical conditions in agriculture sector to ensure business productivity (Dimitri et al., 2005; Panteleeva, 2012).

2.8.1 The Common Agriculture Policy's influence on agricultural development in Europe

With regards to economic development, it is noticeable that the share of agricultural production and employment in the agricultural sector is shrinking (Panteleeva, 2012 p.23). The productivity growth as a result of the introduction of new technologies and high-performance technology has reduced the number of people employed in the agriculture of European countries (ibid.). Furthermore, in many developed countries agriculture is no longer the dominant sector of the economy in production and employment in rural areas. That is why measures of state support for agricultural production only marginally support the economic development of rural areas in general (Panteleeva, 2012 p.23). At the same time, the growing public demand related to food security and food safety, improving animal welfare, environmental protection and the viability of rural communities, have also led to changes in agricultural policy. As described above, an example of such a transformation is the CAP of the European Union. Discussing the role of CAP which was founded with price support as the main policy instrument, Zobbe (2001 p.1) points out: *Despite massive criticism from both within the EU and outside the EU, price support remains the backbone of the CAP.*

Since the initiation of the CAP economic and political surrounding has changed substantially, specially with respect to the Community's role in production and trade with agricultural commodities,

the financial burden of its policy measures, the international attitude toward the CAP and decision making within the CAP itself (Badiane and Koester, 1991 p.199). Solomou et al. (2009 p.265) described the role of agriculture based on CAP as:

The agricultural industry constitutes a productive sector that plays a vital role in the financial, social and ecological balance of any agricultural area. Therefore, the support for an intended complete development of agriculture is – and it will always be – a primary duty of all governments worldwide.

At the same time, considering agricultural policy as aimed at the dynamic and effective development of agriculture and other sectors of agriculture with its influence in whole economy development, the European Commission (EC) measures public opinion on agriculture and the CAP, in order to both see how citizens view agriculture in general and to gauge reactions to recent developments (EC 2007 p.3). This type of investigation, which the EC provides in close cooperation with agrarians from all different levels of agriculture regions on the basis of interviews, appears to help the EC in regular analysis and revision, update and improvement of the CAP. It is noticeable that in the early years of supporting agriculture development the CAP focus was on direct subsidies to agricultural producers of six participant countries: Belgium, France, Italy, Luxembourg, the Netherlands and West Germany. Problems of development of rural areas of the EU countries in the mid-60s of the twentieth century led to the realization that the stimulation of agricultural production caused overproduction of agricultural products and the situation in the rural areas was not improved (Panteleeva 2012 p.23). CAP reform in the 1970's included structural measures focused on improving human capital. Later, these structural measures aimed to stimulate the competitiveness of farmers and rural communities. Panteleeva (2012 p.23-24) identified the following measures (Table 1):

Table 1: Structural measures aimed to stimulate the competitiveness of farmers and rural communities.

| Measure | Aim |
|------------------------------------|---|
| 1 st measure: 1959-1972 | Modernization of farms: provided support for the purchase and installation of modern equipment. |
| 2 nd measure: 1960-1972 | Supporting for early retirement of farmers who had reached 55 years of age and who had sold or transferred their farms to young farmers. At the same time the policy considered additional support for young farmers. |
| 3 rd measure: 1961-1972 | Support for training and retraining - included subsidizing the cost of training and participation in training programs for those who wanted to learn new technologies in agriculture, and for those who wanted to go to other industries and gain nonagricultural specialism. |

| | |
|---------------|---|
| | |
| Later in 1975 | The European Regional Development Fund was created. At that time, the assistance programs to support the rural areas located in unfavorable climatic conditions were launched. |
| Since 1977 | The programs for processing and marketing of agriculture products for supporting farmers were provided and formally recognized the vulnerability of all activities carried out on territories with unfavorable climatic conditions. |

Created by the Researcher and adopted from Panteleeva (2012 p.23-24)

Examining CAP expenditure in line with policy change for the following 30 years, the European Commission (EC) published the CAP post-2013 to demonstrate its evolution for the period of 1980-2012 (EC, 2014) in the following table.

Table 2: CAP evolution for the period of 1980-2012. Created by Researcher and based on European Commission information (2014)

| Periods | CAP evolution |
|------------------------|--|
| 1980's | CAP spending was mainly on price support through market mechanisms (intervention and export subsidies) which rose by the end of the decade due to agricultural surpluses. |
| Due to the 1992 events | CAP reform market price support was reduced and replaced by producer support in the form of direct payments. Spending on rural development measures also increased. |
| Agenda 2000 | CAP continued the reform process. Rural development policy was introduced as a second pillar. |
| 2003 | CAP reform: most direct payments were decoupled from current production as they were based on the farmer's historical receipts. Rural development expenditure continued to increase. |
| 2008 | Health Check continued on the path of CAP reform, further reducing market support. CAP expenditure has been stabilized and despite successive enlargements overall CAP spending as a share of GDP has actually decreased from 0.65% in the 90s to 0.45% in 2012. |

Thus, both tables demonstrate structural measures aimed to stimulate the competitiveness of farmers and rural communities and also reflect CAP evolution (EC 2014). Regarding the role of European countries in world trade, Troitskyi (2013 p.1) states that *the EU is the largest player in the field of*

international trade. On the basis of WTO data, the writer notes that the total volume of EU external trade in 2002 reached 1.87 trillion dollars, and the EU and the U.S. shares in world trade in 2002 were 18.5% and 18.7%, respectively.

It is noteworthy that the CAP protects consumers by ensuring healthy and safe products, as well as providing a framework to maintain adequate supplies to increase agricultural productivity and to ensure that both sides – on one hand consumers and on the other producers – receive a fair deal in the market (EC 2007 p.9). However, major agrarian reforms in the EU countries are strategic tasks of the state, and are usually characterized by fundamental changes in ownership, social structure, methods and tools of management. As Termeer and Sibout (2012) suggest, most policy decisions in Western countries have been developed through the participation of three groups, namely: the Ministry of Agriculture, farmers' organizations, and agricultural policy makers in Parliament.

At the same time, Wiskerke et al. (cited in Termeer and Sibout, 2012 p. 2) note that the growing public and political concerns about the negative effects of agriculture modernization, such as overproduction, the degradation of nature, pollution of environment, animal diseases and animal welfare issues, have delegitimized agricultural policy and the large amount of tax money flowing to farmers. In this context, Meester (cited in Termeer and Sibout, 2012 p.2) notes:

Traditional agricultural price and income support policies are losing their importance. Food safety, animal welfare and other so-called consumer concerns, as well as the protection of the natural environment and the countryside, are increasingly the central issues, even in the (European) Council of Ministers of Agriculture.

In the response to the existing questions in CAP the EC began reforms on this issue with public debates between April and June 2010, then in July, 2010 a public conference followed at which 600 people participated. The purpose of the debates was based on different sectors of society with the participation of all Europeans in these discussions. Dacian Cioloș, Commissioner for Agriculture and Rural Development (EC A&RD, 2010 p.3), analyzing the history of the CAP, states:

For 50 years, the European agriculture policy has fed the European project. This policy is not only tailored for farmers but for all European citizens. It concerns all of us.

Additionally, he claims that the CAP is a policy for food security for citizens and a decent living for farmers and adds that feeding Europe's citizens is still a great challenge. But that is not all. The CAP is also about landscapes, employment, environment, climate change and biodiversity (EC A&RD, 2010 p.3). Based on the public debates which were organized by EC in 2010, the CAP towards 2020: meeting the food, natural resources and territorial challenges of the future with three outlined options for the future CAP development, was presented in 18 November 2010 (EC, 2010). In the process of policy improvement over 500 contributions were received, 44% of which came from the farming and processing sector, suggesting the active participation of agrarians and farmers in this important

project. Contributions and impact assessment evaluated alternative scenarios for the evolution of the policy on the basis of extensive quantitative and qualitative analysis (Communication from the Commission, EC, December 2014). Thus, on the basis of debates and communications, in 2011 the EC presented a set of legal proposals to reform the CAP after 2013. In the course of these discussions, the overwhelming majority of views expressed suggested that the future CAP should remain a strong common policy structured on the following strategic aims:

- To guarantee long-term food security for European citizens and to contribute to growing world food demand, expected by FAO to increase by 70% by 2050;
- To support farming communities that provide European citizens with quality, value and diversity of food produced sustainably, in line with environmental, water, animal health and welfare, plant health and public health requirements;
- To maintain viable rural communities, for whom farming is an important economic activity creating local employment; this delivers multiple economic, social, environmental and territorial benefits. (Communication from the Commission, 2010 p.2)

The EC additionally identified that reform of the CAP *must also continue to promote greater competitiveness, efficient use of taxpayer resources and effective public policy returns European citizens expect, with regard to food security, the environment, climate change and social and territorial balance. The objective should be to build more sustainable, smarter and more inclusive growth for rural Europe* (Communication from the Commission, 2010 p.3).

The experience of three major developed countries with regard to agricultural policy and attendant support from ICT will be presented in the following sections, beginning with two EU members, Germany and the UK. The evaluation of these countries' experiences of ICT-base AIM arguably will ultimately generate explanatory theory that could apply also to Kazakhstan and other post-Soviet countries that have gone through similar socio-economic changes.

2.8.2 The role of the CAP in German agricultural development

The CAP has been an added value for European integration and has played a crucial role in European integration from the very beginning (Moehler, 1997). According to Shcherbak (2014 p.131) CAP of the EU plays an important role in meeting the challenges of food security of the EU and the stability of the EU's agricultural business. The CAP is concentrated primarily on the food security of states - members of the EU and its population, as well as the interests of its agricultural sector (Shcherbak, 2014 p.130). Thus, promoting agricultural development in EU countries participants from all countries have played a very significant role in the process of creation and implementation of CAP. The role of Germany in the CAP was described as *the largest absolute contributor to the EU Budget and the third largest CAP beneficiary, that represents a powerful actor in the current and future discussions on*

European agricultural policy (Ecologic Institute, 2014). To understand the policy formation of any country, Koester (2000 p.1) states that the political market must be thoroughly analyzed since one member state's domestic political situation might significantly diverge from other member states if the EU organizational policy allows fulfillment of a specific national interest.

The CAP mirrors the national interests of European countries and Germany is one of these countries where the important role of the CAP in the EU's development is evident. This was highlighted in OECD (2004) reports. Examining the role of Germany in the CAP, the German ex-Minister of Food, Agriculture, and Consumer Protection, Ilse Aigner, states that *Germany supports abolishing export subsidies by 2013 and continuing trade reforms to increase the competitiveness of European agricultural products and stability in the world food market* (Ministry of DA&CP, 2014).

The Agricultural sector in Germany and the European Union (EU) is densely regulated by agricultural policies and depends on considerable public support. The sector received transfers by consumers and the government (measured in PSE – producer support estimates) as high as 37% of the production value in the European Union in 2003 (OECD, 2004).

Additionally, examining the role of Germany in the formation of agricultural policy for European countries and Germany's particular interest in the foundation of the CAP, Koester (2000 p.16) notes that agriculture price levels in Germany at the beginning of 2000's were one of the highest in comparison with other EU member states, therefore Germany had to undergo political pressure to continue the policy of high prices for agriculture products. According to the WTO, Germany comes in second in global agricultural trading after the USA and the Netherlands. German agricultural exports have more than doubled since 1990 and quadrupled since 1980 (FM of FACP, 2010 p.17).

In 1992 EU agricultural reforms cut market price supports, replaced artificial prices with government subsidies, and, at the same time, established a strict control on output volume. *It should be noted that the 1992 CAP reform boosted budget outlays on the Community level* (Koester 2000 p. 14). Thus, CAP measures and reforms promoted effective farming methods and more ecologically safe agriculture production. The German government, in their turn, provided financial assistance for agriculture development. In 2011 this amounted to 86 billion euros (ÓGráda (cited in Shcherbak 2014 p.131). The federal and state governments offered financial assistance for agriculture development, land consolidation, village renewal, and construction of country roads. Surely, these changes also affected Germany's agriculture development. Koester (2000 p.15) claims that due to Germany's virtuous policy on agriculture protection in comparison to most EU member states, German farmers were better disciplined and prepared than in other countries of EU. Koester (2000 p.13) describes the family farm business in Germany as one of the most important in German policy making, as the family farm was believed to be the most efficient farm organization, having its peculiar value of contributing to specific objectives in society. Before the unification of Germany, the policy was

focused on having as many family farms as possible. Further, Koester (2000 p.13) highlights that the German government believed that an increase in family farms would motivate the prompt progress of farm structures and therefore subsidized family farms more than any other organizational forms of agriculture. However, the evolution of the CAP did not meet the expectations of German agrarians and as a result, in the western states of Germany, the number of farms decreased dramatically. Germany's agriculture was undergoing such rapid structural change that during 10 years, the number of farms declined by 25 percent (Specific Information Requested from the German Farm Accountancy Data Network-FADN, cited in Witzke et al. 2007 p.4). The larger a farm, the higher is the proportion of rented land. This is due to the fact that in Germany, individual growth of farms is predominantly realized through land rental rather than land purchases (Witzke et al. 2007).

Koester (2000 p 13) notes that in the seven year period after unification single-owner farms' productivity dropped sharply and the policy and the core value of German authorities *family farms are the best and natural organizational form of agriculture production* was challenged. With large farms increasing profits in a few years after the fall of the Berlin Wall, the German government weakened its request to conserve small family farms and therefore expressed willingness to accept CAP reform in 1992. Based on the implementation of the CAP in Germany, in the process of unification of single owner and small farms these types of farm had a number of difficulties in the process of agricultural production (Koester 2000). For example, they did not provide an efficient system of material - technical resources, the system of procurement, storage and marketing of agricultural products. In most cases, the process of agricultural production was based on the use of low-mechanized technologies and the percentage of manual labour was very high. Excessive distortion adversely affected the development of educational, cultural and intellectual standards of the farmers at lower socio-economic levels. All these factors directly affect the competitiveness of their products on the market, and so this case explains why the product price in Germany was higher in comparison with other European countries. Thus, the process of unification of single-owner farms to large farms was not painless at the beginning but later, after several years, large farms became highly profitable. But a different view of the role of single-owner farms and family farms was reflected in the following statement: *family farms around the world feed their country, at the same time solving problems and food security and sustainable rural development* (Bashmakova 2014). In this way Germany and the USA – as will be seen – developed along similar lines, firstly, by supporting small agricultural businesses and family farms, but after several changes in strategy the governments in both countries reoriented to support large agricultural businesses.

Taking into account the structure of German agriculture before the implementation of the CAP, the researcher found several similarities with the Kazakhstani agriculture system during its independence; for example, the process of unification of single-owner farms to large farms was not painless for German agriculture, especially after reunification. The same problems such as: structural changes in agriculture of Kazakhstan, unification of small farms to large, and addition, the distortion of a central

planned system with transition to a new market economy relation, also faced Kazakhstani farmers during the period of gaining independence. Moreover, single owner and small farms in Kazakhstan have a number of problems, for instance, in limited state financial support and aids in comparison with large enterprises and farms; most of them technically were not well-equipped and, as the result, less profitable in production of agricultural goods. In this context, Darinov (2011 p.5) adds that the Ministry of Agriculture, when developing the agricultural policy of Kazakhstan, does not fully take into account the interests of small and medium-sized rural businesses, does not meet the expectations of the rural population, and, most importantly, does not contribute to the dynamic development of the agriculture sector.

Returning to the examination of German agriculture, several years after the implementation of the CAP, large farms in Germany became highly profitable, because using public investments the large farms became more equipped and processes in agriculture were automated, new mechanisms and equipment were implemented to support agriculture (Koester 2001 p.17). These solutions could arguably be considered with regard to the same problems in Kazakhstani agriculture. However, agriculture in Germany is well-equipped and mechanized; this is one of the leading countries in the use of technologies in agriculture production (Achalova 2007 p.11-12).

2.8.3 The role of ICT-based AIM in support of German agricultural policy development

Examining the role of new technology in the agriculture of developed countries, Lukiyanov (2012) notes that the development of intensive and efficient agricultural production has been provided by means of the introduction of new manufacturing processes, and by improving the information and technological base in the management of these processes. As a rule, the main factor of agricultural production's efficiency is based on modern information technology. Thus this section considers the role of IM in supporting German agricultural policy development.

Stricket et al. (2003) note that the use of IT *is widely spread among German farmers, the majority of farms have a PC, use it to connect to the Internet and are frequent e-mail and web users.* And also on the basis of interviews with farmers, these writers suggested that *the vast majority of farmers use the Internet to access information and the majority thinks the quality of this information is better than that received through traditional media channels.* They add:

The wide use of information and communication technology in Germany had begun around 1990 and was accelerated by the opening of the Internet to the general public in 1995 (Stricket et al. 2003 p.8).

Additionally the vast majority (between 85% and 95%) of farms had a computer. Agricultural software used most often in crop management programs, bookkeeping software, cattle management and pig management software (Stricket et al., 2003 p.8).

These writers highlighted the increase, at the beginning of the twenty-first century, of Internet use in German agriculture, suggesting that *Internet access is widely established among German farms; between two thirds of all farmers and in some regions even 83% of farms have access*. Also, Stricket et al. (2003 p.8) noted that *young farm managers with higher education are more likely to use the Internet than their older, less educated peers*. In Germany *Internet technology is well established and it works with sufficient speed at acceptable costs* (Stricket et al. 2003 p.8).

On the other hand, when one examines the situation for the same period of time in post-soviet countries, at the beginning of 90's during the initial period of independence, not one farmer in Kazakhstan used a PC in their agriculture business, and the same situation existed in other post-soviet countries. The lack of interest of agricultural producers in information technology in their use in agriculture was explained by Ananyev and Ukhtinsky (2013 p.4) as a case of insufficient financial resources. However, in the market economy, priorities have now changed in the direction of improving the agricultural sector at the present time in Russia and other post-Soviet states agriculture, and a technological revolution is beginning to happen (Ananyev and Ukhtinsky 2013 p.1).

Thus, taking into account the leading role of Germany in agricultural development among the European countries, *the vast majority (between 85% and 95%) of farmers use computers in their daily work, and the wide use of information and communication technology that began in 90's, progressed during the following 5 years with opening of the Internet to the general public* (Stricket et al, 2003 p 8).

2.8.4 The United Kingdom: the CAP in agricultural development

The United Kingdom's agricultural development was selected for examination in this study because of the UK's stable economic development, the country's role in the world community and international trade, as well as the role of innovation and advanced technologies in the development of the agricultural economy. The United Kingdom is one of the major members of the European Union (EU), although it only joined the European Community in 1973. Concern about the British economy's performance led economists and governments to focus on external alignments and trading relationships, paying attention to highly successful economic integrity in Europe (Hansin 1997). In the early 1960s, the UK faced gradually increasing economic problems. Chronic deficit in her budget and the devaluation of the pound sterling weakened the role of Britain in the world (Hansin, 1997). Thus, twenty-two years after the EEC was formed, the UK finally became a member at the third attempt. The attempts to join the European economic integration were rejected twice by French President De Gaulle, because of his belief that Britain would be the US "Trojan Horse" within the Communities and would spoil his ambitious plan to become the leader of Europe. However, soon after De Gaulle's resignation from office, the new French President Pompidou opened the way to the United Kingdom to become a member of the EEC (Hansin 1997).

The UK joined what would become the EU with Denmark and Ireland on 1 January 1973 and accepted the existing CAP, agreed by the official House of Commons Environment, Food and Rural Affairs Committee. This was a policy which UK had played no part in shaping and it aimed *to create a single market in agricultural produce in the EC*. The CAP also gave preference to European countries *to produce over that from other countries with no barriers to trade in agricultural produce between Member States*. Thus, at the beginning of the 1970's *the CAP was devised when there were still food shortages in parts of Europe and when many farms were very small enterprises*. As the result, *Treaty (Article 33) places ensuring the availability of supplies and a fair standard of living for the agricultural community amongst the objectives of the CAP* (EUROMOV, 2008). Before the UK joined the EC, EU countries had their own *elaborate and expensive system of agricultural subsidy*. *Increasing production was also the major objective of British agricultural policy at that time, with subsidies for converting grassland into more productive fields, for taking out hedges and for the use of fertilizers* (EUROMOV, 2008). By accepting the existing CAP, the UK Government formulated the "Vision for the Common Agricultural Policy" for agricultural development in EU countries for the next 15 years. The document was published by the Treasury and Department for Environment, Food and Rural Affairs (Defra) in December 2005 and set out a vision for the future of the European Union's CAP. *The document defines its vision for agriculture within the next 15 years, stating that it should be:*

- 1. Internationally competitive without reliance on subsidy or protection;*
- 2. Rewarded by the market for its outputs, not least safe and good quality food, and by the taxpayer only for producing societal benefits that the market cannot deliver;*
- 3. Environmentally-sensitive, maintaining and enhancing landscape and wildlife and tackling pollution; socially responsive to the needs of rural communities;*
- 4. Producing to high levels of animal health and welfare; and non-distorting of international trade and the world economy* (UK Agriculture, 2011)

These aims were formulated as a long-term perspective for agriculture development in EU countries with its effect in practice on the world economy and international trade development. The attitude of the UK to the CAP has been described as follows:

Although the UK has never been keen on the CAP, because of its cost and its focus on supporting less efficient small farms, the policy has achieved its goal in improving Europe's ability to feed itself and, in recent years, great progress has been made to make the policy more rational and less trade distorting. The EU now needs other industrialized countries – notably the USA – to make similar reforms (EUROMOV, 2008).

At the same time, they add that *the UK will be in the lead among other member states wanting to see further reductions in CAP expenditure before the present funding arrangements expire in 2013*

(EUROMOV, 2008). This suggests that the UK is not completely convinced by the existing CAP mechanisms in funding arrangements and planning to play a leading role during the discussion of this issue. Kuenkel adds:

Within the EU, new debates have emerged on the financing of the CAP. Especially those countries that are “net payers” to the EU, like Germany, Netherlands or Great Britain argue for the need for further reform and limitations of expenditures (Kuenkel 2004 p.4).

The financial subsidies which affect agricultural development, and the analysis of subsidies and other investigations to agriculture sphere development are important directions in agricultural development. Additionally, the revision of proportion between assignments and farms' incomes can demonstrate the case of financial support according to the CAP (FSO, 2011). For example, the proportion between assignments and farms' incomes: in the UK the subsidy works out 27.2% of Internal Gross Production (IGP).

Taking into account the progressive technology implementation in UK agriculture, it is important to examine the role of information management based on new technologies in supporting the UK's agricultural policy development.

2.8.5 The United Kingdom: the role of ICT-based AIM in supporting agricultural policy development

Considering the information and communication technology (ICT) as a platform for AIM, McNamara and colleagues note:

Information and communication have always mattered in agriculture. Ever since people have grown crops, raised livestock, and caught fish, they have sought information from one another (McNamara et al., 2011 p.3).

The electronic data processing issue was examined by Anderson (cited in Blandford, 2007 p.46) in the USA and UK. Anderson observes that farmers may be more willing to share data on their farm businesses if they will have access to databases that allow them to compare their performances with other farms, by thus obtaining opportunities to increase their own efficiency and profitability, as it is provided to participants in ARMS survey in the United States. The Department of Environment, Food and Rural Affairs (DEFRA) in the United Kingdom is currently developing a database which will simplify the data transfer required by different programs and will enable access to information and recommendations to improve management skills in the agriculture (UK AGRICULTURE , 2011). At the same time, it keeps track of the necessary aspects of the farm, as the means of mechanization, the animals are equipped with miniature computers connected to the network via the Internet and the farmer can set different types of sensors in the appropriate places and have access to them at any time, so allowing access to all data needs (Ananyev and Ukhtinsky, 2013 p.5).

Warren (2002 p.3) notes *ICT can be used to embrace a multitude of standalone media, including telephone, television, video, teletext, voice information systems and fax, as well as those requiring the use of a personal computer fitted with a modem.* Warren adds *the intrinsic and instrumental importance of IT in agricultural management is such as to make it a significant factor in the future competitiveness of agriculture*", and claims that *"empirical study in the United Kingdom suggests the emergence of a digital divide which will create pockets of relative or even absolute disadvantage within agricultural society.*

It appears then that, with some exceptions, use of ICT is now widespread in Germany and the UK, and continues to impact on the development of agricultural policy in both countries. The thesis now considers the situation in arguably the world's most highly developed industrial country, the USA.

2.8.6 The role of agricultural policy in the USA's agriculture development

Examining the history of American agriculture at the outset of the twentieth century, Paarlberg et al. (2000 p.136) characterized it as demographically large, poor and less productive in comparison with other spheres of economy. Yet now, in the twenty-first century, *American agriculture is one of growth and prosperity, achieved through adjustment and change* (ibid.). Exploring the role of agricultural policy in USA economic development, Panteleeva (2012 p.5) states that agriculture programs support the development of all types of economic activities at the rural areas: hunting and fishing economy, environmental organizations and recreational purposes, forestry, and fishing. American agriculture underwent huge changes since the early 20th century when it was *labor intensive, and took place on a large number of small, diversified farms in rural areas where more than half of the U.S. population lived* and, on the other hand, *concentrated on a small number of large, specialized farms in rural areas where less than a fourth of the U.S. population lives. These highly productive and mechanized farms employ a tiny share of US workers and use 5 million tractors in place of the horses and mules of earlier days* (Dimitri et al. 2005 p.2). Describing changes in farms, farm households and rural communities, and in the whole agricultural sphere across the century, the writers concluded:

As a result of this transformation, U.S. agriculture has become increasingly efficient and has contributed to the overall growth of the U.S. economy (Dimitri et al. 2005 p.2).

Examining the difficulties in USA agriculture, DBGS (2009) notes that expansion led to over-production and made it difficult for farmers to sell their products in the market. Despite over-production and attempts of Congress to regulate the situation, the agricultural economy of 1920s sustained continuous depression, as large surpluses were followed by lowering prices, and at the same time farmers were burdened by enormous debts. Therefore, between 1920 and 1932 one out of four farms were sold to cover financial debts and many farmers migrated to urban areas. It was the period of the Great Depression in USA. Thus, the situation in the farming system was made worse by the

policy of the US government. *Farming did not do well in the 1920s....During the 1920s more than 600,000 farmers went bankrupt* (DBGS,).

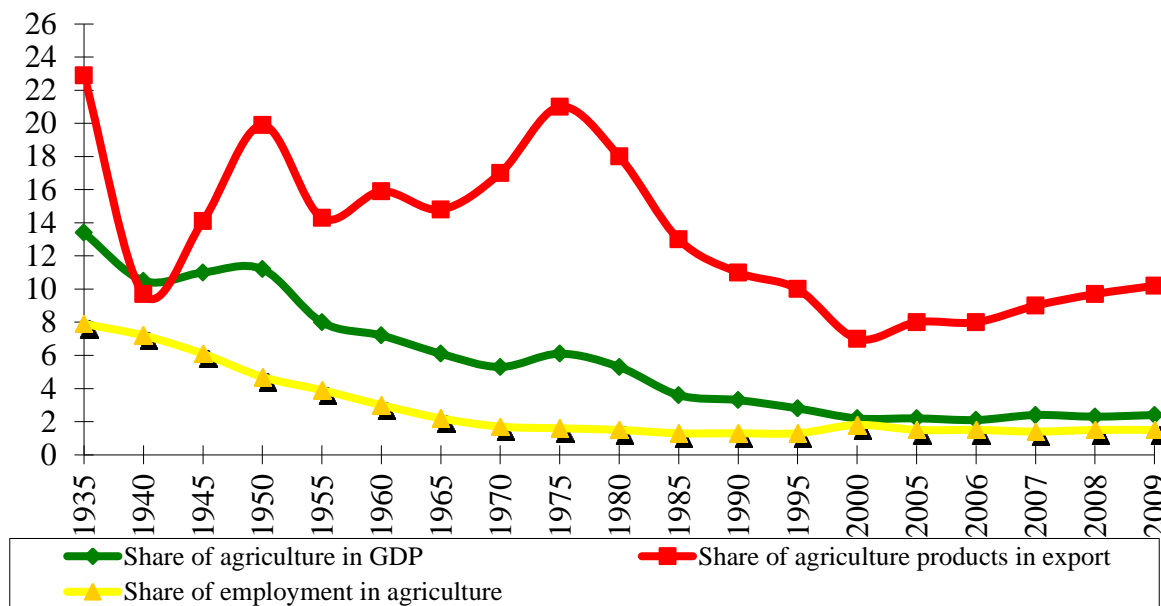
At the beginning of 1920 several agriculture regulations were accepted for improving the situation in agriculture and economy as whole. Thus, in 1921 the Packers and Stockyards Act was passed and in 1922 Capper-Volstead Act, which regulated livestock and protected farmer cooperatives' interests. Those regulations in agricultural policy began to become more helpful for farmers. Considering the previous experience of agricultural policy to agrarian development, according to Fox (1987 p.55), agricultural economics in the United States was officially defined as a special area in 1922 when the Bureau of Agriculture Economics was founded. The US government's early attempts to escape from the economic depression ended in failure. In this context, Tweeten (1998 p.7) adds:

The American agricultural economy deteriorated further with domestic and export demand falling with the Great Depression. Farm income per capita dropped to as one-third of those non-farmers; up to three-fourths of the farm population was classified as poor.

To overcome the crisis, the American federal government accepted the Agricultural Adjustment Act of 1933 – the 'grandfather' of today's commodity support programs (Tweeten, 1998 p.7). The writer adds *some characteristics of American agriculture...make it unique among sectors, but mostly are part of an earlier stage in the agricultural transition*. The purpose of Tweeten's studies is *to glean lessons for other countries from American agricultural policy*. His view is supported by others: *the transformation in American agriculture and rural life over the last century has been driven by long run economic developments, as well as periods of economic crisis*. Dimitri et al. (2005 p.6), suggest the most influential trends are *technological development, the rise of consumer influence in agricultural production, and the increasing integration of American farming into national and global markets*.

Further, considering the dynamics of agricultural development in U.S. and taking into account the role of the agriculture sector as the dynamic and effective development of economy that is ensuring the growth of social progress and living standards in the country, it is relevant to consider the ratio between shares of agriculture in GDP, agriculture products in export and employment in agriculture for the period of 1935-2009 in U.S. (Figure 3) The diagram demonstrates the GDP decline from 13.4% to 2.4%, of exports - from 22.9% to 10.2%, of total employment - from 7.9% to 1.5% for the period 1935-2009.

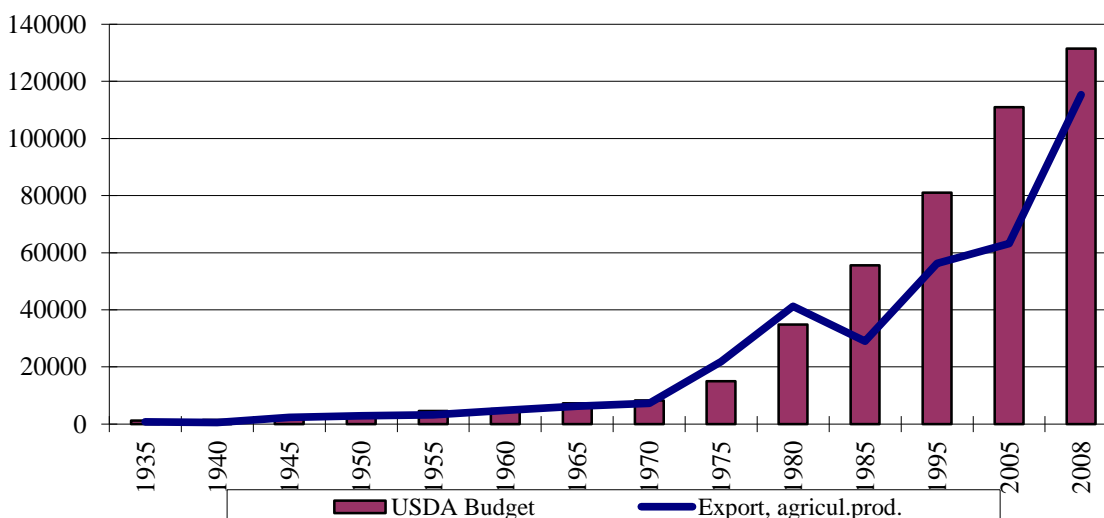
Figure 3. Agriculture for the period of 1935-2009.



Created by: Mini-Historical Statistics. Value of US Agriculture Trade by fiscal year, 1935-present; Statistical Abstract of the United States 2008. Agriculture Outlook tables 2010.

In 2008, at the height of the global financial crisis, the USA government allocated 131.5 billion dollars to support the agricultural sector. The sharp increase in government incentives towards agriculture, which began at the turn of 1970 and continued until the 1980’s, coincides with the take-off dynamics of export of agriculture raw materials and food products from the U.S. The curve (Figure 4) illustrates the fact of the increase of the U.S. exports of agriculture products based on the comprehensive support of the state.

Figure 4. Proportion between the dynamics of state agriculture support and export of agriculture products, U.S. (million dollars).



Created by: Mini-Historical Statistics. Value of US Agriculture Trade by fiscal year, 1935-present; Statistical Abstract of the United States 2008. Agriculture Outlook tables 2010.

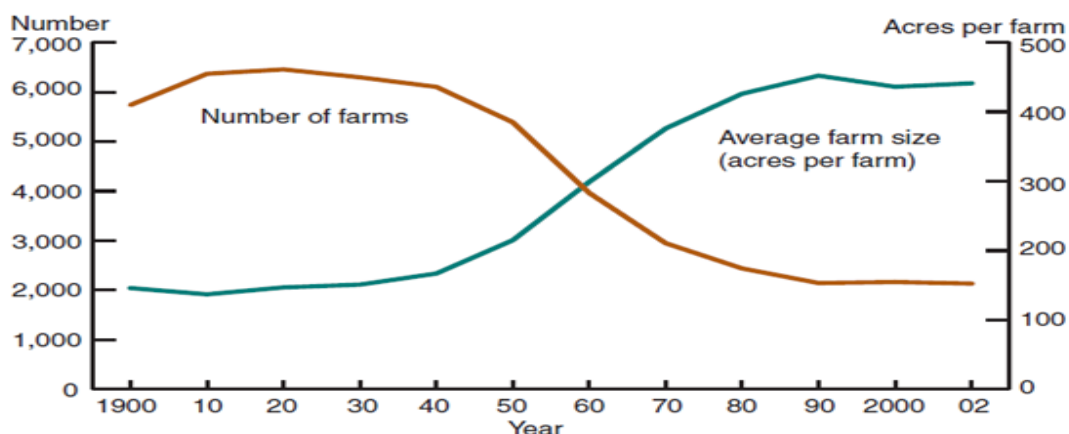
For the period from 1993 till 1994, the US government invested about 63 milliard dollars from the federal budget to support the agrarian sector. Of this, 20 milliard dollars was directly invested to farmers. In 2008, at the height of the crisis, the U.S. government allocated 131.5 billion dollars to support the agricultural sector against, for comparison, 4.8 billion dollars budgetary support to agriculture in Russia in the same year (Maltseva, 2010 p.3). This means that the USA government reoriented their effort for stimulation and supporting of domestic and foreign demand to the protection of local farm producers (Maltseva, 2010 p.3). And, with the entry into the age of high-tech, agriculture continues to be the focus of U.S. authorities.

The situation in USA agriculture development differs significantly from the Kazakhstan or other post-Soviet countries context, but the basic principles of agrarian policy of US, for example, reorientation of state effort for stimulation and supporting agriculture with the protection of local farm producers, can be investigated for application to the Kazakhstani case. In this context, Ovchinnikov (1999 p.4) adds *the most valuable are not specific details, but the basic principles of agrarian policy of developed countries, their experience in reforming the system of state regulation of agriculture, together with their experience in reforming the system of state regulation of agriculture, in general.*

Scientific research work in the USA into agricultural problems and issues is usually provided by government assignments. All expenses for gathering information of farms' productivity, research-and-development activities, and management science for realization in practice are usually based on the government's financial budget (Maltseva, 2010 p.3). Scientific recommendations give farmers an opportunity to realize their innovations and take cheap rate credits for doing their business and for improving the current situation. In total, in USA the budget assignments to the agriculture sphere are 6 times higher and this is 40% of farms' gross production. All these assignments were directed for agriculture modernization, in the form of technical equipment, machines and applications for modern scientific achievements (Maltseva, 2010). Beck (2008) states that the different types of subsidies and donations to the agrarian sector in developed countries aggregate the amount between 40% and 80% from all produced product cost.

Among the reforms which were implemented in supporting of the USA's agriculture policy, the decrease in the number of farms with the increase of their average size to make them more specialized takes an important place (Dimitri 2005). The result of these reforms is demonstrated in the Figure 5.

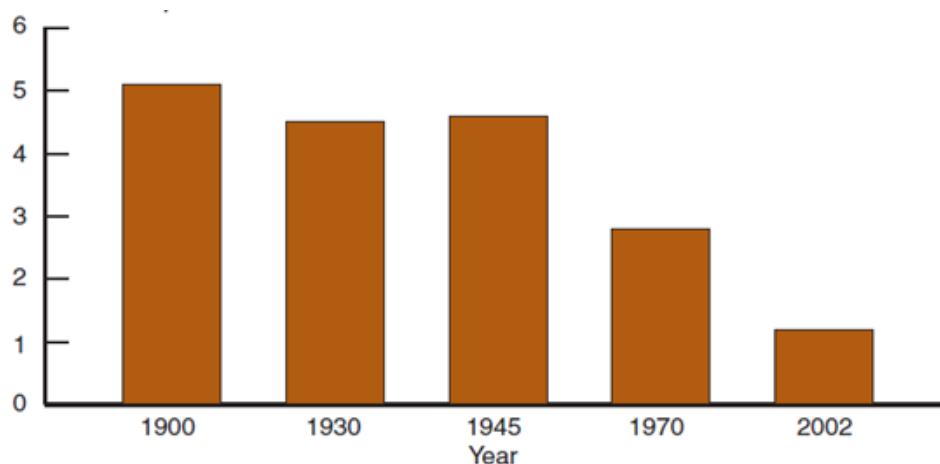
Figure 5. Reduction of number of farms with the increase of their average size



Source: Compiled by Economic Research Service, USDA, using data from Census of Agriculture, Census of Population, and Census of the United States.

According to Dimitri et al. (2005), as farms become more specialized, the number of commodities produced per farm decreased, as presented in Figure 6.

Figure 6. Commodities per Diem.



Source: Compiled by Economic Research Service, USDA, using data from Census of Agriculture, Census of the United States, and Gardner (2002).

With regard to the current situation in agriculture of post-Soviet countries since independence, after the transition to a new market economy, after examining the successful practice of developed states' reforms, scholars such as Darinov (2011) and Ovchinnikov (1999) claim that the developed countries' reforms cannot be easily used and adopted in the context of the post-Soviet and Kazakhstani case. However, the basic principles of agricultural policy in the USA with their positive results in reforming agriculture system can be adopted with a thorough examination (Ovchinnikov 1999 p.3). Moreover, Darinov (2011 p.6) claims that the main mistake in the formulation of agriculture policy in Kazakhstan was the bid which was made on the full support of large-scale production, **while the 'peasant' economy in Kazakhstan, by its nature involving medium and small-scale farms, was ignored.**

According to Panteleeva (2012 p.23) the overall support for agricultural production in the U.S. contains indirect support through the provision of common services to all producers, the development of industrial and social infrastructure in rural areas, research and consultancy support on the basis of greatest state support to producers and agriculture production support.

The U.S. long-standing practice demonstrates that state regulation was a decisive factor in the successful development of the agricultural sector of the country, where the structure of state regulation changed periodically in accordance with the change of priorities facing the agricultural sector of the country (Ovchinnikov, cited in Panteleeva, 2012 p.23). So, the experience of successful U.S. agricultural development appears typical of the experience of these developed countries. Clearly, without a thorough examination of other countries' experiences, it is impossible to implement their practices successfully, and may even lead to negative consequences (Ovchinnikov, 1999 p.3). However, it could be argued that understanding of the basic principles of agricultural policy of USA and other developed countries could be applied in consideration of agriculture policy reforms in post-Soviet states (Panteleeva, 2012 p.23).

USDA helps American farmers sell their products, ensures a competitive market for agriculture products and provides them with comprehensive information and data on standards and prices on world markets. In comparing the situation in Kazakhstan, in the latter there is a poor AIM system, with limited access to inadequate internal informational sources and, absence of ICT in remote rural agricultural regions. With the lack of an entrance to the global agricultural informational system, Kazakhstani farmers and agrarians from year to year face significant problems in agriculture, for example agrarians' participation in the world agriculture market. In this context, taking into account the political decision on Kazakhstan's accession to the WTO, the experts (Bergenov, 2004; Kaigorodtseva, 2013) suggest concentrating the attention on the beginning of preparation for life in a liberal market with new rules in strong competitive conditions with the aim of entrance to the global agriculture market.

The experience of the USA's agricultural policy development and government strategy reorientation to decrease the number of farms, and increase their average size with the goal to make them more specialized, appears to be a frequent practice of developed countries. The U.S. long-standing practice demonstrates that state regulation was a decisive factor in successful development of the agricultural sector, where the structure of state regulation changed periodically in accordance with the change of priorities facing agriculture, (Ovchinnikov, cited in Panteleeva, 2012 p.23). At the initial stages of the EU, government financial assistance for agriculture under the CAP was associated with the need to achieve self-sufficiency in basic products, but the U.S. policy was primarily aimed at increasing agriculture exports and protection of the environment – hence the successful experience of both USA and EU countries was an important issue for investigation in this study for discovering the basic principles of agricultural policy development in reforming the system of state regulation of agriculture. But it should also be remembered that, according to Ovchinnikov (1999 p.3), it is not always helpful to

adopt the experience of developed countries without a thorough examination of the context of developing countries.

2.8.7 The role of ICT-based AIM in support of USA's agricultural policy development

Reviewing the role of IM in USA's agriculture development, the Bureau of Labor Statistics (2012) in their reports consider the improvement of AIM based on the use of computers in American agriculture. They claim that *computer skills are becoming increasingly important, especially on large farms, where computers are widely used for recordkeeping and business analysis*. Furthermore, *some farmers, ranchers, and agricultural managers use personal computers to access the Internet to get the latest information on prices of farm products and other agricultural news* (Bureau of Labor Statistics, 2012). On the other hand, the Ministry of Agriculture in America reported that the number of Internet and ICT users in USA agriculture is significantly increasing from year to year, and the Internet is a tool for gathering data and information from all levels of agriculture management, creating reports of income and expenditure. Barrett and Jones (cited in Beck, 2008 p.27) note:

In an effort to store, organize, and analyze complex data structures in a way that captures the meaning as well as the content of data, knowledge representation techniques used in artificial intelligence were explored. This effort coincided with the interest in applying expert systems technology in agriculture decision support systems in the late 1980s.

In recent studies, U.S. scholars Baumgart-Gertz and colleagues provided *a quantitative summary of 46 studies from 1982 to 2007 addressing the adaptation of agricultural Best Management Practices (BMPs) in the United States*. Examining *the influence of 31 social factors assessed over 25 years of BMP adoption*, these authors described the role of networks in AIM and their influence on BMP as follows:

For example, using networks to implement extension efforts and disseminating information presents a logical way to combine and extend the reach of factors was found to have a significant effect on BMP adoption (Baumgart-Getz, et al. 2012 p.23).

However, taking into account the positive influences of BMP adoption, they commented that *too often attitudinal and awareness indicators have been included in studies without defining a clear connection to BMP adoption*, and, additionally, they identified *the increase of individual capacity and awareness by using networks to inform other farmers about the benefits of adoption* in agriculture management as one of the main approaches to BMP installation (Baumgart-Getz, et al. 2012 p.23). It appears, therefore, that in the USA, although individual farmers may benefit from information networks, research has not demonstrated a definite link between individuals' attitudes and the development of best practices.

Additionally, statistics highlight that *skills in information management, communication, personnel management and conflict resolution are equally important in the operation of a farm or ranch business* (Bureau of Labor Statistics, 2012). A statistical report published in 2005 by the Bureau of Labor Statistics notes that *many companies began to compete for transactions in the agricultural sector. As reported by the manufacturers, in 2005 through an electronic commerce system has been sold/bought products to 665 million dollars, which was 33 % of the total sales transactions/purchase in agriculture. They add: on an online purchase (machinery and equipment, material resources for crop and livestock production, office and computer equipment) accounted for 378 million dollars. On the material and technical resources for crop and livestock production fell 35% of all transactions in online shopping. Through e-commerce system farmers sold products to the value of 287 million dollars (191 million dollars - Livestock products, 96 million dollars - Crop production)* (Bureau of Labor Statistics, 2012).

Consequently, the increase of AIM based on ICT implementation in USA agriculture is evident. On the other hand, the former Minister of Communications and Information highlighted that the annual turnover of e-commerce market in Kazakhstan in 2010 amounted to only 0.25%, and in neighbouring Russia it amounted to 1.6% of total sales. In the United States, however, it is estimated 6.4% of all e-market sales goes through the internet (IT-PUBLICATIONS 2010). According to USDA's analysis published in July, 2007 (the first in-depth analysis of computer technologies in farming), 20% of farmers in the state with incomes over than \$100 000 per year have an access to the Internet sources. For instance, in the leading states such as New Jersey 31% use Internet sources, in Utah, 29%, Maryland, 25% and California 23%. Farmers from Eastern regions of USA are the leaders of using global network sources in their business (ERS, USDA, 2007).

Thus, on the basis of official statistics it is evident that AIM based on ICT implementation provides an opportunity for USA agrarians with remote access to daily operational internal and external information for timely and correct decision making processes. Additionally, it is noticeable that Internet accessibility through the development of computer and other forms of ICT has attracted a growing number of American farmers. According to a recent report from the USDA, the use of computers on farms is growing every year, and the Internet has taken the role of a management tool in their daily activities (ERS, USDA, 2007).

Technological changes have long been the basis of the USA's rural economy. Internet use by farmers is equally attractive to those who are involved in animal husbandry, as well as for those who are involved in other forms of agriculture. Of American farmers who use the Internet in their business: in price monitoring 82% were Internet users; for information services in agriculture the figure was 56%; obtaining information from the USDA (33%); communications with other farmers (31%) and advisory services (28%); an online account and transfer data to clients and services (31%) (ERS USDA, 2007).

The demand for financial services in agriculture is large, since about 40% of the farms use it for business loans, and even most of the farmers refer to the services of financial advisors. 3% of all Internet users are farmers, solved some problems of its financing activities: online banking (10% of Internet users); the payment of bills (7%); obtaining loans (2%). Thus, in 2000, nearly a quarter of all farms used the ICT and Internet sources in their business. This figure is the same for many different types of farms, and hence it seems ICT is potentially attractive to all, not for any particular group of farmers (NY City, 2013).

The main indicator of market development of public telecommunication services is the number of telephones per 100 residents, which is correlated with GDP per capita (IFPRI cited in Shelomentseva et al., 2013 p.1105). However, in Kazakhstan in 2012, the overall number of phones was about 2.9 million units, i.e. 18 phones per 100 residents (in the U.S. and Western Europe, 60 - 70 phones) (ibid). Generally, all statistics and research projects illustrate the increase of the role of AIM based on ICT in support of agricultural development in developed countries. Examining the intensive use of IT in EU countries, Ananyev and Ukhtinsky (2013 p.5) claim: the number of computers in these countries connected to the Internet, is practically not more than 50%. In the information society, the farmer can connect to the Internet from anywhere in the area by powerful wireless communication links. Consequently, the experience and achievements of developed countries on this issue can be examined to learn the useful lessons for case of post-Soviet states.

2.8.8 Barriers to adopting developed nations' strategy of ICT-based AIM in the developing world

According to scholars one of the signs of the use of IT in farms is the presence of computers, as well as their connection to the Internet (Ananyev and Ukhtinsky 2013 p.5). Some of the results of these authors' surveys summarized the situation in agriculture of developed countries and Russia on the issue of IT use. On the basis of this survey, the author highlights the big difference between developed and developing states when describing the situation of the ICT role in the agriculture of UK, Germany and Russia (Table 3).

Table 3: The use of information technology in farms of UK, Germany and Russia.

| Country | Number of Farmers (full time) | Number of Farmers using computers in their business | | Number of Farmers using Internet sources | |
|--------------------|-------------------------------|---|------|--|------|
| | | Amount of People | % | Amount of People | % |
| United Kingdom | 80000 | 60000 | 75.0 | 30000 | 37.5 |
| Russian Federation | 275000 | 9000 | 3.3 | 3000 | 1.1 |
| Germany | 170000 | 75000 | 44.1 | 55000 | 32.4 |

On the basis of this survey (Ananyev and Ukhtinsky 2013 p.5) table 3 demonstrates that the UK and Germany are the countries with intensive use of IT in comparison with Russia. Thus, this sample demonstrates the significant difference in the use of IT in agriculture between developed and developing countries: the Internet users in UK agriculture for the period of 1998 -2013 increased from 8552 to 33850 respectively and compound annual growth rate is 31.7% (Warren 2002 p.5).

Summarizing the review of literature regarding AIM for Germany, UK, and the USA, the accelerating role of AIM based on the implementation of new technology to support agricultural policy development in these countries is evident. Given the fact that agriculture is the largest consumer and user of natural resources and land, the sector retains an important policy status. If the policy measures are to be efficient, accurate and targeted AIM has to be provided by agricultural units (Suprem et al., 2013 p.356). Thus, examining the role of ICT-based AIM in developed countries in the context of a project about Kazakhstan and reflecting on the barriers that might prevent lessons being transferred from this study to Kazakhstan and other post-Soviet countries, a number of existing problems have been identified by writers.

For example, Tausova (cited in Jarolimek and Ulman, 2014 p.13) suggests there are a number of places and groups that do not have access to informational resources and among them people who live in rural areas. Furthermore, on the challenge of obtaining improved information for the decision making process Blandford (2007 p.10) suggests that the expansion of problems and goals in the field of agriculture and difficulties in acquiring precise information in this sphere is one of the main obstacles in obtaining quality information for policymakers. The problems of agriculture information distribution were discussed at 2.5, where Blandford proposes “information asymmetry” *an aspect of the principal-agent problem in policy implementation* (Blandford, 2007 p.47) and the “incomplete information” as another problem in the process of generating information. According to Blandford, adaptive management was considered by scholars - Holling, 1978; Allan and Stankey, 2009; Williams, 2010 as the way to deal with challenges posed by incomplete information on complex systems.

At the same time, the increasing use of computers and Internet have improved and eased the task of handling and processing of internal and external information. However, the collection and analysis of data still proves a demanding task: information is produced from many sources and can be located on many different sites; information can be separate and not interrelated (Blackmore et al. cited in Sorensen et al., 2010 p.37). According to Blandford (2007 p.17) it is important to pay crucial attention to solving IM problems in order to maintain future goals and priorities. He suggests *in terms of future priorities, addressing deficiencies due to information management problems* should become a high priority task in agricultural policy development. Blandford (2007 p.46) emphasizes the importance of increasing use of computers and Internet by farmers’ households in many OECD states as it opens the possibility to collect the data for policy purposes using these technologies.

Writers have noted the accelerating development of AIM based on new technology, arguing that, in rural regions, its development is directly related to the introduction of new ICT (Kabanova 2001,

p.87). The thesis now sets out to discuss what is currently happening with regard to AIM in developing countries.

2.9 Developing countries: the role of ICT-based AIM in supporting agricultural development

Examining the continued increase in world food markets, McNamara et al. (2011, p.4) state that ongoing globalization and integration of markets increased competition in the agriculture and thus brought opportunities to involve small households in the supply chains. At the same time, regarding the role of information in agriculture management, UNESCO (1981 p.3) has suggested:

Each nation has an important responsibility to husband its information resources for the purpose of developing its economy and enlightening its people. . . Structuring of a national information system has a major effect upon a nation's future economic and social development. A well-organised, carefully planned national information system can accelerate progress and enhance development. But a disorganized information system can lead to paralysis of decision making and insufficiencies in national growth and culture.

The description could be applied to the early stages of the development of Kazakhstan after independence. Hann (cited in Omekwu, 2003 p.444) notes that *most developing countries are faced with a crisis of efficient information resource management. The ongoing information explosion and the extensive use of information technology in industrial economies contrasts sharply with the information poverty of developing countries*, and observes that *developing countries (their policy makers, managers, knowledge workers, entrepreneurs) face problems in acquiring, retrieving, processing and disseminating various types of information*. Aiyepetu (cited in Omekwu, 2003 p.444) also contends that:

Until specific audiences within the developing countries are identified and the information needs of each are ascertained, efforts at designing effective information systems will continue to be governed by the finding agencies, researchers and the priorities of information specialists rather than being a reflection of the identifiable information needs of the users in those countries.

Given the existing problems in AIM for developing countries, it is important to identify the barriers to its development, in post-Soviet developing states.

Taking into account the scale of agriculture business in the world, a large amount of data and information needs to be processed at all levels of agricultural management. O'Brien (cited in Palmieri and Rivas 2007) defines *information as data that has been converted in a context that is significant and useful for specific end users*.

The experience of developing countries shows that *agriculture, including forestry and fisheries, is a powerful engine for development, helping to increase food security and lower food prices, create employment and generate income for the rural poor, alleviate rural and urban poverty; protect and conserve the environment, stimulate development in the rest of the economy, and ensure overall prosperity through the stimulation of global trade and greater global political stability* (Kapange cited in Ozcatalbas et al., 2004 p.97). *To solve all these and other problems with rural development, agricultural information systems have very important roles and influence* (Ozcatalbas et al., 2004 p.97). Additionally, Ramirez states *to the new information professionals, the development of appropriate technologies requires input from a number of actors. Ideally, the list should include rural folk, field staff of extension organizations, NGOs, research institutes and, increasingly important in many countries, local municipal authorities* (Ramirez cited in Ozcatalbas et al., 2004 p.97).

Snapp (cited in Ozcatalbas et al., 2004 p.97) adds *extension services around the globe face increasingly limited financial support, yet rural populations require services, training and access to information.*

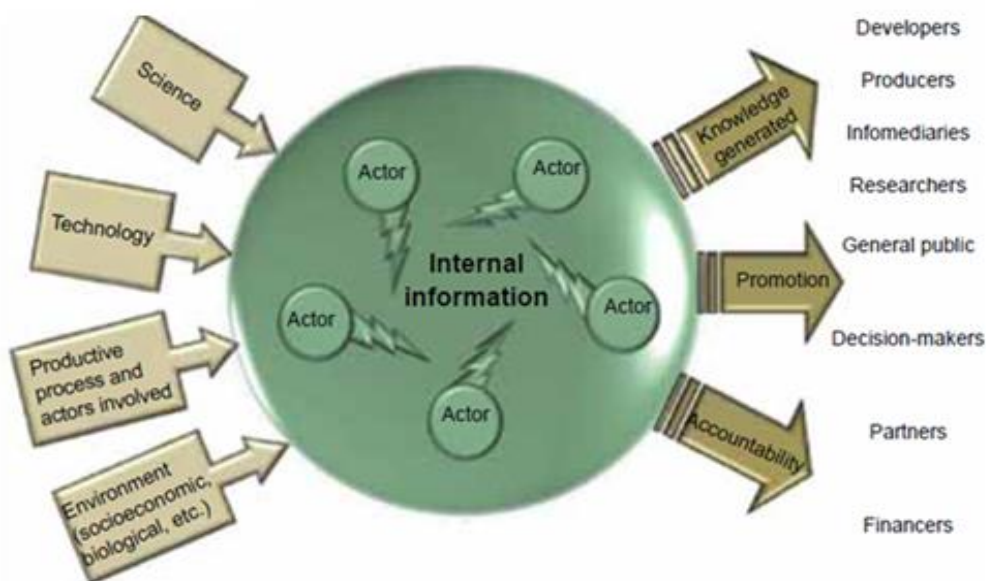
Information is a vital resource for farmers; without it they cannot make the best use of other resources at their disposal (Fitzherbert, in Ozcatalbas et al, 2004 p.97). These writers claim that *information is both an input in production and a product of a functioning market.* Additionally, information impacts agricultural production by affecting the economic quantity and timing of inputs and activities, ranging from quantities of fertilizer, timing and quantity of irrigation, and the timing and efficacy of both risk-reducing and production-enhancing inputs (Howard et al. cited in Ozcatalbas et al 2004 p.97). *Knowledge and information are basic ingredients of food security and are essential for facilitating rural development and bringing about social and economic change* (Munya in Ozcatalbas et al., 2004 p.97).

Information is a valuable resource because it helps people in their business take more effective decisions toward achieving their goals. Thus it is evident that the implementation of advanced ICT to support AIM will reduce the cost of information relative to its value in agriculture production and marketing. Furthermore, according to Ozcatalbas et al (2004 p.98) an AIM system involves *collecting and producing information related to agricultural production and the agricultural sector.* And, as Howard et al. (cited in Ozcatalbas et al. 2004 p.98) suggest: *improvements in information technology enable organizations to economize on transaction costs (i.e. the costs associated with conducting exchanges in the external relationships of the organization) and on coordination costs (i.e. those arising in the internal relationships of the organization).* AIM is a complex phenomenon and *an integrated analytical tool to obtain the information required to increase productivity, and to develop, share and use that information* (Talug cited in Ozcatalbas et al., 2004 p.97).

Roling (cited Ozcatalbas et al., 2004 p.98) stressed that *an agricultural IS is generated, transformed, transferred, consolidated, received and fed back in such a manner that these processes function synergistically to underpin knowledge utilization by agricultural producers*. According to Roling, AIM is based on receiving, transforming, transferring information flows and linkage mechanisms and an agricultural information system. Furthermore, *in most of the developing countries, [sources of] information on improved agricultural technologies and practices are public goods and agricultural extension services are one of the most common means of public-sector knowledge dissemination* (Meena and Singh, 2013 p.58). According to Morton and Matthewman (cited in Meena and Singh, 2013 p.58), with the intensification of livestock production and market development, the importance of information in agriculture is growing in many developing countries. As a result, information and knowledge has increasingly become *an important factor of production, as one of the critical factors for efficient and effective agricultural decision-making* (Meena and Singh, 2013 p.58).

During the investigations of AIM based on ICT in several countries, Farrington et al. (Palmieri and Rivas 2007 p.19) underlined *the importance of analyzing and supporting a larger group of professionals in agricultural sector that need information, inter-linkages, inter-cooperation and training*” and created the term ‘actors’- *as researchers, producers, extension workers, suppliers, information intermediaries, trainers or a combination thereof and their organizations at the local level*. These do not make up an isolated system and demonstrate their interrelation in Figure 7. In this respect, they claim that *the term ‘actor’ refers to all parties directly involved in the innovation process* (Palmieri and Rivas 2007 p.19-20). And for IMS the actors can receive information from different sources, either internal or external. Figure 7 which presented by Palmieri and Rivas (2007 p.20), highlights that a variety of actors can receive the information flow from different sources: science, technology, productive process, socio-economic and other environmental processes; and information can be shared between scholars and can be transferred or distributed between producers, decision makers, partners and financiers.

Figure 7. Information in innovation processes: main information flows in agricultural technology innovation process.



Source: Elaborated by Palmieri & Rivas (2007 p. 20)

Describing the agricultural technologic innovation processes, implemented with a number of ‘actors’ or professionals who are able to design, configure, and implement the change of product resulting from the innovative processes, Palmieri and Rivas (2007) claim:

Each actor possesses knowledge, acquired through study and experience that needs to be shared for the system to work properly. This process entails converting each actor’s knowledge and know-how into explicit knowledge that can be communicated to others. The more effectively the knowledge is shared, the greater the likelihood of converting it into a practical innovation (Palmieri and Rivas, 2007 p.19).

Additionally, it was highlighted that ICT can provide tools to facilitate the flow of information about production techniques to farmers and also open up new opportunities for farmers to document and share experiences with each other. Characteristically, the information flow has been one-way, and when ICT has been implemented, all these approaches gave the local agriculture enterprises and communities possibilities to establish dialogues between peers for transmission and exchange of information via two-way communication systems (IICD, 2006). Thus, in studying the potential of ICT-based AIM *the development of the capacities of professionals and their organizations through information services* the creation of network systems was identified by researchers as a key challenge. Regarding the technical updating of current ICT, Palmieri et al. (2007 p.24) claim:

Many institutions are also faced with the challenge of updating their equipment, increasing the quality and amount of the access they have to information systems and databases, and improving their communication mechanisms in general (Palmieri et al. 2007 p.24).

McNamara et al. (2011 p.3) add:

The ability of ICTs to bring refreshed momentum to agriculture appears even more compelling in light of rising investments in agricultural research, the private sector's strong interest in the development and spread of ICTs, and the upsurge of organizations committed to the agricultural development agenda.

ICT's role as an influence on the development of agricultural economy was described by McNamara et al. (2011 p.3):

- First, ICT can be any device, tool or application that allows receiving and exchange of data through interaction or transmission. Fundamentally, ICT is a term that includes any transmission device from radio to cell phones or electronic money transfers.
- Second, ICT is a world-wide phenomenon as it can be used even in impoverished regions, as it is affordable, accessible in any rural households; as such mobile telecommunications, food safety programs, money transfers, have progressed sharply.

There is little doubt that adoption of mobile phone technology has had positive impacts on developing nations, not least because in many countries, such as those in Sub-Saharan Africa, landline systems are often expensive and frequently ineffective (Aker and Mbiti, 2010). These authors point out that mobile technology has 'leapfrogged' landlines, and put IT systems in the hands of those who would not otherwise afford it, especially as in parts of Africa, mobile phones are seen as a shared resource. With regard to agriculture, there appears to be evidence that mobile technology has had a positive impact on agricultural practices in Africa, as obtaining and comparing data is easier for grain traders and such to obtain pricing information than by radio, which is unreliable. But these authors acknowledge that there is insufficient research into the impact of mobile technology on farmers in developing countries, and it is often assumed that mobile technology has a uniformly positive influence without any real understanding of the positive economic impact, and with minimal research amongst users (ibid.). Gruber and Koutroumpis (2011) appear to support this view, suggesting that the impact of mobile telephony on economic growth is smaller for countries with low mobile useage, usually countries where income is low. It is suggested that the case of Kazakhstan is more complex for a number of reasons (discussed particularly in Appendix I and II), but it appears to be generally the case that research tends to focus on economic and statistical factors, rather than the experiences of end users, in this case agrarians.

McNamara et al (2011 p.3) suggested the possibilities of ICT on the basis of a dialogue *where farmers, experts, and government can select best solutions based on a diverse set of expertise and experience* and claim that *the types of ICT-enabled services that are useful to improve the capacity and livelihoods of poor smallholders are growing quickly*. At the same time, Palmieri and Rivas (2007 p.18) note:

In recent years, there has been an exponential increase in the amount of information available that is potentially important for agriculture production. Furthermore, changes in ICT have impacted the way in which organizations devoted to agriculture research and innovation work and have opened up a wide variety of new opportunities, while at the same time posing new and complex challenges.

Considering the existing problems in agricultural development, McNamara and colleagues argue:

Given the challenges, the arrival of ICT is well timed. The benefits of the green revolution greatly improved agricultural productivity. However, there is a demonstrable need for a new revolution that will bring lower prices for consumers (through reduced waste and more-efficient supply chain management), contribute to “smart” agriculture, and incentivize farmers (for example, through higher income) to increase their production (McNamara et al. 2011 p.3)

Technology developed Internet gives the following advantages to agrarians and farmers: ability to use and manage information and data sources, knowing about other farmers’ businesses and other subjects in the agrarian spheres (Ananyev and Ukhtinsky 2013 p.5). The possibility of using network communications with Internet sources essentially decreases the barriers for accessing and processing information for farmers. Furthermore, this process is not dependent on the location of farms. Sæbø et al. (2002), Blandford (2007), Palmieri and Rivas (2007) all described the process of using network connection by agrarians and farmers as a new motivation and source of commercial profit from Internet sources, among them market and sales of agriculture products, cooperation on agricultural issues between agrarians, examining the statistical analysis of agriculture products.

Examining the role of ICT in agriculture for developed countries in previous sections, the importance of ICT-based AIM in economic development was evident. But, with regard to the current situation on this issue for developing countries, especially for poor rural regions, it is clear that existing difficulties and limitations influence AIM development. For improvement of agricultural productivity, farmers need to be in cooperation with each other to exchange experience and to find answers to their questions which can arise during the business. *Updated information allows the farmers to cope with and even benefit from these changes. Providing such knowledge can be challenging, however, because the highly localized nature of agriculture means that information must be tailored specifically to distinct conditions* (McNamara et al. 2011 p.3). This view is supported by Lönnqvist and Shelomentseva (cited in Jarolimek and Ulman, 2014 p.14) who point out that *benefits need to be found*

in activities that are conducted more effectively so that they bring an economic profit. Furthermore, three areas for potential growth and development of ICT in rural areas were formulated by Viturka (cited in Jarolimek and Ulman, 2014 p.14): Support of business, Starting [one's] own business, Improvement of quality of life.

1. **Support of business** includes the set of activities and processes that are already conducted in rural areas but their effectiveness might be multiplied by the ICT in the way that was not realizable before states Leitão (cited in Jarolimek and Ulman, 2014 p.14). It is possible through the automation of informational processes in agriculture, to implement new technology with remote access to agriculture market datasets and information. Vaněk (cited in Jarolimek and Ulman, 2014 p.14) suggests that *region presentation is one of the basic marketing tools for regional development where numerous potential areas could be presented, such as:*
 - *Accessibility of information as the main contribution for the development;*
 - *Education – higher accessibility of education in regions is a fundamental building block of human resources development and the use of modern technologies, e.g. (Feng cited in Jarolimek and Ulman, 2014 p.14);*
 - *Accessibility of services – that makes the business easier and more effective for rural citizens, namely e-Government, electronic banking system, electronic communication, e-Consultancy,*
2. The second area for potential growth of rural regions and development of ICT formulated by Vaněk is **Starting [one's] own business**. It means *new business opportunities that were not possible without the ICT such as: homeworking – there is a large potential for employment of rural inhabitants without any geographical limits; information technology services - participation in huge and dynamically developing market of immaterial information and communication technologies (software development, design, services,); and business - electronic commerce with material and immaterial commodities (Jarolimek and Ulman, 2014 p.14).*
3. The third area was identified as **improvement of quality of life**. Salmelin et.al. (2005) noticed *social cohesion in places where is a strong community aspect. Even if the people live in isolated locations, they need to be included in various communities that relate to their social background, hobbies, and other interests. The social media play a significant role in it. Additionally, education and training in rural areas can be guaranteed only if new eLearning technologies are used. Furthermore, the use of modern infrastructure and services will assure availability and access to the public services, and the quality of life and security for people living and coming to rural areas (Jarolimek and Ulman, 2014 p.14).*

Considering the role of ICT- based AIM for developing countries, Kokate et al. (2012 p.2) note:

The policy framework for agricultural extension (Ministry of Agriculture, Government of India, 2000) highlights the opportunity for ICT to improve the quality and accelerate the

transfer and exchange of information to farmers, and ICT is consequently given a high priority, particularly as a tool for improving the marketing aspects of farm enterprises.

They add *to bridge the information gap between the farmers and to build productive and competitive market, different ICT interventions support rural and under-developed markets to become efficient and productive* (Kokate et.al., 2012 p.2). On the other hand, Liao et al. (2013 p.1) argue that an AIM system *can provide users with integrated and accurate response information*. Furthermore, they claim that *not only agri-professionals, but also farmers, who might not understand information retrieval skills, can benefit from this newly proposed AIM system to conduct activities in agricultural production life cycle* (Liao et al., 2013 p.1).

With regard to access to AISs, some writers have pointed out the *access via web browsers, handheld devices or other special interfaces to obtain desired agricultural information*. For providing better access to AIMS, *it has to be built as a single system which offers relevant and contextual information, as well as scientifically correct information regarding agricultural production life cycles* (Liao et al., 2013 p.1). Thus, examining the situation in developing countries, scholars stressed AIMS are *gradually becoming available to farmers covering nearly all aspects of agricultural and farming-related activities for a long time*. At the same time, some writers characterized existing agricultural information systems as a large number of independent platforms with incomplete information. Meena and Singh (2013 p.61) claim *technology can apply to conditions in rural areas, which will help improve communication, increase participation, and disseminate information and share knowledge and skills*. However, these writers observed that the rural population still has *difficulty in accessing crucial information in order to make timely decisions*, adding that *information availability is demand driven rather than supply driven*. Discussing the challenge of ICT, they add *it is not only to improve the accessibility of communication technology to the rural population but also to improve its relevance to local development*. Considering the role of mobile telephony as an ICT intervention for empowering farmers in developing states, Meena and Singh (2013 p.61) state that *the mobile technologies have created new channels to communicate with others. Farming is not so linear but requires constant inputs at every stage where new technological inputs provide better crop outputs. It means crop production depends on weather, agricultural practices and management of pests and diseases at right time to save crops and gain better results*. Furthermore, they noticed that *the final produce should provide better marketable price to farmers, where the market intelligence is the key, which provides regular information about nearby markets in local language* (Kokate et.al. 2012 p.3).

Meena and Singh (2013 p.61) add *next to the radio and television the mobile phone users are increasing rapidly in India particularly in rural areas, creating platform for information dissemination through value added services like Short Message Service (SMS)*. Thus, considering the mobile phone as a part of ICT, scholars argue that *mobile phone is the growing manifold in comparison with other ICTs in rural regions*. According to Waverman et al. (cited in Meena and Singh, 2013 p.62), 10 extra phones per 100 inhabitants can lead to 0.59 per cent extra annual growth in

a typical low income country like India. Thus, Meena and Singh note *dissemination of information through mobile phones is a newly emerging concept in agriculture and allied sector* (Meena and Singh, 2013 p.62). McNamara et al. (2011 p.8) claim:

Mobile-based applications are also becoming more suitable for poor and isolated communities, especially through feature phones. Drawing on simple, available technologies such as SMS, service providers can offer mobile banking, other transactional services (selling inputs, for example), and information services (market price alerts)”

At the same time, Fafchamps and Minten (2012, p.338) investigated the role of agricultural information in supporting agriculture in India on the basis of new ICT. Their study set out to *ascertain whether agricultural information distributed through mobile phones generates economic benefits to farmers and to estimate the benefits that Indian farmers derive from market and weather information delivered to their mobile phones by a commercial service called Reuters Market Light (RML)*. The authors conducted *a controlled randomized experiment in 100 villages of Maharashtra where, in Maharashtra and other Indian states, RML distributes price, weather, and crop advisory information through SMS messages* (Fafchamps and Minten, 2012 p.338). *Price information is expected to improve farmers’ ability to negotiate with buyers and to enable them to arbitrage better across sales outlets. Weather information should help farmers reduce crop losses due to storms. Crop advisory information should induce farmers to adopt new crop varieties and improve cultivation practices* (Fafchamps and Minten, 2012, p.411).

The authors concluded that:

We find no statistically significant average effect of treatment on the price received by farmers, crop value-added, crop losses resulting from rainstorms, or the likelihood of changing crop varieties and cultivation practices. Although disappointing, these results are in line with the market take-up rate of the RML service in the study districts, which shows small numbers of clients in aggregate and a relative stagnation in take-up over the study period (Fafchamps and Minten, 2012 p.338).

The authors also suggest that:

Although the absence of positive effect on price may surprise and disappoint, we find evidence of an RML information effect on where farmers sell their crop: they are less likely to sell at the farm-gate—especially young farmers—and more likely to sell at a different, more distant wholesale market (Fafchamps and Minten (2012 p.412).

They note that *the following suggestions should help steer policy intervention toward regions and markets where the effect of price information may be beneficial, and avoid wasting resources on*

markets where it is unlikely to matter, suggesting that price information would be particularly useful to certain groups, such as farmers who sell at the farm-gate, such as the coffee growers studied by Fafchamps and Hill” (cited in Fafchamps and Minten, 2012 p.413). Again, such studies highlight the positive developments in telephony in agriculture, but stress that farmers need to embrace the technology and feel confident in using it (ibid.).

The role of mobile phones in farmers’ marketing performances in Sub-Saharan African countries was also investigated by Courtois and Subervie (2012) and survey relied on data about farmers’ transactions in northern Ghana in 2009. Due to the remoteness of farms and poor communications with marketplaces in these regions *farmers’ uncertainty about market prices is usually high and they typically have a choice between selling their products to traders who travel between villages and markets and transporting their products to the nearest market themselves* (Courtois and Subervie, 2012 p.1). Furthermore, taking into account the importance of *the potential for mobile-based MIS in agricultural development*, these authors note that *theoretical analyses of the conditions for its positive impact on farmers’ marketing performances are rather scarce, as are empirical impact evaluations*. During their study, Courtois and Subervie (2012 p.23) estimated *the causal effect of an MIS-based program on farmers’ marketing performances* and obtained an unexpected result: *providing price information to the farmer allowed him to avoid negotiation failures while Pareto improving deals exist*. Thus, the results of the research suggested *that the theoretical conditions for successful farmer use of MIS may be met in the field*. However, the answer to the question of *whether a fixed gain in farmgate prices will be an incentive to adopt MIS technology* remained unclear. Discussing this issue, the authors suggested:

Despite the potential value of information and the low marginal cost of the technology (the cost of sending an SMS message), only a small share of African farmers actually use mobile-based MIS outside of development programs, for reasons that are not well documented. Much remains to be done to test all of the predictions of the theoretical model (Courtois and Subervie, 2012 p.23)

Regarding the role of mobile phones, Parker, et al. (2013 p.26) noticed that *they are rapidly changing supply chains in developing economies through improved information flows... access to mobile phones enables farmers to strategically choose markets in which to sell their produce, correcting demand-supply mismatches and reducing geographic price dispersion*”. The effect of ICT on prices in agriculture markets was discovered by the researchers examining *the provision of regular, reliable and unbiased price information delivered via text message impacts geographic price*. Thus, during the investigation, scholars *“utilizing a detailed, market level dataset from Reuters Market Light (RML) exploit a natural experiment, where bulk text messages were unexpectedly banned for 12 days across India*”. As the result, *“the average spatial price dispersion of 170 crops across 13 states increased by 7.6% during the ban as compared to the period before the ban*”. The researchers in this case reported

that improvements in such technologies are not by themselves sufficient to ensure access to the best information. As mentioned by Parker, et al. (2013 p.28): *Future research can identify areas where existing technological infrastructure can be leveraged to improve market and operational functioning, and the current research will investigate the role of end users in this process.*

Although, as suggested above, it is not necessarily appropriate to claim that mobile phone technology is a sort of universal panacea for agricultural productivity in developing nations (Aker and Mbiti, 2010, Gruber and Koutroumpis, 2011), there is no doubt that the growth of ICT worldwide has generally been positive for developing nations. Meena and Singh note that the new ICT is *the most powerful tool among the driving forces of globalization and ICT through internet, CDs and mobile phones have become a powerful tool to contribute in the development process* (Meena and Singh, 2013 p.60). Furthermore, *ICT has repeatedly demonstrated its potential for alleviating poverty in developing countries. In many instances, poor people have experienced benefits in the form of increased income; better health care; improved education and training; access to job opportunities; engagement with government services; contacts with family and friends; enterprise development opportunities; increased agricultural productivity, and so on.*

Omekwu (2013 p.444) examining the national AIM system in Nigeria, highlighted another problem in the use of ICT: *problems of data inconsistencies, scarcity of relevant information and dilemmas faced by policy makers, planners and agriculturists* and suggested a conceptual framework for the development of a national AIMS which *will involve a functional integration of all agencies and individuals involved in the production, processing, provision, and utilisation of agricultural information.* Analysing the current situation in AIM in developing countries Omekwu suggested it was *essential to move the country from the present state of information poverty to that of information abundance. This is a national mandate, for no country can expect to control the trend of her food and fibre production without effective control of her agricultural information resources* (Omekwu, 2013 p.450).

Omekwu believes that development of the current situation has to be based on *critical decisions and actions that will enhance the evolution process, including a commissioned inventorization of all grey literature and agricultural information resources at both Federal and State Agriculture Ministries, a systematic documentation of resources in the research and academic institutions and, the exploitation of the awesome capabilities of information technology in harnessing a nation's rich information heritage* (Omekwu, 2003 p.444).

Discussing the role of national AIMS in Nigeria and other developing countries, scholar highlighted that the system must be *mission-oriented and the effective management of the national information resources must be the operational objective of a national AIM system. All functional responsibilities can be carried out by the effective networking of agricultural information producers, information*

providers and information consumers (Omekwu 2003 p.448). Moreover, Omekwu summarized that a conceptual framework for the evolution of a national AIM in developing countries *will involve a functional integration of all agencies and individuals involved in the production, processing, provision, and utilisation of agricultural information*. This suggests that all sectors: agrarians from different levels of agriculture, stakeholders, policy makers have to be involved in the process of successful AIM development.

Having considered the challenges of effective AIM in developing countries, the thesis now considers the situation of Russia as head of the ex-Soviet Union. How successful has AIM been in supporting Russian agricultural policy?

2.9.1 AIM development in supporting Russian agricultural policy since independence

The reasons for selecting Russia were described in the previous sections of this study. Taking into account the similarities in socio-economic development of Russia and Kazakhstan, and also the Russian leading role on many spheres of economy among the other former Soviet countries, the case of the Russian Federation on the issue of ICT-based AIM development was investigated in this section.

Kabanova (2001 p.5). notes: *at the beginning of the 1990's during the collapse of the Soviet system, the State IS was almost completely destroyed, moreover, rural producers found themselves in an information vacuum* and the agriculture sphere of Russia in the implementation of economic management functions has been faced with the lack of external information as well as information on its financial and economic activities. As a result, *during the current socio-economic conditions, rural producers must take a huge amount of economic decisions independently*, adds Kabanova. In practice, in the process of implementation of economic management functions is apparent, the lack of daily operational information, and information on its financial and economic activities did not consider the importance of IM and the use of its potential (Ananyev and Ukhtinsky, 2013). On the other hand, examining the slow development of IM in Russian agriculture, while the global and European experience of agricultural work has directly related to information technology, in Russia this trend has not developed (Ananyev and Ukhtinsky, 2013 p 1). *As a result, untimely, ill-conceived and inadequate economic solutions occur*, notes Kabanova (2001 p.5) adding that the lack of an integrated system, a unique academic theory of agrarian relations, a system of information and knowledge negatively influenced agricultural development of Russia.

Other scholars have shared Kabanova's point of view on this issue. For example, Ananyev and Ukhtinsky (2013 p.1) suggest that innovative development of Russian agriculture has evolved very slowly due to the low level of technological equipment, which is largely determined by the technical and technological level of the industry and the lack of qualified personnel. Taking into account the global and European experience in agricultural business, these authors believe that it is directly related

to information technology, but Russia, due to the lack of information technology and effective information systems, was faced with several difficulties and problems to its development. Ananyev and Ukhtinsky (2013 p.1) highlighted insufficient state influence on the processes of formation of the material-technical base and organizational-economic situation; lack of information infrastructure; and low interest of farmers in the development of information systems due to the lack of knowledge in the field of IT.

Examining IM from a management perspective, the source of information is an important basis for the classification of information. The economic IM of any economic subject, including agriculture is based on information which includes the five pieces of information consolidated: *legal and regulatory information, normative reference books, accounting and statistical reporting, nonsystematic data* (Kabanova 2001 p.39). Additionally, according to Korotkoe (1997 p.304) the role of IM was identified as a valuable resource in comparison with others. Korotkoe claims that there is a popular point of view in which information is regarded as a critical factor in understanding of IM and its practical implementation, and IM is considered only as a process of information flow, or as a process of transformation of the initial information to a command or the resulting information. At the same time, Kabanova (2001 p.15) claims that information is the kind of resource, which is not only being depleted but also accumulates quality development, at the same time contributes to the most efficient and effective use of all other resources, their conservation, and in some cases, expands and creates new ones. According to this view, information is one of the types of economic resource needed for decision-making, and to identify strategic, tactical and operational objectives of economic object. Thus, regarding the latest implemented programs in Russian agriculture since the USSR's collapse in the 1990's, Kabanova (2001 p.6) argues the inability to implement new technologies in agricultural sector to support AIM has been due to existing financial, social and even psychological problems: *it cannot be implemented in the practical activities of agricultural enterprises, because they are not based on the extensive use of computer technology and radical change on the basis of this information and communication processes is an issue for investigation.*

Ananyev and Ukhtinsky (2013 p.2) listed the following reasons: *low efficiency of economic entities in low state influence and support on the formation processes of material-technical base and organizational-economic situation of IS; lack of informatization infrastructure in Russian agriculture; low interest of economic entities in the development of IS and the use of its products due to insufficient stimulation of products of information technology systems.* All these reasons can be demonstrated by the extent of IT use which largely depends on the size of farms in agriculture of Russia (Ananyev and Ukhtinsky, 2013 p.2). So, as of 2011, in the agricultural sector the use of IT is carried out in only 10% of agricultural enterprises, mostly large, whose land area of over 20 thousand hectares (Koptelov (cited in Ananyev and Ukhtinsky, 2013 p.2). Thus, the progress of the economy inevitably leads to specialization and diversification, increased financial and economic independence of enterprises, with the activity of economic entities in the achievement of their own local purposes, to complicated economic relations, and the emergence of complex systems. The consequence is an increase in the

volume of information. Before the control system in such circumstances there is a problem of efficiently processing this information and of how to keep a control object in a given mode of operation (Kabanova, 2001 p.49). Therefore, regarding the role of computer technologies to support AIM, Kabanova (2001 p.49) adds that the production of effective management is impossible without improving the management structure, optimizing of the information flow, automation of labour management and economic information systems based on computer technology. Furthermore, considering the improvement of current AIM based on the implementation of new technologies to support AP development, Kabanova (2001 p.113) notices: *analytical work on farms is weakened, the analysis of the results of its operations does not have a system, is too simplistic in nature, the frequency and quality of its execution do not meet the needs of managers in the summary of analytical information for developing the right economic decisions.* Shanchenko (2006 p.6) adds: *IM performs strategic, operational and administrative tasks. Among the strategic objectives are - information infrastructure of organizations and information technology management. Operational and administrative tasks are narrower and of subordinate nature.*

At the same time, considering the evolution of IM development since the 1990s and taking into account the main purpose of IM as *improving the efficiency of the company through the use of information systems (IS) and technology (IT)* (Shanchenko, 2006). Kabanova (2001 p.5) suggests: *the State informational system was almost completely destroyed..., and the rural producers found themselves in an information vacuum. The need to solve this problem led Ministry of Agriculture of Russia and the region look for new forms of interaction between the participants in the reproduction process in the agricultural sector.*

Comparing the agricultural sector with other spheres of economy in Russia, Kabanova (2001 p.112) notes a strong lagging behind of the agricultural sector in IM and adds: *studies have shown that analytical work on farms is weakened, the analysis of the results of its operations did not have a system it is too simplistic in nature, the frequency and quality of its execution do not meet the needs of managers in the summary of analytical information for developing the right economic decisions.*

At the beginning of the 2000's Kabanova (2001) analyzing the situation in CIS countries on the issue of improving AIM, identified it as *the most important direction in agriculture economy development.* She studied the practice of developed countries to find suitable and effective mechanisms and models to solve the existing problems of current AIM. Shanchenko (2006 p.9) adds: *from the quality of the resource and its efficient use largely depends the effectiveness and viability of enterprises and therein lies the importance of the role of IM in modern economic conditions.*

On the other hand, Borisov (2011 p.8) says that agriculture in the information society requires continuous production of information from external sources (via the external Internet) at anytime from anywhere. For example, continuously updated weather forecasts may be available to farmers

throughout the day. Borisov (2011 p.12) states that modern ICT enables farmers to receive tips, advice, regardless of the time and place of their location. Farmers can describe their problems through common speech, illustrated with photos or videos. Time and location of a farmer has to be determined automatically. Also via e-mail a farmer can send materials to supported agricultural experts and get an answer after a while, or farmer can discuss his problem in on-line regime directly over the Internet. In this regard, Kabanova (2001 p.5) adds: *one of the areas to improve the quality of economic decisions should be the issue of improvement of their informational management supports with the implementation of new technologies*. Ananyev and Ukhtinsky (2012) have proposed ways to improve the existing situation in Russia. They suggest that managers from rural regions have an urgent need for all kinds of information to carry out their management responsibilities: *market of agricultural products, prices, supply, customers, economic, financial, taxation and auditing standards of labor costs and many other items*.

Kabanova (2001 p.5) adds that the lack of operational information in rural regions creates for agrarians certain difficulties in the process of planning and managing business. The main area of the quality improvement of the economic decisions was identified as *improved IM has to be based on the use of new information technologies* (Kabanova, 2001 p.146). On the other hand, according to Shanchenko (2006 p.9), improvement of IM based on new IT can create conditions for effective management of agricultural resources for the production of fundamentally new products, agricultural production orientation on perspective effective demand, creating long-term stable relationships with other enterprises, harmonization of interests and cooperation of all stakeholders. This statement demonstrates the significance of AIM based on new technologies which can create effective AIM. While noting the role of ICT-based IM in agriculture, Kabanova (2001 p.7) claims: *the availability of quality knowledge with sharing between farmers and agrarians - all this makes the management of agriculture more efficient and helps maximize the interests of all participants in agro-industrial formations of rural regions, territories and the country as a whole*.

Shanchenko (2006 p.3) claims: *an important task of IM is a rational choice of forms of ICT, as well as characteristics of information resources needed to achieve the organization's objectives*. He adds that specialists, employees, supervisors are not just consumers who supplied the information, but also they are directly involved in the informational processes, in the most important part of the structure - of information management. So, examining the situation in developing countries the Economist Intelligence Unit suggested:

Developing member countries are being called on to invest in the development of network infrastructure capacity to take advantage of newer, cost-effective telecommunications and computer technologies (EIU, 2006 p.58).

Reviewing the main directions of agricultural development, and an agricultural market which requires the collection and processing of information based on new technologies, Kabanova (2001 p.7) adds

that the dynamic market situation requires accelerating of the collection and processing of information, the development on the basis of its solutions to the complex problems that require multivariate calculations and huge investment of time to carry them out by hand. All these circumstances explain the relevance and determine the practical significance of improving IMS based on the introduction of new IT. In this context, Ananyev and Ukhtinsky (2013 p.2) add: the informatization process as a management process was adopted to implement a national project "Development of agriculture", where one of the sections of the state program "Development of agriculture and regulation of markets for agricultural products, raw materials and food for 2008-2012" is "Creating a common operating conditions agriculture. The creation of a unified information management system is a set of measures for the formation of state information resources and provision on the basis of their public e-services to agricultural producers and rural population. All this will help to accelerate growth and improve the efficiency of agricultural production. Further, examining the evolution of AIM in Russian agriculture, different studies and research papers highlight the economic efficiency of informatization in agriculture development. Informatization of agriculture is the process of creating effective ISs and the introduction of the latest computer hardware, software, in order to radically improve the working conditions and quality of life, improve the efficiency of production management, cross-cutting reforms in line with global trends and the most efficient use of all kinds of resources. This task is implemented in production and management at different levels; agricultural education and science, as well as the social sphere, as ex-President Medvedev suggested in the report on the development of information society in Russia (RIA, [2014](#)).

However, it should be noted that agriculture in Russia's rural regions has its own specifics, due to a poorly developed methodological base, a low level of information culture of consumers, and weak formulation of the problem. In this context, Ananyev and Ukhtinsky (2013 p.4) add: accounting and reporting of some farms are in the under-developed state, often agricultural managers and farmers do not have the necessary data required for specialists in communications technology to adapt the control system to the specific conditions. Currently, a number of large agricultural enterprises are interested in improving production based on automation technology and information, and they have the financial capacity to do so. But, examining the situation in small businesses it is much more difficult to solve these issues. Use of ICT is not yet available for most small and medium-sized producers. One of the main problems is the skill level of the representatives of the farming sector.

Therefore, improvement of IMSs is an important task in Russian agriculture (Stukova 2013 p.1155). The analysis of trends in the development of agriculture in Russia for the last decade suggests a need for improving its infrastructure (Ananyev and Ukhtinsky, 2013 p.8). Moreover, in the current economic conditions, when agricultural organizations operate in a developed market, and governments have become the country's agriculture authorities in the indicative planning and regulation of market relations, to work effectively requires data on supply and demand, delivery terms, and payment (Stukova 2013 p.1157). According to Ananyev and Ukhtinsky (2013 p.8) the analysis conducted by

the use of production resources in small (peasant) farms showed the presence of large untapped reserves in their functioning. However, the use of these resources should be based on systematic study and address the issues identified through the creation of a unified state system of access to information, implementation of IT in all phases of the economic functioning of the subjects of the agricultural sector with the participation of public administration at the federal and regional levels (Ananyev and Ukhtinsky, 2013 p.8).

With the development of economic relations and globalization, increased competition in the agricultural sector, information on modern scientific and technological developments, market conditions for agricultural products, advanced production experience of other countries, the resources and means of industrial production is becoming an increasingly popular challenge for the development of the agricultural sector in Russia (Stukova 2013 p.1157). At the same time, the need for agricultural producers, including the sphere of small and medium-sized modern agricultural business, for timely information requires continuous improvement and support of the entire IMS. Management and timely provision of specialized information to agricultural organizations, farmers provide assistance in the development of innovations and new technologies in various fields is a priority and a very important task of effective management of agriculture (Stukova 2013 p.1157). At the same time, an increase in the level of information is one of the strategic directions of development of agriculture at the level of regions and the country as a whole.

The functioning of the system of scientific and technical information (SS&TI) in agriculture is particularly important. SS&TI was designed to create a centralized repository based on the electronic version of text, provide remote formation of full-text electronic versions of documents of research institutes of the Russian Academy of Agriculture and its subordinate organizations of the Ministry of Agriculture of Russia on agricultural topics. It would also seek to provide remote access to the central repository with providing full-text searching and browsing, document, taking into account the features of the thematic information in the agricultural sector in Russia, reference books and dictionaries (Stukova 2013 p.1156). Additionally, the AIM system of distance monitoring of agricultural lands allows agrarians at every level to take efficient management decisions based on the analysis of different information layers; geographic information system (GIS) enabling analyses of micro- and macro-levels on the maps for agricultural lands (Stukova 2013 p.1156).

In recent years, in the Russian agricultural sector there have been significant changes associated with the need for information resources and the use of communication technologies (Lapin 2006 p.3). A number of scientists, among them Kondratev (1989), Koshelev et al. (1997, 1998), Koshelev (1998), Kozlov (1998), Chelintsev (1999), Bautin and Lazovski (1999) and others at various times have been studying the issue of agricultural informational consultant and advisory services. However, most of these studies were carried out in the period of transition to a market economy, focused on regional aspects of the service, in the development of its individual fragments. It does not cover the problem of

integral formation and development of a *unified network of information and consultancy services* at all levels of agriculture in a fundamentally new socio-economic situation (Lapin, 2006 p.4).

The experience of many other countries shows that due to the late receipt of information or lack of it, each year farmers lose up to 40% of equity. In the Russian Federation, this percentage is 76% (CSAA, 2006). In this regard, the need to create a specialized system - information and consultancy services centers with specific tasks and functions of activities arose in agriculture sector of Russia. The creation of a common information space, which is intended to cover administrative and advisory structures in agricultural information flows, was identified as important task in a market economy (Lapin *ibid.*). At the same time, taking into account the decline in production in the agriculture sector, the outflow of qualified and experienced professionals from the villages created a huge demand for information and knowledge on the organization and management of efficient production in market relations. In these circumstances, the importance of the role of Informational Consultative Centers (ICCs) in agricultural production has rapidly risen and become objectively necessary.

Thus, taking into account the problems in AIM, at the end of the 1990's Informational Consultative Centers (ICCs) began to be established in different regions and districts of Russia. Discussing the role of these centres, Kabanova states that the establishment of ICCs had an impact on changing the organizational and management structure of the agricultural administration. Thus, under the Ministry of Agriculture were established departments of external and regional ties, price monitoring, marketing, enhanced communications service in terms of equipment. The responsibilities of the heads of departments in agriculture on federal and district levels included the collection of information on directions and the forwarding of it to the appropriate service (Kabanova, 2001 p.52). Analyzing the main objectives of ICCs, Kabanova (2001 p.51-52.) claims that the main objective of Centers was identified as: to improve the efficiency and sustainability of the agricultural enterprises of all forms of ownership in a market economy by providing information and assistance to rural producers to make informed economic decisions. An important and fundamental activity of ICCs is the provision of agricultural producers with information and consultancy services. ICCs are also actively involved in the reform of agriculture for the sustainable development of rural areas (Lapin 2006 p.3).

Examining the development of ICCs over the last 10 years, Anayev and Ukhtinsky (2013 p.6) add that they are the main source of additional information for farmers around the issues of crops, livestock, agronomy, economics, marketing, and many others. They also have a not unimportant role in the production and marketing of agricultural products, all rolled into one. ICC staff help agrarians to organize production, give advice on innovation, offer paid services that combine to provide efficient IM to consumers, and also offer consultancy services. The strongest businesses usually create their own information services, but others - become separate subsystems, often unrelated either functionally or with regard to information. At the same time, Lapin (2006) claims that *the completion of regional information and consulting services to agricultural producers are still limited due to the lack of*

organizational and economic development to create a system of information and consultation to ensure the agricultural sector in emerging markets. If the strategy is to create ICCs based on state regional agriculture organizations, it will be necessary to separate them from government management bodies, because the roles of advising and managing are not the same thing. One of the main prerequisites for the creation of the ICCs is the recognition of the changing role of the state in relation to economic entities, where in a market economy the state normally has no right to interfere in the internal activities of private enterprises.

In this case, the association with agriculture industrial institutions seems very promising for further development of ICCs (Lapin 2006 p.4). In addition, the experience of Russian regions, in particular Moscow, regional ICCs demonstrate their success is in part due to the fact that these centers have been established on the basis of educational institutions.

Examining the possibilities to improve AIM in supporting agriculture policy development in recent years, the role of innovations in this sphere of economy in experience of Russia suggests that the efficiency of agricultural production is achieved mainly due to innovative activity. The end result is the creation of innovations with its development directly in production, which will facilitate the systematic and increasingly progressive organizational, economic, technical and technological renewal of agricultural production and improve its efficiency (Ushacheva et al. 2007 p.3). On the other hand, during the literature review the role of Internet connection in agriculture of developed countries was described in the following statement:

As technology, Internet provides the additional advantage of significantly reducing the barriers to accessing and processing information for farmers, regardless of where the farm is and where the information is used (Ushacheva et al. 2007 p.3).

Moreover, due to significantly lower costs for Internet connectivity and services for the collection of information, commercial benefits from its use can give farmers new incentives, on the development of business cooperation, including the ability to buy resources and sell manufactured products (Ushacheva et al. (2007 p.3). The situation in Russia suggests a county still attempting to catch up globally with the use of ICT in the development of its existing agricultural policy, although many improvements have begun to make a positive difference. The thesis will now briefly consider the situation of Kazakhstan as regards agrarian issues, and sum up the specific challenges the country seems to be facing in its own ICT development.

2.10 Agricultural policy and ICT in Kazakhstan: brief overview and relevant comparisons

Appendix I: Overview of Kazakhstan contains a detailed account of Kazakhstan's recent history, geographical features and economy, and for reasons of focus, only the main points are noted here.

2.10.1 Brief Background to Kazakhstan

Kazakhstan is a country rich in minerals and hydrocarbon products. Properly used, its agricultural land could probably feed a billion people, and 45% of the population lives in rural areas (Pomfret, 2009; OREXCA, 2012). During the period of the former USSR, the Kazakh economy overall was one of raw material extraction and heavy industry oriented to the needs of the USSR in general. Agriculture was based on state ownership of collectives (OREXCA, 2012).

After the collapse of the USSR, a number of challenges faced the country in attempting to move from a communist/collective economy to one based on private ownership. Trading relationships with other former USSR states collapsed, and although Kazakhstan joined the Commonwealth of Independent States (CIS) – states which had become independent from former USSR – this group is by no means at the stage of developing joint agricultural policy, and soon after independence in 1991 Kazakhstan had effectively to ‘go it alone’ in developing a market economy (Smailov, 2000; Nuti, 2010). Measures undertaken to improve agricultural production included legislative measures such as land reform, and the setting up of a state agriculture ministry (Kurmanova, 2010; Karbayev, 2011). Not surprisingly, many policy decisions were taken without adequate research or reflection, and although the country has grown economically since independence, this is largely due to growth of primary commodities and there is still heavy dependency on food imports, even when agriculture is a key Kazakh industry. Compared with EU countries where states may provide up to 30% of the budget to support agriculture, in Kazakhstan the figure is 1% (Orazgalieva and Urazalinov, 2011).

Effectively, after independence the large former USSR collective farms collapsed into small scale co-operatives which were reliant on primitive technology, leaving a situation where three types of farm exist: ‘agro-holdings’ based on the old type of collective, ‘peasant’ or private farms, and household plots. Although the two latter form the backbone of Kazakh agriculture, government financial support has tended to go to large agribusinesses not small farmers, and the latter have not found it easy to obtain state loans because of lack of creditworthiness and lack of transparency by state officials in granting loan facilities (Darinov 2011).

Currently, agriculture in Kazakhstan appears to have the potential to ensure food security for the nation, but it is still held back by a number of problems: poor supply chain, with undeveloped infrastructure, insufficient state financial and practical support, lack of up to date equipment, machinery and chemicals such as fertilizers, and the migration of previously agricultural workers to the cities (OECD, 2013). Although the government is trying to address these problems, it is still held back by lack of good data gained from effective information systems and procedures. Although researchers have considered the political and economic background to the current situation, there is very little that has been written about the state of Agricultural Information Systems in Kazakhstan, and the way in which this impacts on current agricultural policy. An understanding of the attendant barriers and opportunities can ultimately give rise to improved national policy and strategy.

2.10.2 Kazakhstan: challenges and opportunities

It has been pointed out at 2.9.1 above that in the early 1990's, the breakup of the Union of Soviet Socialist Republics (USSR) was followed by political and economic crisis in all Soviet countries. The collapse of the Soviet Union led to the emergence of independent sovereign states; it radically changed the geopolitical situation in Europe and worldwide; and the rupture of economic ties has become one of the main causes of the deep economic, socio-economic and political crisis (Yanovski and Poznyak, 2005). As a part of the USSR, Kazakhstan would clearly face similar political and economic problems to those of the other newly independent nations.

The collapse of socialism in the Soviet republics in 1991 in practice meant that reforms and policies were often rapidly implemented without proper study of current economic problems and failed to meet the new conditions of the market economy (Gaydar, 1992). Moreover, following independence and the euphoria of gaining some degree of sovereignty, these new post-Soviet states had to build new independent economic systems. The transition to a market-based economy for countries which were part of the old economic consortium was predetermined, but the choice of model of transformation was one of the most difficult issues for each country to determine. Thus, post-Soviet countries had to develop new ways of organizing agriculture from a low baseline, given the previous centralization of the sector. In the case of Kazakhstan, the lack of a solid theoretical base for agricultural policy at the beginning of the transitional period led to a systemic agricultural crisis for the following ten years and more (Khasanov and Yarullin, 2012 p.19). After Kazakhstan became an independent state in 1991, the problems of developing the Kazakhstani economy became a high priority for authorities. Different approaches and measures to overcome the crisis in agricultural sector of Kazakhstan, such as new reforms and regulations, were developed by state and agrarian policymakers to adapt to a new economic system and to improve the overall situation in the agriculture of Kazakhstan. Some examples include: land reform, privatization program, "Village of 2003-2005", "Agricultural and Food Program for 2003-2005", "State Program for Rural Development of the Republic of Kazakhstan for 2004-2010" and so on. These reforms, with their influence on Kazakhstan's agriculture development since independence in the 1990's, are further considered in *Appendix II: An examination and analysis of the reforms and agriculture policy of Kazakhstan since independence in 1991*. Ospanov (2002), Sagadiev (2006), Khasanov et al. (2012) characterized the early period as one of crisis and stagnation with poor breeding cattle without the necessary amount of fodder, together with huge acreages with very low yields to cover the needs of the country's grain; all of which influenced the slow development of agricultural economy in Kazakhstan. The low availability of agricultural material, technical and informational resources, inability to pay producers, a difficult credit system, and lack of investments and weak development of domestic machine-building remain still a serious obstacle to the development of the agricultural sector in Kazakhstan.

During the period of globalization and technological progress, Nazarbayev (2003) suggested the development of agriculture in Kazakhstan should use technologies and scientific research integration

into global society. It is noticeable that Kazakhstan's agriculture since independence in 1991 has faced complications and problems due to the lack of systematic data and information, planned development areas of agriculture, knowledge and lack of effective management practices, and shortage of professionals and managers in this sphere (Sagadiev, 2006; Asanbayev, 2009). Kabanova (2001 p.6) claims that practical activities of agricultural enterprises in Kazakhstan cannot be successfully implemented as they are not based on the comprehensive use of computer technology: thus, change on the basis of these information and communication processes must become an issue for investigation. Nevertheless, the evolving market situation requires speeding up of the collection of information, and the development of its core solutions to complex problems that require multivariate calculations and huge investment of time to carry them out by hand.

Are there lessons that can be learned by Kazakhstan from the experiences of developed and other developing countries? In the case of Germany and the UK, these countries' agricultural policy has developed as a result of the European CAP, a collective arrangement following the reconstruction of Europe after World War II. Kazakhstan's situation was arguably the opposite – it was part of the break-up of the former USSR and so going from a centralized situation to an individual one, although one of a number of CIS countries facing similar problems. Arguably its dynamic political and economic situation, where policies had to be designed and implemented often without proper analysis, would make collaboration with other states challenging. It could be said, though, that German reunification following the collapse of the USSR threw up similar problems to the Kazakh experience, although as Western Germany was already part of the EU, help was available from that organisation.

The experience of the USA, although it is possibly the most 'successful' developed nation in the world, might be equally useful, given the development of its agriculture from a relatively low base in the 1930s, aided by its leading role in the technological revolution. Russia, although superficially similar to Kazakhstan as a developing nation, was at the centre of the previous USSR. After the breakup of the SU it may have retained a sufficient remnant of its centralized policies and systems, together with the resources based on its size, for it to have different challenges from those of its previous satellites in terms of the development of effective AIM.

2.11 Summary of literature and gaps which the current thesis sets out to fill

The literature review considered agricultural policy and the role of AIM for developed countries: Germany, UK, the USA and the situation of developing states, specifically focusing on Russia. Examining the situation in agriculture in developed countries, the strategy of faster and better-focused access to IS based on ICT takes an especially important place. Moreover, it is noticeable that many global organizations, such as: FAO, WAICENT and COAIM with participation in organization and integration of strategy of agriculture development – were created for improvement of current IMS with the use of fast changing technologies to develop the AIMS for the benefit of agriculture specialists and the whole agricultural economy. Additionally, characterizing the main goal of decision-making processes in AIM it is clear that all these strategies, including creation of standards and building

programmes to increase ICT usage, are aimed at supporting agriculture policy. AIM was described as a system of interrelated databases and information services with the main aim to meet the information needs of the various groups of end-users. In the context of extant literature it was clear that the new ICT are becoming more accessible for agrarians, and at the same time, they can obtain information from various sources. Thus, the strategy of AIM development based on ICT to support agricultural policy takes an important place in agricultural development and is still being researched by state organizations and scholars of both developed and developing countries.

Kabanova (2001), and Ananyev et al. (2012) note that technology has taken an enormous leap in the process of storing, collecting and analyzing of agriculture and scientific-agricultural data and information. Thus the researcher attempted to create a holistic picture of agriculture and AIM development for developed countries which could play an important role in the process of learning lessons for the growing role of AIM in developing countries.

It was also important to review the barriers in AIM development in one of the leading post-Soviet states – Russia. The Russian experience was essential for comparing with Kazakhstani case and for understanding the challenges facing former Soviet Union countries. Discussing the situation in Russia, the author found some similarities with Kazakhstani case on this issue, such as the fact that IS offer different types of information and data, but most of them incomplete and sometimes not reliable, in spite of the previous centralization of information in Russia when it was the hub of the former USSR. The experiences of Russia point to the need to develop current AIM based on ICT in Kazakhstan, together with integration to a unique and centralized AIM system for public users such as farmers, agricultural professionals and policymakers.

The majority of studies in the field of AIM in the USSR took place in the seventies and eighties of the twentieth century (Kutsenko et al., 1972; Mozhin, 1974; Ushacheva, 1988), which could not take into account the currently prevailing economic realities that are associated with the transition to the new market relations, and changes in the socio-economic structure of Kazakhstan. It is argued that these issues require a more detailed and expanded investigation, not only by specialists of the agricultural sector and policy makers, but by academic researchers who are uniquely placed to develop explanatory theory around the barriers and opportunities for development of AIM in the former Soviet bloc.

The contribution of the current thesis to knowledge regarding the opportunities and barriers to successful IMS in Kazakh agricultural policy lies in the fact that opportunities for development of ICT-based AIM, and the barriers to its effective development, have not been adequately considered by previous Kazakhstani scholars. Thus, the academic novelty of the research takes into account that few, if any, studies have gone beyond a conceptual analysis of the issues facing key players in the agriculture sector of former Soviet states. The current study, on the other hand, has consulted a wide range of decision makers from all levels of Kazakh agriculture, and has compared their unique

experiences both of the barriers to the effective implementation of AIM in Kazakhstan and the unique opportunities for its further development in a way that maximizes its contribution to the success of the agricultural sector.

The data collected from these key stakeholders will be presented and discussed in Chapter 4. The next Chapter will describe the rationale behind the researcher's choice of methods for data collection and analysis.

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Introduction

This Chapter will critically evaluate the methodology that was adopted for the study. The research strategy, the methods for primary data collection and appropriate data analysis techniques for meeting the aims and study objectives will be detailed and described in the following sections. Additionally, the theoretical and philosophical contexts of the study will be discussed, along with critical reflections on the methodology.

As was stated in Section 1.5, the aims of this study are:

- to conduct a review of Agricultural Information Management (AIM) based on the implementation of new technology in developed countries, to enable better understanding of the barriers to effective development of current AIM in Kazakhstan since its independence in 1991;
- to identify the barriers and opportunities that affect the development of existing AIM systems in Kazakhstan and other former Soviet countries, including Russia, with a similar socio-economic system of development;
- to develop a best practice model, based on the experiences of Kazakh key stakeholders, and taking into account the strategies of both developed and developing states, for the effective improvement of AIM in Kazakhstan in the post-Soviet era.

Bearing in mind these general aims, the present chapter also details the researcher's tactics to meet objective 4 (Section 1.5) of identifying key players in the agricultural sector of Kazakhstan to determine their views from all levels of management on the barriers and opportunities for AIM in the country. Briefly:

- Section 3.2 describes the researcher's overall research philosophy;
- Section 3.3 considers epistemology and the research paradigm;
- Section 3.4 discusses the differences between deductive and inductive methods;
- Section 3.5 discusses the nature of qualitative and quantitative data;
- Section 3.6 introduces Grounded Theory as a research approach;
- Section 3.7 considers the sampling methods for the study;
- Section 3.8 refers to the checks for validity, reliability and research ethics;
- Section 3.9 sums up the overall philosophy and strategy adopted by the researcher;
- Section 3.10 describes the project in practice, detailing the research participants and the interviews conducted;
- Section 3.11 describes data management and analysis, including the coding process;

- Section 3.12 provides a final summing up and defence of the overall methodology.

The chapter therefore moves from the general to the specific, beginning with the philosophy adopted by the researcher.

3.2 Philosophy choice: research strategy and theory building

In terms of the research strategy adopted, in the previous chapter the researcher critically reviewed prior research in the areas of economics and political theory, in order to develop an understanding of the impact of agriculture policies on a state's economic growth. These fields were joined by an examination of the role of AIM in supporting agricultural development in developed and developing countries. This enabled the researcher not only to comprehend important economic variables that are appropriate in the analysis of the country's economic growth factors, but also to consider the impact of ICT-based AIM on these issues. The study now moves on from a review of the relevant literature to describe the decisions the researcher made in designing and carrying out the primary research necessary to address the gaps in the existing literature, by seeking the views on ICT-based AIM of agrarians at all levels of the Kazakh agricultural sector.

During the methodological journey to conduct a research study it is important to outline the ontological and epistemological positions of the study, because these have a profound impact on the research design and overall philosophy position. Not least, to plan and execute a research project is a basic requirement of a doctoral thesis. Additionally, Yin (1994 p.20) notes:

Another way of thinking about a research design is as a 'blueprint' of research, dealing with at least four problems: what questions to study, what data are relevant, what data to collect, and how to analyze the results.

Consequently, this chapter is constructed around these four elements, taking into consideration an understanding of specific issues related to the research design and methods of data collection and analysis. The chapter also seeks to provide justification of particular methods which were considered necessary for realization of the study aims and objectives. As Gummesson (1999 p 55) points out, the research process is presented in an idealized model, yet the reality is often characterized by complexity and intractability on the journey to generate useable theory.

3.3 Epistemological considerations and rationale for research paradigm

Before discussing the research design and choice of the research methods it is necessary to highlight the epistemological stance. Where the research fits in terms of epistemology is important as it influences the methodological decisions, such as the design of the research questions and goals. Epistemology is traditionally identified with the theory of knowledge. The main epistemological questions are: *is it possible to obtain a must-true and universal knowledge and how? What are the*

criteria that distinguish it from other kinds of knowledge? What are the mechanisms of its objectification and implementation of scientific and theoretical and practical activity? What are the criteria for the validity of scientific knowledge? (Mikeshina, 2006 p.7). Thus, with regard to the research epistemology as it influences the methodological decisions and basic theory of knowledge, the research makes a start from an *interpretivist* (also known as antipositivism or interpretive sociology) world view which is best portrayed by comparing it with a positivist approach.

In order to understand the agrarian community's responses regarding the role of AIM in agricultural development (and the role of those who might be developing it), it was deemed necessary to conceive the situation in which such communities subsist and how these worlds can be understood. The *interpretivist* approach is appropriate where the researcher is *interpreting discourses or traditions and establishing the interpretations and meanings they attach to social phenomena* (Marsh and Furlong, cited in Tait, 2010 p.76). Reinharz (1984 p.365) suggests: *I will never know the experience of others but I can know my own and appropriate theirs by entering their world. This approximation marks the tragic, perpetually inadequate aspect of social research.*

When developing a research methodology it is of course essential to consider, from the range of available methods for selection, the most appropriate method for achieving the research aims and meeting the research objectives. *With regard to ontological considerations, positivism relies on the cause and effect, similar to the natural world, which may exist quite independently of the people's belief* (Denscombe, 2002, cited in Agarwal, 2011 p.70); *whereas, in an interpretivism paradigm, the meaning is given by people* (Easterby-Smith et al., 2002 cited in Agarwal, 2011 p.70). The positivist world view has developed from the 'hard' sciences where in its extreme form it suggests that only observable phenomena are 'verifiable', and that concepts can be measured if the researcher collects large enough data samples (Easterby-Smith et al., 1991). Research carried out by positivists therefore usually advocates exploitation of the natural sciences in order to conduct objective research. Bryman and Bell (2011 p.15) describe positivism as having the following features:

- Only phenomena confirmed by the senses counts as knowledge;
- The purpose of theory is to generate hypotheses which may be tested;
- Knowledge is arrived at through gathering of facts;
- Science can be value-free;
- There is a distinction between scientific and normative statements and the former are the scientist's domain.

In the case of the current study, the secondary research considered a significant number of statistical reports and research papers which relate to the economic and political aspects of the study. Such research, probably regarded as belonging to the positivist paradigm, tends to use large samples, so enhancing internal validity, but counting and classifying is only one part of the story of ICT-based AIM in Kazakh agricultural policy. Even with quantitative, positivist data, meaning and interpretation

are required, and in fact interpretivist research requires the same standards of scholarship (Wilson, 1998). Interpretivism describes the stance of writers who have criticised the positivist approach, suggesting that such a scientific model is inappropriate for the study of the social world, and that the material of the social sciences is different from that of the hard sciences (Bryman and Bell, 2011 p.16). The contrast has sometimes been described as being between the hard science view of positivism, and ‘hermeneutics’ – that is a term which is concerned with the methods for understanding human behaviour. Bryman and Bell (2011 p.16) suggest that hermeneutics is directly in opposition to positivism, as positivism endeavours to explain behaviour, while hermeneutics attempts to understand behaviour. Other writers (such as Schutz 1962 cited in Bryman and Bell, 2011) described *phenomenological* ideas, stressing that social reality is ‘real’ for people and therefore their actions have meaning for them. This means the social researcher needs to access what people think and interpret their actions from their viewpoint. Thus, examining the differences between these views, Bogdan and Taylor (1975 p.13-14) state:

The phenomenologist views human behaviour....as a product of how people interpret the world.....in order to grasp the meanings of a person's behaviour, the phenomenologist attempts to see things from that person's point of view.

Thus, an *interpretivist* approach was defined by the researcher as the most suitable approach for this study, in order to supplement the hard scientific statistical data collected by researchers into agricultural development in Kazakhstan with a better understanding of the community responses of the role and management of AIM in supporting agriculture development.

3.4 Deductive or inductive approaches

The main aim of deductive research is to confirm theories which have been generated from a secondary source. By contrast, induction involves no mandatory hypotheses and instead leads the researcher to develop theory from the data (Saunders et al 2003 p. 388). It is appropriate in the case of phenomena which have not yet been the subject of detailed research, in the current research the experiences of agrarians at all levels of the use of AIM in Kazakhstan. Inductive approaches may start from a theoretical perspective which links into existing research – in the case of the current study, the hard data on Kazakh agricultural practice generated by positivist/quantitative research. Deductive thinking operates through positivist principles in that it uses hard (scientific) data, moves from theory to data, in the process collecting large amounts of quantitative data, and seeks to explain causal relationships between variables. Not least the researcher is required to be independent of the research project. Conversely, inductive research strategy follows interpretivist principles in that the researcher is looking to gain an understanding of the meaning people give to events and phenomena, in the process collecting qualitative data but with a flexible research structure to allow potential changes of

emphasis as the research develops. Not least, the researcher is not independent from the research project but very much part of it (Saunders et al, 2003 p. 89).

The researcher does not start with what is already known about the subject but instead with data collection and analysis. It is only at a later point that efforts are made to build more general truths, by considering the relationship of the findings to existing knowledge (Moses & Knutsen cited in Harding, 2013 p.13).

All these features make it possible for the researcher's findings to reflect the perceptions and experiences of those being researched more accurately. Indeed, using inductive method, the interpretivist approach can evolve and find ways of reflecting the experiences and views of those being researched. As Gilbert (2001 p. 27) claims *induction is the technique for generating theories and deduction is the technique for applying them.*

Consequently, an *interpretivist, inductive* methodology was preferred to guarantee that the research findings could faithfully reflect the experiences of the research participants in agriculture with the ultimate aim of discovering perspectives for further development of this sector of the economy in Kazakhstan and other post-Soviet states with similar socio-economic development.

Thus, reviewing the role of agricultural policy in both developed and developing countries, and at the same time, examining the barriers and opportunities of AIM in supporting agricultural policy, it was important to analyze and contrast the collected data during the interviews for understanding the situation in post-Soviet countries with the specific case of Kazakhstan. A grounded theory approach to data analysis, assuming no a priori hypotheses, was applied to the primary data collected during the semi-structured interviews. According to Strauss and Corbin (1998, p.177) *all grounded theory procedures are aimed at identifying, developing, and relating concepts.* The grounded theory techniques used by the author to generate explanatory theory are described below in section 3.6.

At the same time, *careful selection of quotations will demonstrate the reliability and validity of the data analysis* in the process of interviewing (Hancock, 1998 p.23). As a result, the researcher's strategy for the project, from primary collected data to identifying, developing and relating study concepts, has been carefully considered.

Primary data collection methods in this empirical investigation included interviews with research participants for understanding their opinions on the research objectives, with subsequent comparison with secondary academic studies, articles and publications, as well as the agrarian organizations' documentation and reports. The type of data collected, the data collection method and data analysis techniques, together with the ethical considerations, validity, and reliability of the research methodology will be described and explained in the following sections.

3.5 Qualitative and quantitative research data

As suggested above in the discussion on positivism, quantitative research allows statistical manipulation of large data sets (Saunders et al., 2003 p.328). Neville (2007) identifies the emphasis of quantitative research as collecting and analyzing numerical data; it concentrates on measuring the scale, range, frequency of phenomena. This type of research, although harder to design initially, is usually highly detailed and structured, and results can be easily collated and presented statistically. But it should be added that even when it seems to be rigorous, quantitative research data still requires to be interpreted by the researcher, and its tendency to standardisation can mean it becomes superficial. Van Maanen (cited in Gummesson, 2000, p.ix) suggests: *many of the promises associated with quantitative research have come up empty. Counting and classifying can only take one so far. Meaning and interpretation are required to attach significance to counts and classifications and these are fundamentally qualitative matters.* Not least, although qualitative research methods make different assumptions about data – that is, they are not regarded as ‘scientific’ but interpretive – they still require the researcher to be analytically rigorous, even while the researcher’s own reflections and observations on the data may become part of the data. The data usually takes the form of text and Flick (2002, p.11) has suggested that qualitative research can be described as a process of moving from theory to text and then back from text to theory.

It is therefore clear that qualitative research is more subjective in nature than quantitative and involves examining and reflecting on the less tangible aspects of a research subject, such as values, attitudes, or perceptions. Although this type of research can be easier to begin, it can be often difficult to interpret and present the findings; the findings can also be challenged more easily (Neville, 2007). According to Thorne (2002) *Qualitative research often takes the position that an interpretive understanding is only possible by way of uncovering or deconstructing the meanings of a phenomenon. Thus, a distinction between explaining how something operates (explanation) and why it operates in the manner that it does (interpretation) may be a more effective way to distinguish quantitative from qualitative analytic processes involved in any particular study.* Strauss and Corbin (1990, p.17) add *by the term qualitative research we mean any kind of research that produces findings not arrived at by means of statistical procedures or other means of quantification .*

Finally, both research methods, and the data production, are highly dependent upon the clear definition of the data of analysis throughout the research design. *Each of the various features of qualitative research may be viewed as strength or as a weakness. This depends on the original purpose of the research”* states Hancock (1998 p.3). *Qualitative research is often criticized by quantitative researchers for being subjective, difficult to replicate, not generalizable to the wider population and having a lack of transparency* (Bryman cited in Tait, 2010 p.76-77). Hancock (1998 p.2) adds that qualitative methodology data collection is intensive and time consuming. Hence, smaller but focused samples are more often needed than large samples. *Qualitative research is concerned with the*

opinions, experiences and feelings of individuals producing subjective data. Qualitative research describes social phenomena as they occur naturally (Hancock, 1998 p.2). Moreover, qualitative methods can help to investigate a particular problem with a relatively small sample of people. These methods are more detailed in the focus on how people perceive their problems, why and what their priorities are. Therefore, qualitative methods need to be flexible. According to Snyder:

Qualitative research takes time to constantly review where you are in the research process; what you have accomplished, what you have not accomplished, what challenges you have overcome and what new challenges you may have to deal with in the future (Snyder, 2013, p.241)

The key contrasts between quantitative and qualitative research methods are presented by Bryman (2001, p.285) in Table 4 below.

Table 4: Some common contrasts between quantitative and qualitative research (Bryman, 2001)

| Quantitative | Qualitative |
|-----------------------------|-------------------------------|
| Numbers | Words |
| Point of view of researcher | Point of view of participants |
| Researcher distant | Researcher close |
| Theory testing | Theory emergent |
| Static | Process |
| Structured | Unstructured |
| Generalization | Contextual understanding |
| Hard, reliable data | Rich, deep data |
| Macro | Micro |
| Behaviour | Meaning |
| Artificial settings | Natural settings |

On the basis of these factors listed in Table 4, the researcher considered how each factor might apply to the current research project: Understanding Barriers and Opportunities in Agricultural Information Management in Post-Soviet states: A case study of Kazakhstan. The results of the researcher's considerations are shown in the table below.

Table 5: Choice of qualitative approaches for data collection and analysis. Source: Researcher

| Qualitative Data Factors | Reasons for choice of qualitative approaches |
|----------------------------------|---|
| Words not numbers | No statistics were involved; rather the data consisted of words and sentences which were gathered during the interviews with Research Participants (RPs). |
| Viewpoint of RPs, not researcher | As a piece of interpretive research, the viewpoint of the RPs was actively sought; the researcher was focused on obtaining these views. |
| Researcher close | In view of the researcher's professional interest in the topic area, the views of RPs were particularly important as they could shed light on the barriers and opportunities for development of IMS in Kazakh agricultural policy. |
| Theory emergent | There were no initiating hypotheses but the researcher was focused on generating explanatory theory from the data collected. |
| Process | The research project did not consist of (for example) one specific questionnaire, but involved visiting RPs on their own ground and discovering their views around the research topic |
| Unstructured | The interviews were largely semi-structured to allow the RPs to cover topics which reflected their own attitudes, beliefs and world view. |
| Contextual understanding | The research project was focused specifically on the context of Kazakhstan as a post-Soviet country seeking to rapidly develop its agricultural sector, so generalization was not the main aim. However, some generalisation may be possible in terms of the lessons to be learned by other post-Soviet states. |
| Rich, deep data | The wide-ranging interviews with RPs allowed them to reflect deeply on the reasons for using – or failing to use – ICT in AIMS. A computer-generated questionnaire may not have provided sufficient opportunity for respondents to explain their own views and attitudes. |
| Micro | The focus of the research filled a gap in the extant literature on AIM in post-Soviet states which has tended to focus on quantitative analysis, rather than the views and attitudes of the end user. |
| Meaning | The researcher's focus was on the meanings, or explanations, which the RPs gave to their experiences with ICT-based AIM, in order to shed light on the barriers and opportunities regarding its continued use. |
| Natural settings | RPs were mainly interviewed in their usual work environment. |

3.6 Qualitative research methods – introducing Grounded Theory

Hancock (1998 p 4) confirms that *the systematic use of qualitative method provides equally reliable and objective results as quantitative*. This author subsequently outlined four major types of different qualitative methodologies: Phenomenology, Ethnography, Case Study, and Grounded Theory. Dembitski (2010 p.65) presented the characteristics of different types of qualitative research in the following table:

Table 6: *Comparative characteristics of different types of qualitative research*

| Type of study | Discipline where the approach originated | Report Form/ Narrative Form |
|--------------------|--|---|
| Narrative research | Literature, history, psychology, sociology, anthropology | Chronological history of individual life |
| Phenomenology | Philosophy, sociology, psychology | Description of the experience |
| Discourse Analysis | Linguistics, semiotics | Description of the language used and how different discourses are drawn as identities and relationships |
| Ethnography | Cultural anthropology, sociology | Description of the cultural behaviour of a group or individual |
| Grounded Theory | Sociology | Theory or theoretical model |

For the current project, the researcher had to decide between these types of study and their attendant forms of data analysis. Narrative research was clearly inappropriate because of the focus on individual life history, as was discourse analysis which involves detailed investigation of the linguistic features of a text. Ethnography considers the cultural behaviour of a group or an individual, and although there were some aspects of this approach that fitted, such as the situation of people in Kazakhstan leaving rural environments to work in cities, it was not sufficiently focused on the concept of AIM. Phenomenology was closer to the aims of the research, being focused on the lived experience of research participants, but given that the ultimate aim of the research was to generate useable theory, grounded theory was adopted as the main method for approaching the stages of defining the research questions and collecting and analysing the data obtained. To support this decision, Denzin and Lincoln suggest:

The rigor of grounded theory approaches offers qualitative researchers a set of clear guidelines from which to build explanatory frameworks that specify relationships among concepts. Grounded theory methods do not detail data collection techniques; they move

each step of the analytical process toward the development, refinement, and interrelation of concepts (Denzin & Lincoln, 2003 p.251).

3.6.1 Principles of Grounded Theory research

In terms of 'pure' grounded theory, the researcher had reviewed a range of literature before beginning the data collection, so the research was not completely free of preconceived ideas of what might be discovered (Glaser and Strauss, 1967). Some writers, such as Lowe (1998) have argued for placing the literature review at the end of a grounded theory research, but he appears to concur with the view that it can expose the researcher to a range of theoretical concepts currently beyond the researcher's understanding. But, given the lack of studies on the experiences of Kazakh agrarians in using AIM, it was decided that grounded theory was appropriate in generating theory from the data which was collected and subsequently analysed.

Strauss and Corbin (1990) defined grounded theory as a type of qualitative research which uses a systematic set of procedures to develop and inductively produce a theory about a phenomenon which is grounded in the data. It appears to be an interpretive process which involves the researcher in continuously moving between data collection and analysis, with the aim of developing an effective framework of understanding (Flick, 2002 p 41). Themes are derived from careful reading of the texts produced, a process termed 'coding', which involves identifying themes and from here building theoretical models. Coding IS analysis, suggest Miles and Huberman (1994 p56).

According to Hancock (1998 p.5) *grounded theory is not a new phenomenon, people have going through these stages for as long time as society has existed, but the research using this methodology approach formally acknowledged and described the experience.* On the other hand, Strauss and Corbin (cited in Tait, 2010 p.77) claim that grounded theory is a *theory that was derived from data, systematically gathered and analyzed through the research process. In this method, data collection, analysis and eventual theory stand in close relationship to one another. They add all grounded theory procedures are aimed at identifying, developing, and relating concepts* (Strauss and Corbin, 1998 p.177). Thus, the purpose of grounded theory method is *to build theory that is faithful to and illuminates the area under study* (Strauss, 1990 p.23).

The grounded theorist is attempting to identify categories and concepts discovered in the text, in an iterative process which 'grounds' the analyst in the data. As the codes, or categories, become clear, the analyst may then link them to make theoretical models (Ryan and Bernard cited in Denzin and Lincoln, 2000). Strauss and Corbin (1990 p.23) suggest: *Grounded theory is one of that is inductively derived from the study of the phenomenon it represents. That is, it is discovered, developed, and provisionally verified through systematic data collection and analysis of data pertaining to that phenomenon.*

Thus, once deciding to use a grounded theory approach, a number of issues were identified for the author to consider. *Initially, decisions regarding the number of sites and observations or interviews*

depend also upon access, available resources, research goals, plus your time and energy claim Strauss and Corbin (1998 p.179), all of which were important for a piece of research which was to be carried out while the researcher was employed on a full-time basis, making resources and time particularly important. As Charmaz (2006) points out, grounded theory was originally conceived to be applied flexibly depending on the circumstances and topic of investigation and *can complement other approaches to qualitative data analysis, rather than stand in opposition to them* (cited in Tait 2010 p.78). It is worth noting, however, that grounded theory is a contested methodology and there is controversy as to what constitutes ‘real’ grounded theory (Bryman, 2004; Hodkinson, 2008 cited in Tait, 2010 p.78). Furthermore, even if the strategy of ‘grounded theory’ is one of the most reliable ways of constructing a theory, and is *the most influential paradigm for qualitative research in the social sciences today* Dembitski (2010 p.72), it has a number of difficulties that are associated with its use in studies: first, the process of learning how to use this strategy is a long and creative one (Denzin cited in Patton, 2002 p.124). This may be why its use in Kazakhstan and other post-Soviet states is still not widespread. Secondly, this approach requires the consent of research participants for quite a long partnership, and that may well throw up organizational difficulties (Dembitski, 2010 p.72).

According to Dembitski (2010 p.72) the selection of the various methods for implementing purposeful selection of theoretical sampling is carried out on the basis of the characteristics of the developed theory, groups of people with the necessary information, as well as the capabilities of the researcher.

3.6.2 Procedures of Grounded Theory research

Dembitski (2010 p.66) argues that within the procedures for the full ‘grounded theory’ it is important to develop in the course of the study a high level of *theoretical sensitivity*. According to Strauss and Corbin (cited in Dembitski, 2010 p.66) theoretical sensitivity involves *property of insight, ability to interpret data, the ability to understand and ability to separate right from what is not actually*. Dembitski (2010 p.64) supports this view, suggesting that a theoretical sensitivity property includes insight, ability to interpret collected data and the ability to identify important actions. Sources of theoretical sensitivity are literature, professional and personal experience, as well as the analytical process (Strauss and Corbin cited in Dembitski, 2010 p.66). A number of writers have attempted to describe the main features of grounded theory, bearing in mind its flexibility as a research tool:

Strauss and Corbin (cited Kawulich, 2004 p.3) identify the following types of coding: *Open Coding, Axial Coding and Selective Coding*; and the use of a particular type of coding corresponds to the degree of development of theoretical propositions (Dembitski, 2010 p.64).

These are further considered at 3.6.3 below.

- Theoretical sampling is the selection of people who have information of interest to the researcher in terms of aspects of empirical reality, which in turn, are the basis of relevant theoretical concepts (Dembitski 2010 p.64). *The relationship between data analysis, theory*

building and sampling is crucial when using a grounded theory approach. Theory building should begin as soon as there is sufficient data to analyse and cases should be chosen to add to the sample on the basis that they can contribute to the emerging theory. This sampling method is known as theoretical sampling” (Harding, 2006 p.131-132).

- Theoretical sampling is associated with the concept of *theoretical saturation*, which involves collecting data until it is found that research participants reported no new data to provide new concepts to develop the theory. *Theoretical saturation* and *theoretical sampling* are used together to determine the size of the overall sample (Auerbach and Silverstein cited in Dembitski, 2010 p.64).

Considering the process and the types of coding used in the strategy of ‘grounded theory’, it appears that it is the alternation of data collection and analysis (Egan 2002, p. 280). Charmaz (cited in Harding, 2013 p.83) suggests that *coding is the process of selecting, separating and sorting data; identifying categories is a major part of the separating and sorting*. At the same time, Berg (cited in Harding, 2013 p.83) comments *However, it is difficult to suggest specific tactics or techniques for creating categories*. Furthermore, *the researcher can only use their judgment to identify broad subject areas under which the data could be grouped* (Harding, 2013 p.83). It is possible to use different types of data: observations, documented information, personal memos, or transcripts of interviews but personal interviews are often considered as the best option (Dembitski, 2010 p.67). Thus, grounded theory strategy means not only the use of data collected by other people, but data collection by the researcher personally.

In the case of the current project, the researcher arranged a series of interviews with research participants for data collection. After the interviews, the researcher could undertake the first phase of analysis – *open coding*. In open coding, the researcher identifies the categories represented in the data. Each category has properties that can be regarded as sub-categories. Thus, for data analysis, different coding tools: *open coding*, *theoretical coding* and *axial coding* were examined. Taking into account the main aim of grounded theory – discovery, scholars add *data collection – and the associated theoretical sampling – must be structured to allow for this* (Strauss and Corbin, 1998 p.180). At the same time, sampling in Grounded Theory is directed by *the logical and aim of the three basic types of coding procedures: sampling in Open Coding, sampling in Axial Coding, and sampling in Selective Coding*, concepts which will be discussed in more detail below.

3.6.3 Coding techniques for data analysis

All techniques of data analysis in qualitative researches are powerful and flexible tools. On this note, researchers are not limited towards only one specific technique and they can use suitable approaches to data in highly efficient ways (Strauss, 1987 p.27). They add:

Any researcher who wishes to become proficient at doing qualitative analysis must learn to code well and easily. The excellence of the research rests in large part on the excellence of the coding (Strauss, 1987 p.27).

A code is a concept, a word that signifies what is going on in this piece of data (Corbin, 2004 p.528). According to Gibbs and Taylor (2005) data can consist of interview transcripts, participant observation field notes, documents, literature, artifacts, photographs, video, websites, e-mail correspondence, and so on. A fair number of these were used by the researcher in the course of this study. Furthermore, Gibbs and Taylor (2005) consider coding as *the process of combining the data for themes, ideas and categories and then marking similar passages of text with a code label so that they can easily be retrieved at a later stage for further comparison and analysis (Qualitative Data Analysis , QDA Accessed 2013).*

Hence, Strauss and Corbin (cited in Corbin, 2004, p.528) highlight:

Code is the analytic process of examining data line by line or paragraph by paragraph (whatever is your style) for significant events, experiences, feelings, and so on, that are then denoted as concepts.

Coding the data makes it easier to search the data, to make comparisons and to identify any patterns that require further investigation add Gibbs and Taylor (2005, Qualitative Data Analysis, Accessed 2013).

Thus, coding is the process of examining the raw qualitative data which will be in the form of words, phrases, sentences or paragraphs, and assigning codes or labels to the data. According to Strauss and Corbin (1987 p.181) the aim of Sampling in Open Coding is *to uncover as many potentially relevant categories as possible, along with their properties and dimensions*. Sampling in open coding for this study involved data collected during the interviews with research participants, as well as research reports and studies that appear in the literature review, and on the basis of these data certain categories were established. During the open sampling and coding process, the researcher aimed *to maintain a balance between consistency (that is, systematically gathering relevant data about categories) and the making of discoveries (uncovering new categories, or new properties and dimensions)* (Strauss and Corbin, 1998 p.181).

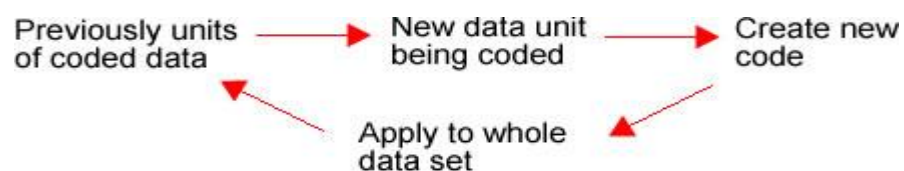
Sampling in axial coding *is the set of procedures used to put data back together in different ways after open coding, by making connections between categories. This is done by using a coding paradigm involving (intervening) conditions, context, action/ interactional strategies and consequences (Kawulich, 2004 p.3).* Thus, axial coding was described as *the process of relating subcategories to a category, which is developed in terms of the causal conditions that give rise to it (Kawulich, 2004 p.3).* Sampling in axial coding for this study meant putting back data together that had been analysed in open coding process and which revealed certain categories, and finally, related subcategories found during open coding were combined and put to categories.

According to Strauss and Corbin (1990 p.187) *the aim of selective coding is to integrate the categories along the dimensional level to form a theory, validate the integrative statements of relationship, and fill in any categories that need further development.* In effect, this means the researcher should be aware of the need to constantly review and refine codes in an iterative fashion to ensure that those which are ultimately selected are relevant.

3.6.4 Applying new codes

Gibbs and Taylor (2005) in Figure 8 demonstrate how new codes should be applied to previously coded data. This means in the process of encoding the data, the researcher created new codes and then returned to check the units of data which were previously coded for creating a new data unit, if this proved necessary. These processes were of an iterative and circulating nature.

Figure 8. New codes application.



Source: Adopted from Gibbs and Taylor, 2005.

In this context, Gibbs and Taylor explain the importance of applying codes to the whole data set:

Something you come across later on may change how you want to code the data; you may not have noticed a new pattern in the data until you had coded a number of interviews; if you only code the data units after you created the node, any previously coded data units will not be included in the searches involving this code (Gibbs and Taylor, 2005).

It is evident that coding is a lengthy process and as scholars claim the researcher *may find that previously coded data does not need to be coded at the newly created code but you could not know this without checking.* On the other hand, as Kawulich notes:

The process of analyzing qualitative data varies from one study to another, depending on how the researcher is guided by the research questions, the theoretical framework of the study, and the appropriateness of the techniques for making sense of the data (Kawulich, 2004 p.9).

Whatever approach to coding and analysis is used, essentially the grounded theorist is looking to identify categories and concepts which emerge from text (in this case, notes of interviews made) and link them into theories or theoretic models, a process which is iterative and by which the researcher becomes intimately aware of the data. Constant review and reduction of these enables a process of synthesizing concept families into emergent theories.

3.7 Sample size and saturation

Samples for qualitative studies are generally much smaller than those used in quantitative studies. Ritchie et al. (cited in Mason, 2002) provide reasons for this:

There is a point of diminishing return to a qualitative sample—as the study goes on more data does not necessarily lead to more information. This is because one occurrence of a piece of data, or a code, is all that is necessary to ensure that it becomes part of the analysis framework.

The strength of qualitative research is its ability to provide complex descriptions of how people experienced in research issues. On this note, the qualitative approaches provide information about the ‘human’ side of study issue that can be often contradictory in their beliefs, opinions, emotions, and relationships of individuals. Qualitative methods are effective in identifying issues that may not be readily apparent (Hancock, 1998). Crouch and McKenzie (cited in Mason, 2002) claim that *frequencies are rarely important in qualitative research, as one occurrence of the data is potentially as useful as many in understanding the process behind a topic*. This is because qualitative research is not making generalized research propositions and is concerned with meaning. And *finally, because qualitative research is very labor intensive, analyzing a large sample can be time consuming and often simply impractical*.

Thus, reviewing the number of respondents necessary for interviewing, the emphasis was on interviews to be carried out until saturation point was reached, and no new data was discovered. According to Mason (2010) numbers of research respondents are offered as guidance, and this author does not tend to present empirical arguments as to why certain numbers and not others are appropriate. Other writers do suggest some kind of guidelines for qualitative sample sizes. For example, Charmaz (2006 p.114) supposes that *25 participants are adequate for smaller projects*; Ritchie et al. (2003 p.84) merely state that qualitative samples often *lie under 50*. In this context, Mason claims: *While some researchers offer guidelines for qualitative samples, there is evidence that suggests others do not strictly adhere to them* (Mason, 2010). On the other hand, Dey (cited in Mason, 2010) suggests that *researchers often close categories early as the data are only partially coded, and cite others to support this practice, such as Strauss and Corbin (1998) who suggest that saturation is a ‘matter of degree’*. According to Strauss and Corbin (cited in Mason 2010) *saturation should be more concerned with reaching the point where it becomes ‘counter-productive’ and that ‘the new’ is discovered does not necessarily add anything to the overall story, model, theory or framework*. Additionally, Mason (2010) claims that *sometimes the problem of developing a conclusion to researchers’ work is not necessarily a lack of data but an excess of it. So it is important for the researcher to cut data if it is necessary*.

To ensure saturation, the author decided to conduct interviews with agrarians from all levels of agriculture management: *strategic, tactical and operational*, whilst also covering the different

regions/oblasts of Kazakhstan. The regions where agriculture was identified as a non-priority sphere of economic development were excluded from the list of respondents, moreover, the basic orientation of those excluded regions was industrial oil and gas development, raw-materials exploration and production; namely, in those regions agriculture did not play a significant role in economy development since independence. Furthermore, during the interviewing, where the Research Participants (RPs) were merely repeating the same points of view on the research issues, this meant that there was nothing new to add to the collected data.

3.8 Validity, Reliability and Research Ethics

Wilson (1998) proposed a list of factors determining a good piece of qualitative research: it should be able to claim that the findings of the research relate not only to the real world, but are transferable to other settings. Not least, participants in the research should benefit by it. In the current study, it is hoped that explanatory theory may shed light not only on the Kazakh experience, but also on that of other ex-Soviet states wishing to develop their agricultural policy using AIM. And because the participants all had a stake in the agrarian industry sector, it would seem clear that they will benefit from the conclusions and recommendations of the research. Reliability is enhanced by developing a suitable research protocol, and where it is possible to follow a chain of evidence. In the case of the current study, the researcher's procedures for data transcription and storage ensured this took place.

Validity is a question of whether the researcher sees what he or she thinks she sees. In the present study, the researcher had worked in the International European project TEMPUS which was set up to develop the agricultural economy in former Soviet Union countries, and the topic originated from the researcher's several roles as a database specialist, lecturer, researcher and adviser in the field of management and business information systems. In situations where the researcher is closely involved with the topic or organisation(s) concerned, there is always a possibility of bias (Yin, 1994 p.10), but this may be overcome by ensuring that the researcher's conclusions are grounded in the evidence from the subjects of study. Not least, the researcher's effective working relationships with the Research Participants enabled her to regularly check her thoughts and theoretical constructions, in a process called by Flick (2002) 'communicative validation'.

The majority of researchers would concur with the need to observe ethical standards in a research project, and this one required the authorization of the University's Ethics Committee. Most would agree to the following considerations:

- Consent to be questioned should be informed;
- Confidentiality, or anonymity of sources, should be ensured for Research Participants;
- Data transcription should be accurate and timely;

- The researcher should be aware that respondents might wish to ‘please’ the researcher by telling him/her what they believe he/she wants to hear, so it is important to affirm any controversial answers they might offer.

The researcher was aware of these important considerations and acted on them. Details will be provided below at 3.10.

3.9 Summing up of research philosophy and strategy

So far the research philosophy and strategy selected by the researcher may be summed up as follows: it takes an interpretivist position as opposed to a positivist stance, and is inductive in that no *a priori* hypotheses are tested. It employs a Grounded Theory approach to generate useable theories from the data and has due regard for questions of reliability, validity, and research ethics.

On the basis of the literature review, it is evident that the empirical literature contains a number of studies highlighting the significance of the influence of agricultural policy as the instrument of action that governments employ to effect for developing an agrarian sector which affect a country’s economic growth (Petit, 1996; Skidan, 2010). This study used official publications and informational sources of Kazakhstan, the Department of Agriculture areas of Kazakhstan, periodicals, academic publications and studies, informational sources which were available from Ministry of Agriculture and JSC AgroMarketing Holding during the researcher’s internship, National Statistics Agency of RK, Internet and other available sources.

However, there are few studies in the area which specifically examine the experiences of ‘end users’ with regard to the use of ICT-based AIM to develop agricultural policy, hence this investigation is based on the primary data collected during the discussions with Research Participants about the role of agricultural policy since independence in the 1990’s, with the aim of understanding the barriers and opportunities facing AIM in supporting state agriculture reforms and regulations, and influencing further development of agriculture in Kazakhstan and other post-Soviet states with a similar socio-economic development.

3.10. The research project in practice

Having justified the choice of research strategy and methods of collecting and analysing the data, the thesis now moves on to describe and explain the practical implications of the researcher’s choices.

3.10.1 Kazakh data sample

As discussed in the Literature Review and appendices, before Kazakhstan’s independence in 1991, the economy of Kazakhstan and that of other Soviet countries was based on a planned economic system.

Moscow, capital of the USSR, had created a general strategy of economic development with distribution of this plan to all Union republics at different periods of time. All USSR countries had an obligation to execute their aspects of the plan and worked under the control of the central apparatus, reporting back to them. The collapse of the Soviet Union in the early 1990s was followed by the destruction of the centralized system and, as a result the changes influenced the development of new economic relations in each country of the former Soviet Union. The economic crisis at the beginning of 90's affected the whole economic system in these countries and authorities identified a market-driven approach with transfer to new market-led economy relations. These fundamental changes required acceptance of the new forms of ownership for the means of production and were described by the researcher in Appendix II. Taking into consideration the long economic relationships between all the CIS nations, in order to avoid deep crisis in the economy of all the states, Nazarbayev (1990), the President of Kazakhstan, initiated and proposed the option for the acquisition of sovereignty whilst retaining such economic relations for a specific period with a gradual transition to an independent economy. However, no country supported this proposal. Perhaps it was one of the main reasons why Kazakhstan separated last among the other CIS countries.

Since the 1990s the new independent Soviet republics had opportunities to build their own political, legal and economic systems. Consequently, statistical and other reports were prepared by countries independently of each other (CIS Declaration, 1999). Until 1991 Kazakhstan had played the role of raw materials appendage in the system of Soviet Union countries, and at the same time was an agro-oriented state. For the purposes of this investigation, the sample consisted of discussions with agrarians from strategic, tactical and operational levels of agricultural management of Kazakhstan and state official representatives. 14 regions of Kazakhstan were investigated: *Akmolinskaya, Aktubinskaya, Almatinskaya, Atyrauskaya, East-Kazakhstan oblast, Zhambylskay, West-Kazakhstan oblast, Karagandinskaya, Kostanaiskay, Kyzylordinskaya, Mangistauskaya, Pavlodarskay, North-Kazakhstan oblast, South-Kazakhstan.*

On the basis of the different types of documents produced by official bodies, the researcher elected to study the regions where agriculture development has been marked as one of the top priority issues. It was an important opportunity to examine the current situation in the agricultural sector in order to demonstrate the impact of policies and understanding the barriers and opportunities in AIM for supporting further development of agriculture in Kazakhstan. Also helpful for gathering information and data for analysis, the researcher had an opportunity to conduct internships in two relevant companies and an international project.

The researcher decided upon a strategy for the sampling process of interviewing the potential respondents. The idea to arrange and negotiate with possible participants was based on the selection of candidates who had access to agricultural information and in their role were responsible for data collection, processing and management. At the same time, it was important to select people who had

participated in the process of creation, introduction and implementation of new policies and reforms in the agriculture of Kazakhstan since independence. Furthermore, the policy makers and agricultural authorities could also play a valuable role in the interview process. Thus, officials from Ministry of Agriculture, “KazAgro” and “KazAgroMarketing” National Holdings, and scientists from “Kazakh Research Institute of Agriculture and Plant” all agreed to be interviewed. The principle was therefore one of purposive sampling, where respondents are selected for theoretical reasons rather than by reason of statistics, as is the case in random sampling (Glaser and Strauss, 1967 p.204).

The process of arranging the interviews with respondents was challenging, not least due to the fact that Kazakhstan has a huge territory, and so the regional centres in Kazakhstan are located at great distances from each other and scattered. Taking into consideration the researcher’s location, Almaty city, the distance between cities and oblast centers were considered in preplanning the trips. It was decided that the minimum distance is 691 km, for example, between two centers Almaty and South Kazakhstan oblast centers, the maximum distance between Almaty and Mangistau’ oblast centres is 3396 km; and, additionally, the cost of flights had to be considered. Furthermore, all decisions for interviewing respondents were agreed with regional agricultural departments’ managers by phone calls on the basis of an informative letter (*Appendix V “Interview Arrangement”*) which was sent by the researcher in advance. The process may be described as follows:

- Each oblast (definition in section 1.7) was approached by a letter in early September 2011, indicating the purpose of the researcher and the study aim, together with the request to suggest a potential participant for interviewing. The letter also indicated that a further researcher phone call would follow to arrange the discussion schedules where it was possible and convenient for participant.
- A sample of the letter for arranging the interviews is shown in Appendix V. Three oblasts/regions declined to participate in the research, but 8 out of the 11 regions responded proactively and agreed to be interviewed. 3 out of 8 regions suggested interviews by telephone.

Data collected during the interviews with respondents from 8 oblasts of Kazakhstan was analyzed and described in Chapter Four. The process of data collection is now considered.

3.10.2 Qualitative data collection

It must be said that the qualitative data collection method is time consuming and consequently expensive. However, the advantage is that data can be gathered from a smaller number of respondents than would usually be the case in quantitative approaches such as the questionnaire survey. The main advantage of collecting and using qualitative data is the deeper insight into the phenomena under investigation and the richness of data. After considering qualitative data collection methods the researcher selected the *semi-structured interview* method to collect primary data with relevant people

from different levels of agricultural management and agriculture officials. During this phase the researcher was mindful of the following caveat:

Once the data is collected, the researcher cannot return back to an earlier step to correct decisions that lend to limitations in the study. At that point, the only choice is to collect the data again after correcting the problem and this can be expensive and sometimes impossible (Kumar, 2005 p.192).

3.10.3 Types of interviews: semi-structured interview

According to Kumar (2005 p.144) *any person-to-person interaction between two or more individuals with a specific purpose in mind is called an interview*. Yin states that *interviews are a very important source of information for the case study* (Yin, 1994 p.84). The development of the interview schedule, conducting and analyzing the interview data, all require careful preparation in advance. However, interviews offer the opportunity to understand how people see their world and why they act the way they do. At the same time, discussing the interview as a qualitative method, interviews are particularly useful in data collection when dealing with sensitive and complex issues. *Interviews offer a systematic way to review people's experiences over time as well as their perceptions, motives and accounts of these experiences and actions* (Gerson and Horowitz, 2002 p.221). In the current study, interviews with Research Participants were designed to discover their thoughts on the research questions and study objectives. For example, it was important to understand their viewpoints about the role of agricultural policy and reforms in agriculture development, to discuss with them the barriers and opportunities in AIM to support agriculture development in Kazakhstan and other post-Soviet states with a similar socio-economic position, and to examine the needs for new ICT implementation in supporting the exchange of knowledge and information between all levels of management in agriculture, as well as in terms of their interaction and collaboration in a unique AIMS. Also in terms of their attitudes to the issue, there were questions about the causes that directly or indirectly affect the solutions to current problems related to AIMS in Kazakhstan. An hour or more of the interviewing process usually gave time enough to understand the details and reveal the complexity of processes in Kazakhstan's agriculture sector. Through the interview process, where research participants could discuss their views on the research objectives, the researcher was able to obtain a deep understanding of current processes in agriculture, and understand the problems in current AIM and its further development as perceived by the stakeholders and potential end users.

Rice and Ezzy (2005) claim that researchers use variety of terms to portray in-depth interviews, such as focused interviews, open-ended and semi-structured interviews. It is generally agreed there are three main types, which are classified according to the degree of flexibility: *structured*, *semi-structured* or *unstructured interviews* can be conducted in carrying out a research project. They argue that these terms generally mean the same method, however, with some differences in their use. Structured interviews involve the interviewer administering a structured interview schedule to ensure

exactly the same, very specific questions are asked (Bryman and Bell, 2011 p.202). This ensures accuracy and ease of data processing, and tends to site this type of interview within a quantitative, hence positivist, paradigm. Qualitative interviewing tends to be much less structured, and interviewers can depart from a planned schedule to follow up issues of interest.

According to Whittaker and Williamson (2011 p.61), the semi-structured interview “*is the classic structure for qualitative research in the social science and the most commonly used format*” in research projects, adding:

In semi-structured interviews, the researcher develops a list of questions known as an interview schedule. However, there is some flexibility during the interview.

In practice, *semi-structured interviews (or focused interviews) usually include a series of open-ended questions based on the topic areas* adds Santiago (2009). This type of interview is rather more relaxed than structured interview, where the open-ended nature of questions define the topic under investigation, nevertheless, provide opportunities for both sides to discuss topics in detail and widely. Not least, *interviewers also have the freedom to be more friendly and sociable* adds Santiago. Benefits, according to this author, *include the ability to gain rapport and participants’ trust, as well as a deeper understanding of responses. Data sets obtained using this style will larger than those with structured interviews.*

It is, of course, possible to use an entirely unstructured style of interviewing, where the interviewer has only a brief set of prompts to deal with a certain range of topics (Bryman and Bell, 2011 p 467). This may be helpful in circumstances where the researcher has a very general brief, but in the case of the current project it was decided that to ensure focus on the research questions, a semi-structured approach would be more appropriate. Consequently, in using the semi-structured interviews as the preferred data collection method, the researcher was seeking to find answers to the research questions, that is, to understand the barriers in current AIM with opportunities for further development of the Kazakhstani agricultural economy.

Patton (2002) suggested approaching respondents with an interview guide before interviewing them: *on the one hand, the guide aids in making the participants informed, on the other, the researcher efficiently uses the limited time which is available to conduct the interviews.* Following Patton (2002), the researcher informed the potential participants in advance of the areas of questioning to be covered. This was communicated in the letters (Appendix V) which were addressed to 11 regions of Kazakhstan by the researcher. The questions in the first section were intended to gather general information about the potential respondents and information about the regional agriculture, for example, number of districts/rayons, farms in each districts, and regions. In the interview itself, the open framework allowed conversational communication flow. During the process of interviewing, the researcher noticed that the most of the respondents were generally interested in the preliminary

findings of the study. Semi-structured interview questions were not fixed ahead of time, but general themes and directions of the study were presented by author at the beginning and during the discussions.

In order to collect the data for current study, the author arranged several interviews with the various governmental bodies, such as: Ministry of Agriculture, Regional Agriculture Officers, KazAgro and KazAgroMarketing National Holdings authorities. The individuals who also participated in this study were the regional/oblasts' agricultural department leaders, lead agriculture specialists; from operational levels of agricultural management – district/rayon agricultural department managers, consultants and senior consultants, agriculture specialists; farmers and enterprise managers. Full details are provided at *Appendix VI 'A Summary of Interviewed Research Participants'*.

It has been suggested that the interview is a privilege to both sides: respondent/ research participant and researcher. This study planned to collect the experience of managers and specialists from different levels of agricultural management in Kazakhstan on the research objectives to find answers for study questions. The method of qualitative interviewing is a conversation, but one which has to be focused on the study area; the interviews were not a totally vacuous conversation with respondents. In general, in order to minimize the researcher's influence on the respondents' opinions, few leading questions were asked and in most cases the interviewer acted as a listener. As such, the researcher was able to be observant during the interviews on any interesting issues and took notes which contributed to the analysis of information after the interviews. The researcher listened to the respondents' answers and in some cases, when it was necessary, explained the details. For instance, some respondents during the interviews talked about their participation in various international conferences, and when anyone of them appeared to stop at this point, the interviewer probed '*did you do anything else at the conference?*' This question showed a significant result: the researcher suggesting a theme that had not yet been considered before, and as a result, the researcher found essential information which might not otherwise have been forthcoming.

It is of course most important to consider the procedures of selection of the potential interviewees, and so the following section will present the selection process of potential interviewees for this study and organizational processes of interviews.

3.10.4 Process of selection of the potential respondents and organization of interviews

Describing the process of selection for interviews, it happened that among the 11 oblasts that were preplanned to be interviewed, 3 leaders of departments were unavailable for scheduled interviews, and they refused participation without any explanation. However, in total, 15 agrarians from the 8 regions/oblasts were interviewed. Also 5 interviews were arranged by the researcher with 4 top managers from Ministry of Agriculture, National Holding "KazAgroMarketing", JCS "KazAgro" and 1 interview with a scientist from KazRI of A&P. Summarizing, 21 interviews with 20 respondents

were arranged by researcher for this investigation. Full details of participants are available *in Appendix VI 'A summary of interviewed respondents'*.

Given the challenges, it was important to select potential respondents who were knowledgeable and also likely to be truthful in their responses. On this note, Salamone (cited in Bleek, 1987 p.314) indicates that lies often can be regarded as helpful source of information, as lies, in brief, are communication type rather than its denial. Moreover, Aubry (2009) claims that lies, as well as incomplete observation and obscure motives when recognized can improve the perception of the information received from respondents. Thus, the process of selecting the respondents was an important one for the researcher. It was noticeable that respondents from strategic levels were more knowledgeable especially in agricultural management. However, there were no interviews with specific interest groups, only individual face-to-face semi-structured interviews for examination of the study objectives.

Usually, the interviews began from the warming up process of neutral questions relating to the profile of the respondent (such as when he/she started to work in agriculture, why he/she had chosen the speciality in this sphere, how he/she wanted to apply the knowledge for agricultural business, how and when the respondent decided to work for this sector of the economy). During the meetings with respondents it was necessary to give an opportunity for them to present their own views and opinions. Because the interview is an unusual meeting, respondents can feel not entirely comfortable and consider the interview an unusual encounter. Therefore, to deal with this situation during the interviews and to make respondents feel more comfortable, the researcher presented herself in such a way as to make respondents feel free and friendly. Discussions were recorded by researcher using a digital Dictaphone then transcribed as quickly as possible after the each interviews to assure their originality, expressions were fixed as correctly as possible. All respondents were informed about the Dictaphone and in case of the respondent's refusal the tape-recorder was switched off. In the latter situation the researcher made notes of the interview as soon as possible after it had finished.

Thus, taking into account that this study brought together two different directions and scientific knowledge, on the one hand, *agriculture* and on the other *information management*, during the interviews the researcher used a series of open-ended questions to direct the discussions with respondents towards the barriers and opportunities in AIM based on new ICT implementation in the agricultural sector. Moreover, during the interviews the researcher asked the respondents about anonymity of their participation and most of the interviewees preferred to remain anonymous, also asking the researcher to change or rename their exact position in this study. Thus, following the requirements of ethics, the name of interviewees and their positions' names were coded as RP NN - that means Research Participant and NN – identification number. The names of positions were also slightly changed, but their belonging to a particular level in agricultural management structure was retained. All these processes were discussed and agreed with respondents, in line with research ethics standards.

3.10.5 Research participants during the discussions

This section presents more details of those who participated in the interview process: respondents from different levels of Kazakhstani agriculture management - officials, policy makers, leaders, managers and farmers from the following organizations:

- 1) *The Ministry of Agriculture of the Republic of Kazakhstan (MA of RK)*
- 2) *Joint Stock Company (JSC) National Holding “KazAgro”*
- 3) *National Holding “KazAgroMarketing”*
- 4) *Kazakh Research Institute of Agriculture and Plant (KazRI of A&P)*
- 5) *Regional/oblasts and district agriculture departments*

To explain the rationale for this selection, the organizations where the respondents were employed are described fully in Appendix III: Description of Organizations which provided respondents who participated in the interviews.

The author carried out 3 semi-structured interviews by telephone with respondents from 3 regions: Aktobe (1 respondent), Zhambyl (1 respondent), North-Kazakhstan oblasts (1 respondent). 15 interviews with regional agrarians from 8 oblasts were also arranged. And as previously mentioned, 3 regions/oblasts: Atyrau, Mangistau and West-Kazakhstan regions were excluded for the following reasons which are reflected in Table 7 below.

Table 7: Non-agriculture oriented regions. Adapted from Statistical Yearbook-2010, Shakabaeva.

| Region | Reasons |
|-----------------|--|
| Atyrau | <ul style="list-style-type: none"> • Large areas of agricultural land occupied by salt and salty soils that have no economic value. Unfavourable environment for economic activities in the region, which leads to high production cost of agricultural production in the area. • Valuable species of fish in the Caspian Sea sturgeon farming. |
| Mangistau | <ul style="list-style-type: none"> • Agricultural production in the area is weak due to bad climatic conditions, lack of natural bodies of water, and lack of vegetation. • Consistent and purposeful policy to build a competitive and balanced economy in Mangistau region centered on the selected program of strategic development priorities for 2011-2015. Priority assessment made on the basis of strategic analysis and expert opinion: agriculture does not belong to three main priorities of development programs. Agricultural production is insignificant and has a share of less than 1% of GDP for the last 5 years. |
| West-Kazakhstan | <ul style="list-style-type: none"> • Agriculture is weak developing due to the climatic conditions, and lack of irrigation system The major role plays livestock: fine-wool, sheep, horse, camel. Wheat. |

In total, 21 interviews (semi-structured) with 20 respondents were undertaken. For various reasons, the schedule of interviews with some of the respondents was changed. For example, in cases when the regional leaders were busy, the interviews were transferred to another date and time.

In response to the question of why these semi-structured interviews were essential to progress the study, the researcher would assert that although agrarians from tactical and operational levels of agricultural management did not take a part in the creation and development of agricultural policy and reforms, they were involved in the implementation of policy in practice since the 1990's, and knew about the policies' positive and negative influences for the development of agriculture. On the other hand, respondents from strategic management participated in the creation of new reforms and regulations in agriculture, but they did not necessarily have any practical experience in their implementation. Agricultural managers know the situation in this sector of the economy from being responsible for the agricultural tasks entrusted to them in accordance with their level in agriculture structure. Indeed, many respondents knew about the existing barriers in AIM on the basis of their daily work and duties, and could share with the researcher their opinion on the opportunities for its development. Thus, it was impossible to prepare a specific list of questions when arranging the interviews. It was important that during the discussions the respondents could discuss ways to improve or change existing mechanisms in AIM with its further development. On the other hand, taking into account the complexity of study objectives, which contain two different topic areas: Agriculture, and then Information Management based on new technologies, semi-structured interviews helped to keep the discussions on both of these, even if many respondents were not ready to discuss IM issues. It was deemed desirable for the researcher to get an insight from the heads of agriculture departments from different levels of agricultural management about the role of IM in support of agricultural policy in Kazakhstan.

As a result, the interviews for this study were completed in 6 months. Moreover, the information which was shared during those interviews was not publicly or easily accessible, so it was essential to demonstrate the original academic contribution of this study. Experts and strategic management leaders shared their knowledge with the researcher about the structure of agriculture before independence and after the transition to a market economy, about the weaknesses and advantages of policies and reforms on both a theoretical and practical basis, and also gave the researcher some assistance with interview planning during the discussion of opportunities in AIM development. For example, a senior manager from the strategic level of agricultural management advised the researcher to plan the interviews with regional agriculture department managers well in advance, explaining that spring is always very busy for agrarians and it would be better to complete all interviews before the beginning of spring.

In the interview process the researcher discussed the themes which were important for gathering the required information about understanding of study objectives and the respondents' perceptions of these issues. Table 8 below lists the topic areas used during the interview process.

Table 8: The list of topics considered during the interviewing process. Source: Author

| Topic areas | Rationale for exploration of this theme |
|---|--|
| Agricultural policy and reform implementation in Kazakhstan since independence in 1990's and its influence on agricultural development. | To understand the situation in agriculture: the stages of agricultural development on the basis of new reforms and agricultural policy implementation during the transition to market base economy for the period of 20 years since independence in 1990's |
| Evaluation of agricultural policy development: advantages and disadvantages of the policies and reforms. Comparison of the experience of developed and developing states. | Discussions about the problems in agricultural policy implementation based on literature review: comparison of developed and developing countries' experience. Justify the focus of developed states in the context of a project about Kazakhstan. Reflect on the barriers that might prevent lessons being transferred from these contexts to Kazakhstani case or other post-Soviet states. |
| Discussions about the role of information and AIM in supporting agriculture. Implementation of ICT in Kazakhstan in comparison with successful experience of developed countries. | Discussions about the existing barriers and opportunities in AIM on different levels of agriculture: strategic, tactical and operational; the business relations (between all levels of agriculture management) based on IM system, the use of new technologies in agriculture, the knowledge on new technology, state financial funds and aids to support agricultural policy and AIM in Kazakhstan and other post-Soviet countries |

Based on the 21 semi-structured interviews with leaders, experts and specialists from agriculture of Kazakhstan the analysis of interviews for this study was conducted as a grounded theory exercise, which will be described in detail below.

During the data collection procedure, each discussion was important in its contents and in practice essential for understanding the research objectives which were formulated in Chapter One to achieve the study aims. Moreover, it was necessary to conduct interviews in an atmosphere that was comfortable and well-known to the interviewee. So, most interviews were arranged at the work place of the respondents or in some cases at an alternative place proposed by the respondent. Additionally, the researcher informed the interviewees that quiet places for conducting the interviews would be preferable. The length of conversation ranged from 42 minutes to two hours and an average time was just over an hour.

In starting this investigation the researcher's hope was at least to interview the four or five relevant agrarians from strategic management, but on the basis of writing to the Ministry of Agriculture, with a positive answer from officials, the researcher took the decision to arrange interviews with respondents from different levels of agricultural management including the heads of regional agricultural departments for deep and wide discussion of the research questions. The interviews did not contain any specific questions about contents of agricultural policy, but instead focused on the impact of agrarian policies and reforms for agriculture development since independence. At the same time, the barriers and opportunities in current AIM with the issue of modelling an effective AIM based on the implementation of new technologies were also discussed. Details of respondents who participated in discussions are as follows:

- Respondents' work experience in agriculture ranged between 10-40 years
- Average age of respondents was between 35-60 years old
- Most of respondents started their career after graduation from Veterinary or Agriculture Universities in Kazakhstan with a speciality in either: agronomies, veterinarian studies, accountancy, or economics in the agriculture sphere. Two participants had an academic degree in agricultural and livestock industries.
- About 30% of the respondents had participated in different International exchange programs and visited the developed countries to improve their knowledge in agriculture business and IM in agriculture.

During the semi-structured interviews it was important to understand the changes in the sphere of AIM after the break-up of the Soviet system, to discuss with respondents the influence of AP on agriculture development since independence, and share their opinions about the barriers and opportunities in AIM with its further improvement to support AP in Kazakhstan. Reasonable communication with reliable and useful respondents was a vital point to progress the research objectives.

3.11 Data management and analysis

The process of tape recording and preserving the data is known as an effective method for increasing the effectiveness of data analysis. However, the researcher was limited by the respondents' requirements. Most of them preferred not having their words recorded, but allowed the author to take notes during the interview. It was understandable for the researcher, because in Kazakhstan people use tape recorders in their business very seldom and that is why respondents were puzzled when this option was suggested by the researcher at the beginning of the interview. One of the interviewees did not allow the researcher to take notes at all without any explanation. At the same time, the researcher managed to use a tape recorder in some interviews, and as a result had on tape 5 semi-structured interviews, and made 12 sets of notes during the process of interviewing. Also 3 phone interviews

were conducted, which explained the number of notes taken in Table 9. When tape recorders were not used, notes of the interview were transcribed as soon as possible afterwards.

Table 9. Data recording list. Source: Author

| Type recording | # of Interviews |
|--------------------------------|------------------|
| Taped interviews on Dictaphone | 5 |
| Phone Interviews | 3 |
| Taking Notes | 12 |
| Notes - not allowed | 1 |
| <i>In total:</i> | <i>21</i> |

All interviews for this study were undertaken in two different languages – Kazakh (Official State Language) and Russian (Language of International Communication in CIS). Both of these languages are recognized as official languages in Kazakhstan. The researcher decided not to translate the interviews in full but rather keep the value in the wording formulation and also the main concepts were matched throughout the phase of coding. The process may be summarised as follows:

- 1) Face-to-face semi-structured interviews with 12 respondents from different regions of Kazakhstan, 5 interviews with 4 respondents from government organizations and 1 interview with scientist from Kazakh Research Institute were arranged by the researcher for the period of September, 2012 - February, 2013. The first interview with the official from the Ministry of Agriculture took place in March 2011.
- 2) 3 semi-structured interviews with 3 respondents from regions were organized by telephone between October, 2012 and January, 2013.

As mentioned earlier, three regional representatives refused to participate in any interviews for discussion of the study objectives. The next section will discuss the analysis of collected data.

3.11.1 Analyzing collected primary data

Regarding the process of data analysis Thorne states *it is the most complex and mysterious of all of the phases of a qualitative project, and the one that receives the least thoughtful discussion in the literature* (Thorne, 2000). However, he claims that the process of *creating a database is not sufficient to conduct a qualitative study. In order to generate findings that transform raw data into new knowledge, a qualitative researcher must engage in active and demanding analytic processes throughout all phases of the research.*

Thus it appears that an understanding of these processes and interpreting the collected data are essential aspects of qualitative research. This research was based on semi-structured interviews and the database consists of focused interview transcripts. The qualitative data that was collected during this study was concerned to uncover knowledge in Kazakhstan about agricultural policy development in

support of the agrarian sector. Also, the data collection was directed to understanding the barriers and opportunities for AIM based on the implementation of ICT in supporting agriculture. At the same time, the researcher discussed with respondents their thoughts about the circumstances in which they found themselves and their opinions on these issues, and their judgments for further development of this important sector of Kazakhstan's economy which is the main focus of this study. Essentially, the research relied on an inductive reasoning process for interpretation of the meanings that can be derived from the data collection process. According to Thorne:

Because data collection and analysis processes tend to be concurrent, with new analytic steps informing the process of additional data collection and new data informing the analytic processes, it is important to recognize that qualitative data analysis processes are not entirely distinguishable from the actual data (Thorne, 2000).

In this study, as described briefly earlier in the chapter at 3.6, the researcher used the practice of Grounded Theory based on sampling in open and axial coding (Ulanovskyi 2009). It is of course true that there is no single strategy to follow to achieve a 'correct' procedure in qualitative data analysis, but the researcher's previous rationale for using a grounded theory approach indicated that it was sufficiently robust to be fit for purpose.

3.11.2 Data interpretation and analysis

Judging from the literature, it appears that data analysis in qualitative research can have several levels, from illustration of the individual fragments of social reality to its description, to the construction of the theory on the basis of studying the phenomenon or process. Masalkov and Kiblitckaya (2003 p.12) comment on a number of ways in which researchers can analyze data, as *modern analysis of qualitative data has sufficient variability, and in methodological approaches, there are many styles and trends*. According to Masalkov and Kiblitckaya (2003 p.12) in the collection, analysis and reporting of data the researcher plays a crucial role and affects the diversity of approaches.

As mentioned previously at 3.5 and 3.6, the researcher had considered a number of analysis tools but had elected to use a grounded theory approach to the research process. When coding the data, the researcher had to become intimately familiar with it in order to understand the meanings grounded in it, and to find the patterns of these data with appropriate explanations. As a rule, the researcher needs to retain the data records or their relevant parts until they are completely analyzed. Masalkov and Kiblitckaya (2003) claim that one of the main difficulties in qualitative research processes is the problem of choosing the degree of analysis to which the data should be subjected. Blumer (1969), Diesing (1971), and Glaser (1978) have all commented on the potentially different degrees of data interpretation and analysis. The choices seem to be that:

- The data should not be analyzed at all. The researcher's task is to collect data and provide them in a way 'that the informants speak for themselves';

- The researcher provides a simple report with little or no interpretation of the data, the interpretation of interference;
- The exact description of the data in the analysis and presentation of results; this is reduction and streamlining of material with the selection and interpretation procedures;
- Construction of theory, which will contribute to the organization of theoretical knowledge.

Thus, the degree of data analysis in this study involves the construction of a theory that involves the interpretation of the data, their conceptualization, where the concepts should be related to the formulation of the theoretical interpretation of reality, that is, reality which actually cannot be known, but is always interpreted. The aim is to get to the point where research participants are merely repeating the same points – saturation of the data in other words. On this note, the theoretical formulation obtained by the analysis of data in this study can be used not only to explain the perception of reality by Kazakh agrarians, but also provides a framework for further ICT-based developments in agricultural policy in Kazakhstan and other post-Soviet states. In addition, the researcher was interested in the construction of theory which is the most systematic way of building, synthesizing and integrating academic knowledge.

3.11.3 Data analysis: coding and grouping

The thesis now moves to examine the process of coding and grouping the data. Data within this study has been presented with guarantee that the views and experiences of respondents are fully integrated. Moreover, the researcher used tabulated quotations for providing detailed accounts of the participants' views and experiences. The data gathered for this study was analyzed using a grounded theory-based thematic analysis (Ritchie and Lewis, 2003), which is steadfast with the interpretative and phenomenological strands employed for this investigation. As noted previously, data were collected, then transcribed, and imported for the coding purposes. To initiate the coding process, interview transcripts have to be read and re-read for deep familiarization with the data, after which they were analyzed then encoded manually. This first step was based on *open coding* method, as described at 3.6.3. The data was approached without any assumptions. During the data analysis it was essential to identify any important and relevant themes. Then the selected themes were recorded on the side of the selected transcripts. Finally, all the terms were sorted to identify connections and transcripts were assigned to relevant categories. *Appendix VII 'Tables of code sheet and axial code sheet'* presents the sheet of codes for data analysis. The next step was that the researcher read all transcripts several times and then all codes were grouped. The phrases which were used to code the statements were descriptive. As described above, thematic descriptions of worked experience in the epistemology approach was inductive rather than deductive whilst theories appeared from the description of the experience. Based on the grounded theory coding approach with understanding of the respondents' views, the author examined the links of codes that had been reviewed initially. The coding process in this investigation was conducted with the shifts between the parts and whole interviews, and then the indexed codes were labeled to form a descriptive structure of the interviews. As Mason (2002) notes,

the coding process entails decisions made on information in accordance with the researcher's viewpoint.

During the data analysis the researcher focused on the themes to brief phrases of coding to see how they were relating to each other; then attempted to put individual phrases into groups depending on their meaningful connections. In this way, it was important to be sure that the created codes reflected the meaning of the statements in its context. Therefore, after completion of all the interviews, and using open coding, the researcher analysed each interview in their context to find the relevant points and respondents' reflections on study objectives, to code them manually. Then using the mechanism of 'applying new codes' suggested by Gibbs and Taylor (2005) and described in Section 3.6.4 additional codes were added. As a result, on the basis of data analysis and according to the above mentioned descriptive categories the repeated conceptual reflections were progressed to the analytical stage. Thus, during the process of reading, thinking, re-thinking and analyzing the separate analytical categories that emerged from the data records, all categories were grouped separately for formation of the key categories to reflect the research objectives. Repeating the process with a number of transcripts, it was evident that there were no any additional categories that could be merged with already mentioned categories. All these confirmed the principle of data saturation and allowed the researcher to move on to the next step – to create a sheet of codes with inclusion of all categories. All categories within the code sheet were numbered by researcher in order to progress the further process of data analysis. In case of emergence of any additional themes with sub-themes or categories, these could be added to the sheet of codes. Thus, for each category, theme and sub-theme a number was assigned, and finally, the coding process was completed. The next step involved researcher in bringing together text from all relevant categories and transcripts. Thus, after completion of open coding procedures and according to the principles of axial coding a series of codes were analyzed, sorted and distributed into different categories and groups. All these codes and categories of codes are presented in further detail in Appendix VII.

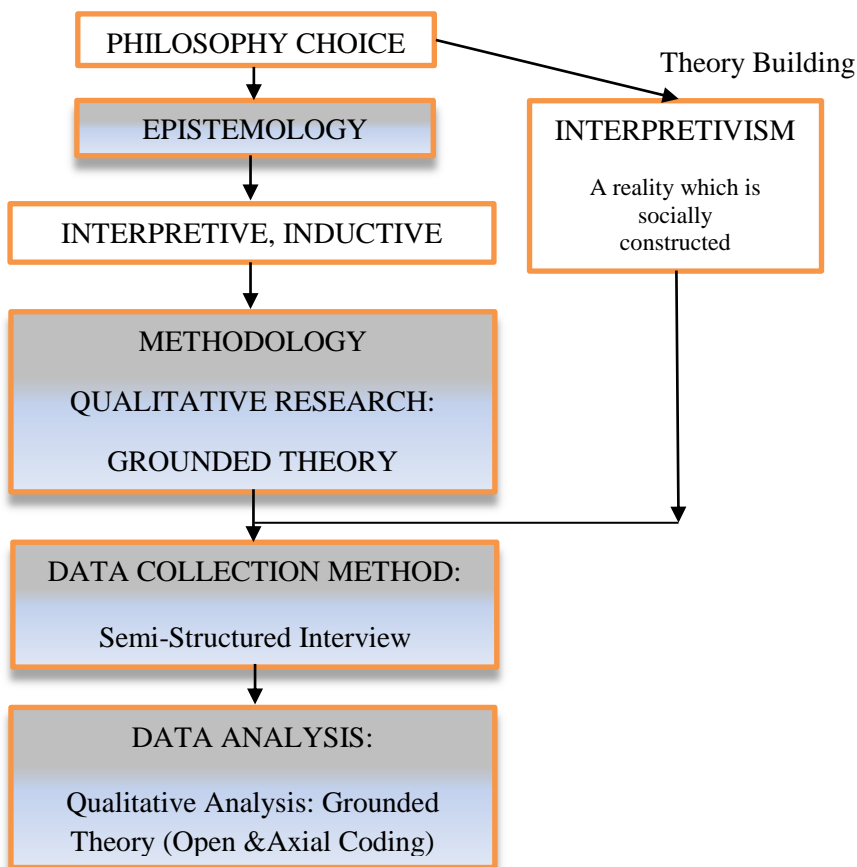
Thus, the research was framed as a grounded theory approach to data analysis using open and axial coding to generate theory from interview transcripts. During the qualitative analysis based on grounded theory the determined codes were interpreted and explained, and the research findings described and explained, as will be seen in the subsequent chapters. Given that the process of interpretation is such an important stage, this process was approached carefully. It was also important to ensure that none of the informants' views and experiences were ignored by the researcher during the process of interpretation of the interviews and coding process.

3.12 Summary of Methodology

Chapter Three has represented the methodological journey of this study, in which the researcher described and justified decisions made in order to pursue the aim of understanding the barriers and opportunities in Agricultural Information Management (AIM) in post-soviet states, using the example of Kazakhstan as a case study. This was identified as an under-researched area in the literature

consulted and described in the previous chapter, and the researcher’s aim is to demonstrate an original academic contribution to knowledge in subsequent chapters of the thesis. Previous studies of the impact of ICT-based systems on agricultural policy have tended to be positivist interpretations, relying on statistical data. The current study instead sought to examine the situation from the point of view of end users and potential end users of such systems in the context of the agricultural sector of Kazakhstan’s economy. Figure 9, which was designed to demonstrate the concepts of this study with theory building, represents the methodological journey of this study.

Figure 9. The methodological journey of this study. Source: Author



Consequently, the research strategy was interpretivist, involving collection of qualitative data in the form of semi-structured interviews with agrarians from various levels in Kazakh agriculture. The researcher used a grounded theory approach, where there are no a priori hypotheses, and which is appropriate where a phenomenon has not been significantly researched. Theories are thus securely grounded in the collected data, and the process of generating explanatory theory through data coding was explained. The processes of deciding on an appropriate strategy, carrying out the primary research, and having regard for issues of validity, reliability and research ethics were all described in this chapter. The subsequent chapters will present the researcher’s findings, and discuss the implications of these before offering general conclusions and recommendations for further research.

CHAPTER 4: DATA ANALYSIS AND DISCUSSION

4.1. Introduction

The main goal of this chapter is to present and discuss the findings related to the data collected during the semi-structured interviews, and thus to position this piece of research within the body of earlier research in order to highlight the way it meets a gap in previous literature: in other words to mark out its unique contribution. The process of data analysis and the analytical templates used were described in the previous chapter. At this point the researcher will discuss the explanatory theory arising from the findings, and its implications for agricultural policy development in post-soviet states such as Kazakhstan. As discussed in the previous chapter, due to the existing three levels of agricultural management roles in the agriculture sector of Kazakhstan, the respondents were distributed into separate groups by their positions and responsibilities in this specific agricultural structure: that is, into strategic, tactical and operational levels (see *Appendix VI 'A summary of interviewed research participants'*). The purpose of this distribution was to present the various perspectives and opinions of respondents regarding the research objectives, in accordance with their duties and roles in agricultural management. Thus the researcher would be able to compare and contrast the views of individuals at all levels of the agricultural sector in Kazakhstan. In terms of the research objectives for the study, described in the previous chapter:

Objective 4 was met in the previous chapter, which described the selection of an appropriate sample of individuals to be interviewed. To demonstrate how the other objectives are to be met, the chapter is set out as follows:

Section 4.2 considers the respondents' views on the theory and practice of Kazakh agricultural policy in the period following independence in 1991, and their understanding of the experiences of other countries, both developed and developing. This will enable the researcher in part to meet **objectives 1 and 2** of the study.

Section 4.3 presents the respondents' understanding of the evolution of agricultural policy and its contribution to economic development. Three stages are considered: i) 1992-1997 (initial structural reforms as new policy institutions emerged); ii) 1998-2002 (stabilisation and agricultural debt restructuring); iii) 2003-present (promoting agriculture as a part of economic diversification). This section addresses **objective 3** of the study.

Section 4.4 considers the respondents' perceptions of AIM in developed and developing countries such as post-soviet Kazakhstan, and contributes to achieving **objectives 1 and 2**.

Section 4.5 presents and discusses the respondents' views regarding their experiences of agricultural practice based on ICT implementation, together with their opinions and concerns regarding the improvement of IM on the basis of the introduction of new technologies to support Kazakhstan's

agricultural policy. This section will also consider respondents' views on Information and Consultative Centres (ICCs). The results will support the meeting of **objective 5**.

Section 4.6 examines the role of IM based on new technologies and innovations in different spheres of the economy, and the potential advantages in the development of those economic sectors. Agriculture is also considered by the respondents as a potential sector for the introduction of new technologies to improve current AIM. In this context, respondents' views on the role of knowledge management, Internet-based information sources, network connectivity and ICT-based technology infrastructure to support agricultural policy in Kazakhstan will be discussed, together with proposals for a framework to improve the current situation, thus meeting **objectives 5 and 6**.

The chapter begins with an examination of the respondents' views on the general principles of agricultural policy.

4.2 Theory and practice of agricultural policy

To understand the challenges in the theory and practice of agricultural policy implementation during the period immediately following independence in Kazakhstan, it was clearly important to compare the experience of developed and developing countries. To this end, several developed countries: Germany, the UK and the USA, were discussed in Chapter Two. The issue of learning from the experiences of developed nations to address some of the challenges in the agriculture of Kazakhstan was discussed with respondents during the interviews under the following headings:

- an analysis of problems in agricultural policy implementation at the initial stages of independence;
- examination of the role of rural citizens in the process of new agricultural policy implementation;
- understanding perceptions of the state's role in agriculture development in comparison with other spheres of the economy; and,
- comparing the respondents' perceptions of the state's role in Kazakh agriculture policy with that of developed countries.

Thus, discussing the development of conceptual frameworks of contemporary government regulation in Kazakhstani agriculture, based on the implementation of new agricultural policy and reforms, respondent RP01, a senior manager, highlighted it as one of the main, but also one of the most difficult, issues for investigation by academics and agricultural professionals. He suggested that it involves a new direction in academic research which is required to support a number of agricultural strategies, taking into account the experiences of other post-Soviet and other, developed states. RP01 claimed that scientists and policy makers have not paid enough attention to the investigation of the theory and practice of agricultural policy in Kazakhstan since it gained independence: *during the following ten years we could not find suitable and detailed information on these issues to analyze the*

problems and mistakes which happened for that period, and that is why the subsequent new reforms in agriculture repeated the same mistakes.

This view is echoed by academic writers. Ospanov (2002 p.13) writes that: *the collapse of the Soviet Union at the beginning of the 1990's put the question to Kazakhstan to choose the direction of self-development. Life has demanded urgent decisions that had to be made without proper study and even more practical tests. The latter circumstance made changes (and will) be felt in changes in subsequent years.* So, according to Ospanov, the early period of independence was a time when Kazakhstan had to make an urgent decision to make a rapid move towards self-development. Explaining the absence of investigation into the theory and practice of agricultural policy implementation, Akhmetov (2011 p.3) highlights: *the decline in research funding from the state budget and the production sector, and the reduction of the number of employees in scientific and technical sphere of the country.*

Reflecting on the theory and practice of Kazakh agricultural policy, RP06 (an agricultural scientist) stated: *in some cases the reforms were changed and implemented repeatedly, for example land reform. So, the lack of examination of weaknesses in the previous versions of reforms influenced the results of new implementations.* RP06 claimed: *in order to stand on a solid foundation of knowledge, it is necessary to own a truly scientific theory of the laws of development of agrarian policy.* He added that development patterns should be identified and addressed through the principles of interaction and interdependence of the basic foundations of social progress. On the other hand, examining the latest investigations, two decades after the implementation of several reforms and regulations in Kazakh agriculture, Aimurzina (2010 p.4) notes: *each country chooses its own way of regulating the economy, developing and defining for themselves the most appropriate forms and methods.* Additionally, she claims that *scientific discussions in this field have covered a wide range of problems in the theory and practice of public management of agriculture in order to enhance the competitiveness of agricultural products.* However, *despite the widespread attention of researchers to the regulation of agriculture, many aspects of this important problem have not yet been fully explored* (Aimurzina 2010 p.4).

Thus in this instance, both scholars and a senior agrarian respondent agree that due to the absence of studies on the theory and practice of agricultural policy implementation with its timely examination of weaknesses the same mistakes were repeated during new stages of agricultural policy implementation.

The first detailed investigations into Kazakhstan's agricultural policy development were undertaken by Pomfret in 2007, 2008 and 2009. Later, at the beginning of 2013, the Review of Agricultural Policies was initiated in response to a request of Government of Kazakhstan. The OECD review of agricultural policies assessed the performance of the agriculture sector in Kazakhstan over the last two decades and the report was published in May 2013 (OECD, 2013). It was the first structured and detailed review, by international experts, of agricultural policies in Kazakhstan since independence. However, this review did not consider all the important directions of the theory and practice of agricultural policy development of Kazakhstan, and could not cover all existing problems which had begun at that time.

Continuing the discussions on the issue related to the achievement of the objective laws for sustainable agricultural economic development, RP06 claimed: *the importance of the theory and practice of agricultural policy, and the need to study it, are evident*. The essence of the theory of agrarian policy, RP06 claimed *can be summarized by a unique understanding of the scientific theory of agrarian relations (or to put it another way, an agrarian theory)*. *It is a system of information and knowledge, giving a holistic view of the driving forces, forms, and effective management mechanisms in agriculture* to develop this sphere of economy in Kazakhstan. RP06 offered the following perspectives: *to integrate the theory of agricultural policy into a unique scientific theory of agrarian relations*, which will represent a frame of knowledge of Kazakhstani agricultural policy and reforms. From the academic viewpoint Kabanova (2001 p.89) stresses in Russia *the urgent need for in-depth study of the theoretical and practical aspects of economic decision-making in the management of the agricultural sector*. The role of agricultural policy at a theoretical level, and its impact for the development of the agricultural sector in Kazakhstan, began to be considered by scholars at the beginning of the 2000's, when they examined land reforms, food security, and privatization policy. These regulations and reforms as an element of agricultural in Kazakhstan were described by the researcher in Appendix II, Section 4.33 and 4.3.4, and subsequently discussed during the interviews with respondents. Moreover, the limitations and in many cases the lack of suitable information about agricultural theory and practice were identified. RP01 notes:

A lack of knowledge, theoretical and practical, of agriculture policy implemented during the independence since 1991, influenced untimely and not well-grounded, often inefficient economic solutions in the agricultural development of Kazakhstan.

Among academics, this view is shared by Kabanova (2001 p.5): *in practice, the agriculture sphere in the implementation of economic management functions involves a lack of external information as well as information on its agriculture policy theory, financial and economic activities*. As a result, there are often *ill-conceived and not well-grounded, inadequate and inefficient economic situation solutions* (Kabanova, 2001 p.5). Thus, in view of the lack of information on agriculture policy theory, financial and economic activities, Kabanova (2001 p.5) suggests: *to improve the quality of economic decisions, is to improve information systems in agriculture management*.

Academics and respondents agree on the most significant development needs:

- *To undertake a timely revision and examination of the theory and practice of agriculture policies in supporting and improving agriculture in Kazakhstan* (RP01; Ospanov, 2002 p.13; Kabanova, 2001 p.89).
- *To integrate the theory and practice of agricultural policy since independence to a unique scientific theory of agrarian relations, to create a system of information and knowledge which is interrelated to build valid and effective agricultural policies* (RP06; Kabanova, 2001 p.5).

This aim, if achieved, would go some way to progress the development of a sector which has been deprived of a body of theory supported by consolidated research data, specifically obtained from end users of AIM systems.

4.2.1 Agricultural policy: analysis of problems at the initial stages of independence

Of Kazakhstan and other post-Soviet states in Central and Eastern Europe since independence, Izmuratov (2000 p.12) notes: *in recent times there has been a large-scale reform of the economy. It is characterized by a change of ownership and the transition from a planned distribution system to the state-regulated market economy... In modern conditions it can be generally recognized that the agrarian reform was carried out all over the place without science-based, proven in practice programmes, and was accompanied by significant errors.*

In Kazakhstani agriculture at the beginning of the 1990's, there were major policies – for example, land reform and privatization reforms – which were implemented without any advanced preparations during the transition period from a centrally planned economic system to a market-based economy. On this note, RP06 asserts that *most of the reforms at the beginning of the 1990s were undertaken spontaneously and rashly...were realized through different theories of foreign models which were untested and un-adapted to local climatic conditions and economic situation in Kazakhstani rural regions. As a result, all weaknesses of policy practice influenced the slow development of AP in the following 15 years plus since independence.*

Maulenkulov (2001 p.26) highlights *the lack of evidence-based and well-defined agriculture policy; use of foreign business models without considering the peculiarities of socio-economic and natural conditions in Kazakhstan.* All these practices were arranged without advanced checking and examination of other components (such as the technical conditions of farms, the use of new technologies, the qualification of agrarians, the financial loans, or natural conditions) which could affect the result (Maulenkulov, 2001 p.26).

RP04, a senior manager, added: *unfortunately, neither the evolutionary nature of such transformations has been taken into account or the absence of a strong agricultural base (social, material and technical resources), as well as the legislative foundation. At the best, agricultural policy has been focused on solving only current problems and was not oriented for the strategic development of agriculture.*

RP13, from tactical management, commented on the transformation from a centrally planned economic system to a market-based economy: *Kazakhstan's agriculture is one of the key sectors of Kazakhstan's economy and the collapse of the USSR influenced the whole economic system.... The changes in agriculture system were organized without specific mechanisms and procedures.* Sharing his very skeptical opinion about agricultural regulations and reforms practice, RP13 added: *the failures of several economic reforms and policy in agriculture for the period 1990 to 2005 were caused by the*

reforms that were far from the real problems in agriculture and, moreover, for that time the government was too focused on mining, and raw materials orientation.

The Informational Agency of Kazakhstan characterizes the post-independence period as: *a new stage in agriculture economy development with implementation of new forms of property, privatization process and land reform that was characterized by scholars as 'a period when the formation of reforms was conducted with the diversification of the agriculture economy, which was identified as one of the strategic directions in state economic policy. However, any drastic transformations are not passed through the state's economy painlessly. As a result, the violation of long-term inter-regional and inter-sectorial economic ties led to a crisis in agriculture'* (IA K-Z 2011).

Among the new reforms that were implemented at the beginning of the 90's, land reform takes an especially important place, given that land is one of the key factors in Kazakhstani agricultural production. Dodabayev (2007 p.476) notes that land is the main element of national wealth and the main means of production in agriculture: *this important [land] reform was implemented spontaneously, without well-prepared plans.* According to Karbayev (2011), *land reform is a major policy in Kazakhstan's agricultural development and takes a central place in economic transformation, which affects the interests of every citizen and society as a whole... the problems that faced agrarians during the implementation of land reform were not investigated till the beginning of 2005.* Kurmanova (2010 p.23) adds: *the land reform was started without any proper preparation of legal basis and methodology which caused certain problems...Land reform is compounded by the reduced role of land use which subsequently led to the loss of the main functions of the Government in the field of land management. This consists of the organization and implementation of State control over the use and protection of land, planning and forecasting their use, information management data for the land cadastral and land monitoring* (Kurmanova, 2010 p.3).

Comparing the views of academic writers with those of the respondents, the underdevelopment of agricultural policy is evident:

- *The new agricultural policy was implemented due to the urgency and necessity of regulating a new economic system in conditions of chaos and collapse in the country* (RP01; RP03; Ismuratov, 2000 p.12; Kurmanova, 2010 p.23)
- *The disbanding of scientific research institutes, a sharp reduction in state financial support of agriculture, all influenced the destruction of scientific – research institutes and academic centers* (Akhmetov 2011 p.3, RP03)
- *Due to the absence of experience in new socio-economic system, there were several attempts to use foreign business agricultural models which were arranged without advanced checking and examination of components which could affect the result of the introduction* (RP13; Maulenkulov 2001 p.31)

All these factors could be said to have influenced the results of agricultural development during the first decades since independence in 1991. The President of the Republic of Kazakhstan, Nursultan Nazarbayev, commented:

Those years involved the most acute shortage of people, people who knew what to do in the new situation with new economic changes. Everyone understood that it was impossible to live in the old conditions, but no one had any idea of what we wanted, and what to do (Nazarbayev 2001).

RP09 highlighted another problem: *due to the lack of management skills in agriculture business in the new economic, market oriented system with its new economic relations, (which was completely different from the previous Soviet system), agrarians could not understand and accept all changes and act upon the state agrarian policies.* Moreover, all these changes and projects for introduction required from agrarians relevant knowledge and experience which they did not have, according to RP09.

Scholars state that the main reasons for such large agricultural losses were *hasty market reforms, and lack of forethought organizationally and methodically. 59% of farmers have no education in the field of agriculture, and have no additional skills and knowledge in management, finance, accounting, agriculture and livestock, which are all necessary to manage the peasant farms (Sagadiev et al. 2006 p.215).* On the other hand, considering the situation in developed countries on this issue, writers highlight the following: *farmers, ranchers, and agricultural managers need the managerial skills necessary to organize and operate a business. A basic knowledge of accounting and bookkeeping is essential in keeping financial records, while knowledge of sources of credit is vital for buying seed, fertilizer, and other inputs necessary for planting. It also is necessary to be familiar with complex safety regulations and requirements of governmental agricultural support programs (Bureau of Labor Statistics, 2012).* OECD experts add:

The move to a more active policy since the 1990's has nevertheless introduced policy uncertainty. While the government has shown flexibility in redirecting economic strategies when weaknesses have emerged, the decision-making process has been highly centralized, policy reviews were not consistently evidence-based, and the frequent policy shifts have impeded implementation (OECD, 2013 p.64).

Both sides – respondents and scholars – pinpoint that agriculture, as well as the entire economy of Kazakhstan was now to be based solely on the free market orientation and the transformation from the Soviet economic system was hard to implement. This change was especially difficult for agrarians as they had no efficient skills, knowledge or experience to operate in the new system. Respondents also noted that the main focus of government was drawn towards improving and developing raw-materials sector, such as oil, gas, coal, rather than agriculture. Another problem which arose during the discussion with respondents (and has been noted by scholars) is the lack of experienced agrarians in agriculture – the problem in human resource issues for agriculture in Kazakhstan is evident.

4.2.2 The role of rural citizens in the process of new agricultural policy implementation

Discussing the position of rural citizens during the process of implementation of the new agricultural policies, RP01 claims: *it was beyond the power of the villagers and they were not willing to work under this new scheme in conditions of new market-based economy system for the following reasons:*

1. *Due to the non-understanding of the principles of new market-based economy, many agrarians have not been able to work in new market conditions. Moreover, some of them have not believed in the seriousness of all transformations, and waited and hoped for the return to a centralized planned economy system. Some agrarians psychologically have not been able to adapt to the new market economy system.*
2. *The lack of competitiveness of agricultural products, as a result, of saturation of the Kazakhstan market of imported goods; Kazakhstani agricultural products were non-competitive.*
3. *Inflation and hyperinflation have been challenging.*
4. *The State during the transition had not created adequate market infrastructure, neither has a bankruptcy system been established (RP01).*

All these factors eventually led to the deterioration of the financial situation of many agricultural enterprises and, in general, to a prolonged economic crisis in the country (Safronov, 1998 p.110). Discussing the reluctance of agrarians to embrace the new market relations, Safronov adds: *many people, especially the middle-aged and elderly, in psychological terms were not ready for the transition to a market economy; they have lost much in the material (depreciation of deposits of the population), and socially. Naturally, many of them were against the transition to a market economy (Safronov, 1998 p.111).* Furthermore, taking into account that the basis of the transition to a market economy in agriculture is the consumer demand for the sale of agricultural products, Safronov (1998 p.21) states: *it was necessary to study market conditions, customer demands, market capacity, product quality of a potential competitor, and other issues specific to market relations.*

On the other hand, RP06 highlighted another problem which influenced the result of the new agricultural policy implementation for that period: *the absence of experienced and qualified professionals in rural regions. This problem arose on the basis of immigration and migration of the rural citizens from the countryside,* adds RP06, noting: *the agricultural sector was faced with the problem of migration and emigration of rural population from countryside, and this fact affected the staff shortages in rural areas.* Additionally, RP14 added: *most of the qualified specialists and professionals, and educated people, moved to the cities and other countries. For many years agrarians could not see the prospects for the villages' development.* In support of the respondents' view, Asanbayev (2009 pp.2-3) suggests: *however, in Kazakhstan it is still preferable not to discuss the issue of outflow of villagers to the cities of Kazakhstan publicly. After all, to recognize the spontaneous and massive outflow of villagers to the cities of Kazakhstan means the need to acknowledge the many mistakes made in the agrarian policy during their implementation, which led to*

such immigration. The massive outflow of rural population to the cities every year will only increase, gaining a much larger scale and consequences.

From an academic perspective, it is evident that the problem which started at the beginning of the 1990's still exists and still has not been solved in Kazakhstan. According to Asanbayev (2009 p.3): *one thing is clear - from the fact that the authorities ignore the problem of internal migration, it will not go away by itself and will not be resolved.* Both academics and respondents identify a lack of professionals and experienced agrarians for the implementation of new reforms and regulations as one of the major barriers in current agriculture development. Given the lack of literature on this issue in Kazakhstan, an examination of the literature of other CIS countries indicates that Russia, as a post-Soviet state with a similar socio-economic system, faced similar problems. Russian scholars suggest the need to *develop and implement programs for a highly qualified management industry. However, the accumulated scientific and methodological framework is not enough to address issues of agricultural human resources management* (Korotnev, 2004 p.22). There are few studies in which the solution to this problem was viewed as the need for a holistic, multi-level system with effective mechanisms of market and state regulations. Questions remain poorly understood regarding the optimization of supply and demand in the labour market for agricultural experts, and the need to improve the quality of their training, as well as the need for adaptation and consolidation in agricultural production. In this context, Korotnev (2004 p.25) claims: *Having an effective system in agriculture with highly qualified management is one of the main conditions for the development of the agricultural sector. Therefore, its formation is of national importance and is one of the particularly urgent tasks of economic science.*

With regard to the situation in Kazakhstan, Tasbulatov (2013 p.25) adds: *one more issue is probably the human resources policy in agriculture... First of all, people are now interested in the training programs and they are beginning to realize that the money should be invested in training to improve their professional knowledge.*

The researcher highlights this issue as one that respondents also perceived as a major barrier to achieving an effective system of agricultural development. Thus, *a lack of qualified specialists, managers and agrarians in agriculture since transition to a new market economy and continuing to the present day* was identified as a major problem both by respondents (RP06 and RP14) and scholars (Asanbayev 2009 p.3, and Korotnev, 2004 p.25).

RP02 added: *it is essential to note, that the problem with the lack of qualified agrarians – both professionals and managers – for the agriculture sector has to be investigated in detail to find ways to solve an existing problem.* Asanbayev (2009 p.3) stressed: *from the fact that the authorities ignore the problem of internal migration, it will not go away by itself and will not be resolved.* After considering the role of rural citizens in the development of agricultural policy, it is logical to follow this with discussion of the role of the state in these processes.

4.2.3 Kazakhstan: The State's role in agriculture in comparison with other spheres of the economy

The examination of the state's focus on agricultural development in comparison with other spheres of Kazakhstani economy since independence in 1991 is described in detail in Appendix II. As it was explained here, Kazakhstan is among the five countries in the world which have all the necessary natural and other resources for self-sustainability. Moreover, the presence of mineral resources, oil, gas and other natural resources has made it possible for Kazakhstan to emerge from its long and deep economic crisis in the early 1990's (KISS, 2008). Respondent RP03 recalled this: *by the decision of the state, the agricultural economy was defined as a non-primary and non-priority objective among the others and was put on the back burner. The main issue was to rid the country of deeper [economic] crisis through the development of the mining industry...* (RP03). *In fact, agricultural productivity sharply dropped at that moment, stated RP04, adding: in the two year period from gaining independence, due to the instability and economic crisis in Kazakhstan, agriculture production decreased by 14.6% in comparison with its relative stability in 1990* (RP04).

This shows that the destruction of the agricultural economy at the beginning of the 1990's followed a decline in agricultural production, and as a result, *led to a crisis and destabilization in the economy of the country as a whole* (RP04). From the academic perspective, Sultanbekova (2001 p.3) characterizes the first decade since independence by a series of crises: *the crisis of economic growth, investment crisis, inflationary and financial crisis* and concluded: *the deep crisis of economic growth that took place before 1996 hit the entire economic system and had a devastating impact on all sectors of the economy and social development.*

This period in Kazakhstani agriculture development, and the role of the state in the processes of implementing agricultural policy, seemed to be a very sensitive topic during the interviews. Agrarians were still unhappy with the results of agricultural policy in practice, as well as the economic situation in the agricultural sector overall. For example, RP15 claimed: *the government removed the problems of rural regions and villagers and put them on the back burner; furthermore, the rural regions received state support in the form of financing, subsidies and the allocation of grants on a very small scale in comparison with other industries.* RP14 added: *The experience of recent years indicates that the introduction of agricultural policy and reforms in Kazakhstan subjected the people of rural areas to heavy casualties. Why the number of victims should have to be so significant, so far no one has explained.*

Additionally, RP18, a respondent from tactical management, suggested: *definitely, all reforms and policies in agriculture have led agriculture to a complete collapse, and its development is still far behind the other sectors. The strategy adopted in the 1990's led to the stagnation of the rural economy over the next 15 years, and as the result, the problems which have accumulated over a long period are still not fully resolved.* The state's reorientation to other spheres of economy than agriculture was evident and in the period following independence:

Kazakhstan was transformed into a great industrial region... Huge centres of energy, metallurgy, fuel, chemical and machine-building industry were built in the republic (KISS 2008).

Pomfret (2008 p.1) stresses *the agricultural sector is a major part of Kazakhstan's economy, with between a quarter and a half of the population depending upon it*¹.

The state's financial support during a slow restructuring of economic and market relations, RP04 recalled, was characterized by: *an unequal exchange between urban and rural areas, insufficient distribution of loans to support agrarians and their business, and the systematic use of resource potential for other sectors of the economy.*, Bergenov (2004 p.28) notes: *modern agricultural policy must be comprehensive, with all the transparency of financial statements from investors and government agencies that implement the state support of the agriculture sphere. But the ongoing agricultural policy, on the contrary, creates the necessary conditions for misappropriation of public funds, as a result of its unsystematic character, lack of control and lack of effective implementation mechanisms.* Aimurzina (2010 p.17) highlights: *a comprehensive study of the mechanism of financing the budget programs demonstrates that at the stage of budget planning individual programs were included in the national budget for the planned year without sufficient examination. As a result, in recent years in the Republican budget the number of budget programs with undeveloped and inefficient use of budget funds has increased.* It seems that financing, subsidies and grants were allocated for the agricultural sector on a very small scale in comparison with other sectors of the economy. Pomfret notes:

During the 1990s the general policy stance towards agriculture was one of neglect. Relative prices shifted against farmers as agriculture went from being a favoured economic activity in the late Soviet era to one suffering from net discrimination (or at best neutrality) by the late 1990s (Pomfret, 2008 p.3).

Pomfret (ibid.) claims that one of the causes of the deterioration in the agricultural economy was *a policy vacuum which occurred in the early 1990's from supporting the farmers to emerging free-market politics.* This situation, however, was reversed at the beginning of the 2000s when the government began to support agrarians more generously by encouraging economic diversification as a response to the oil boom. In 1996-1997 there were insignificant 'bursts' of economic growth, which were not sustained. However, since 1999, the economy has embarked on a new path of transformation, and there has been steady growth, indicating that the crisis is gradually being overcome. OECD experts claim:

¹ The number of people involved in agriculture is difficult to define, because many people who lost their jobs during the transition from central planning reverted to growing their own food. The farm sector accounts for less than ten percent of GDP, but employs over a third of the workforce. According to the World Bank's 2006 Agricultural Policy Assessment, about 43% of the population relies on agriculture for their livelihood. (Pomfret 2008)

Agriculture output hit its lowest point in 1990. Policy support for the agricultural system continued to be limited, although a number of activities were emerging, to later to become the principal components of agricultural support in Kazakhstan. Emphasis in the agricultural sector was placed on improving the technical base of agriculture through preferential leasing of machinery and equipment... The decline in production was reversed in 1999 (OECD, 2013 p.113).

Thus, at the beginning of 2000's, a decade after independence, the development of the oil industry in Kazakhstan gave some financial relief to the agriculture sector, with the aim of promoting economic diversification in the country:

After severe hardship in the first decade of independence the oil boom triggered rapid growth...The economy was plagued by hyperinflation and deep recession until the mid-1990s, but as the oil boom began the country's economic fortunes rapidly improved (OECD, 2013 p.16).

Comparing the state's position in relation to the agricultural economy in countries with developed agriculture, writers suggest that *the experience of countries with developed agriculture reveals that the state policy in the field of agriculture is a key factor for the development of agriculture... international experience in the field of state aid to agriculture shows that government's involvement in agricultural production and the availability of industry development programmer contributes to the successful development of sustainable agriculture (Orazgalieva and Urazalinov, 2011 p.19).*

With regard to financing, subsidies and grant allocation to the agriculture sector, Pomfret suggests:

One problem facing the farm sector was lack of investment to improve infrastructure and permit quality upgrading. The capital-output ratio, labor productivity and total factor productivity all continued to decline in the second half of the 1990s and early 2000s, when productivity growth had become positive in other sectors² (Pomfret, 2008 p.6).

On the basis of official statistical data from the Statistical Agency of Republic of Kazakhstan, OECD experts detailed the investments in agriculture after 2000 in relation to total investment in other spheres of Kazakhstan's economy:

The more favorable market conditions are reflected in increased investments in agriculture after 2000. Nevertheless, investment in agriculture remains small relative to

² According to International Monetary Fund estimates (IMF Country Report No. 03/211, July 2003, p.23), total factor productivity (TFP) in agriculture declined by an annual average of 1.8% during the period 1996-2001, when TFP growth averaged 5.8% in industry, 9.5% in construction and 4.0% in services, and labor productivity fell by 8.2% per year in agriculture while it was increasing by more than TFP in the other sectors. The cotton ginning sector was an exception to this negative picture; by 1998 the existing gins had been fully privatized, and several new gins have been constructed since then (Sadler, 2006, 105).

total investment in the economy, which goes overwhelmingly to the energy sector (OECD, 2013 p.71).

As can be observed, one reason for the similarity between the opinions of respondents and scholars was that both based their views on official statistical information and data. And, of course, most foreign states directed their investments in the more profitable oil and raw materials sector. However, due to the oil boom and subsequent economic growth, since the 2000's the government has been able to begin increasingly investing the national budget in agricultural development.

However, with regard to the state's role in the distribution of monetary loans in Kazakhstan, the researcher found a divergence between the viewpoints of respondents and scholars. The former suggested: *a lack of state support with an unequal exchange between urban and rural areas, insufficient distribution of loans to support agrarians and their business, the systematic use of the resource potential for other sectors of the economy (RP04, RP15).* In contrast, scholars emphasized: *the ongoing agricultural policy creates the necessary conditions for misappropriation of public funds, as a result of its unsystematic character, lack of control and lack of effective implementation mechanisms. The number of budget programs with undeveloped and inefficient use of budget funds has increased (Bergenov, 2004 p.28 and Aimurzina, 2010 p.17).* It seems that scholars summarized the disadvantage as *insufficient state control of managing and distribution of public loans in supporting agriculture*, whereas respondents highlighted the state's *systematic use of the resource potential for other sectors of the economy.*

It is evident that effective use of monetary funds takes a central place in any sphere of the economy and agriculture is no exception. Yet, agriculture was *relegated to a secondary plan in economy development of the country in 1990 (RP04).* As a result, respondents confirm that the problems of weak state support, the lack of sufficient funds allocation, and the lack of control in effective implementation mechanisms in agriculture have still not been solved.

4.2.4 The state's role in Kazakh agriculture policy in comparison with developed countries

The transition to a Kazakh market economy has led to the need for a full review of principles, methods and forms of state intervention in agriculture with the aim of the creation of an environment for agricultural business development. It is clear that the agricultural policies of developed countries cannot be imported uncritically to the Kazakhstani case, but nevertheless there are some lessons to be learned from these countries' experiences, as respondents' views confirm.

For example, RP01 claimed: *scientists, experts in agricultural sphere and policymakers studied the theory and practice of agricultural policies of other countries in order to develop a theory of agricultural policy acceptable to the new independent Kazakhstan.* Academics suggest that *in order to develop the theory and practice of agriculture policy in Kazakhstan around the issue of state support, it is necessary to examine the modern Western economies in an agriculture sector which is actively supported by their governments (Orazgalieva and Urazalinov 2011 p.25).* Moreover, RP04 believed

that examination of policy theory and practice in developed countries with traditional Western approaches to agricultural development was considered as an attractive option, but *was not acceptable for the Kazakhstani case*.

The European countries' experience with CAP in the area of state support was examined during the interviews with respondents along the following lines:

- Differences between the EU CAP and the experiences of Kazakhstan;
- State support of different (large, middle and small-sized) types of agriculture enterprises;
- The role of government in providing agrarians with detailed information in the local and global market, to protect agrarians' interests in the market price.

In this context RP21 stated: *agricultural policy directly affected the development of the village at all levels. However, in some cases the reforms were not efficient and could not effectively influence agriculture development and productivity growth*.

During the discussions respondents concentrated their attention on the issue of state support of agricultural enterprises and farms. They highlighted the existing problems with small and medium farms in the Kazakh agricultural sector. Respondents RP13, RP14, RP21 and RP15 all expressed similar opinions on this issue, claiming: *new regulations and reforms in agriculture since independence were oriented for supporting large agribusiness. Moreover, the state's allocation of funds is not oriented to support small and medium-sized agricultural businesses. This problem still exists in the current agriculture of Kazakhstan*. Comparing financial support of small and medium-size enterprises in developed countries with the Kazakh case, RP14 suggested: *it is possible to achieve significant results in increasing production through the creation of conditions for the development of small and medium-sized farms. For this it is necessary to change the existing procedures and supply chain. The state has to support the small and medium-sized rural businesses, taking into account their interests*.

During the discussions it was apparent that state support was oriented towards full support of large-scale production, while the peasant agricultural enterprises, which by their nature are small-scale businesses, remained outside the state's attention. It seems that respondents disagree with current state policy on the issue of supporting the large agricultural business in Kazakhstan. Academics seem to support the respondents' viewpoint. For example, Darinov (2011 p.5) claims: *agriculture policy is focused only on big agribusiness*. His view is that this is not only in contradiction with the principles of market economy and free competition, but also flawed from a socio-political point of view. In Darinov's opinion, it is a step back. A waste of effort and money to support not always effective large-scale agriculture production can lead to stagnation and degradation of farming, the food crisis and the further impoverishment of the rural population. Darinov adds: *the Ministry of Agriculture by developing the agricultural policy of Kazakhstan does not fully take into account the interests of small*

and medium-sized rural businesses, does not meet the expectations of the rural population, and most importantly - does not contribute to the dynamic development of the agriculture sector.

At the same time, Ryabsev (2004) suggests that funding for these programs must *combine the budgets of all levels, including the large businesses, and the most important reason for the sharp fall in the level of agricultural production, as well as in small and medium-sized businesses is the passive role of the state in regulating the processes taking place in the agricultural sector. The basis of the state support of small and medium business should be made a target-oriented approach. Sector development programs should be formed at three levels - national, regional, and district, and have interaction both between levels and areas with development programs in general and other industries* (Ryabsev, 2004).

Furthermore, Darinov confirmed that *small and medium rural business accounts only for 14% of all funds allocated to the financing of agriculture from different sources. In addition, small and medium agribusiness accounts for the predominant share of the production of feed, cotton, tobacco, wool and hides. This is confirmed by the statistics from Statistics Agency, and it is necessary not only to recognize, but also to consider the design and implementation of new agriculture policy with orientation to small and medium-scale rural business development* (Darinov, 2011)

Thus, comparing the respondents' (RP14; RP15) opinions with that of the scholars (Ryabsev, 2004; Darinov, 2011 p.5), the problem to design and implement *improved agricultural policy with re-orientation to small and medium-scale rural business development in supporting the agriculture of Kazakhstan* was identified as an important issue for state and policy makers' attention.

At the same time, discussing the state's role in providing agrarians with detailed information in the market, to protect agrarians' interests in the market price, RP14 added: *government has to provide agrarians with detailed information about the local and global markets, regulations and also to develop the infrastructure of rural regions. RP13 suggested: family farming as a system of flexible prices and liberal foreign trade regime, which is held through the active support of the state's policy in the agricultural and food sectors with appropriate adjustment of prices and production – these were defined as the direction for the development of the agricultural industry in Kazakhstan. When considering Western countries' strategy for agricultural management, scholars point out: an agriculture sector is actively supported by the government. Government establishes and annually reviews by minimum prices for major agriculture products. Thus, producers are protected from the sharp falls in prices. At the same time, the domestic market can be protected from cheap imports and excessive price fluctuations by using a system of additional import duties. Expenses for agrarian policy are used by the state budget* (Orazgalieva and Urazalinov, 2011 p.25).

It appears that both scholars and respondents would agree that: *government has to provide agrarians with detailed information about the local and global markets. Examining the experience of Western countries in protection of agrarians from sharp falls in prices, the domestic market is defended from*

cheap imports and excessive price fluctuations (RP01). But how easy would it be to adapt their experiences for post-Soviet developing countries such as Kazakhstan? On this note, RP01 noted that at the beginning of 2000's many agrarians from different levels of agricultural management and different regions of Kazakhstan were offered possibilities of visiting European and Western developed countries to learn their best practice and exchange experiences.

4.2.5 Summing up: theory and practice of Kazakh agricultural policy

Summing up the underdevelopment of agricultural policy the following key issues emerged:

- *the urgency and necessity of regulating a new economy system in conditions of chaos and collapse in the country* (RP01; RP03; Ismuratov, 2000 p.12; Kurmanova, 2010 p.23),
- *disbandment of scientific research institutes, a sharp reduction in state financial support of agriculture* (Akhmetov 2011 p.3),
- *due to the absence of experience in new socio-economic system, there were several attempts to use foreign business agricultural models which were arranged without advanced checking and examination of components which could affect the result of the introduction* (RP13; Maulenkulov 2001 p.31)

A lack of qualified specialists, managers and agrarians in agriculture since transition to a new market economy was identified as a key weakness and one of the urgent tasks for the development of agriculture in Kazakhstan (RP14; Korotnev, 2004). Examining the state's role in supporting Kazakh agriculture in comparison with other spheres of the country's economy, respondents stressed *insufficient distribution of loans to support agrarians and their business, the systematic use of the resource potential for other sectors of the economy* (RP03; RP04; RP15). In contrast, scholars emphasized *the ongoing agricultural policy creates the necessary conditions for misappropriation of public funds, as a result, insufficient state control on managing and distribution of public loans in supporting agriculture* (Bergenov, 2004; Sultanbekova 2001; Aimurzina, 2010).

Considering the state's role in Kazakhstani agricultural policy in comparison with the experiences of developed countries, the following findings emerged:

- The suggestion to re-orient Kazakh agricultural policy to emphasise the development of small and medium-scale rural businesses (RP14; RP15; Ryabsev, 2004; Darinov, 2011);
- The perceived need to provide agrarians with detailed agriculture information, and to protect local agrarians from cheap imports and excessive price fluctuations (RP14; Orazgalieva and Urazalinov, 2011).

Thus it appears that there are learning points which might be adopted by Kazakh agrarians from the experiences of developed nations, even if the situation in Kazakhstan is unique, based on its history, geography and culture.

RP01 made a helpful point when this respondent suggested that neither Kazakh scientists nor policy makers have put sufficient resources into the issue of agricultural policy. It is not enough, he suggested, simply to examine the strategies adopted by other post-Soviet states, but also to consider what developed countries had done with the issue. It must be borne in mind however, that Kazakh independence came about as a direct result of the breakup of the former Soviet Union, itself a prey to catastrophic economic problems. Ospanov (2002) described the situation as one of major crisis, where many important decisions had to be taken without adequate preparation. Given that the previous culture in the USSR had been one of command and control, where most decisions were made centrally, it was particularly challenging for the new ex-soviet states to manage rapid change.

There was also a significant lack of scientific research for policy makers to consult, as many of the centralized records were lost or destroyed during the USSR break-up. Both issues, of the chaotic situation following independence, and the problem of loss of vital centralized information, came up frequently in the interviews, and although respondents identified them as still major areas of concern, given the challenges faced by the new republic of Kazakhstan, it is difficult to see how the period just after independence could have been anything other than chaotic. A similar time of rapid restructuring faced Western Europe after the Second World War, resulting in the establishment of the EU. But as pointed out in the literature review, the latter case involved a number of independent states coming together on policy issues. For the former USSR, the issue was one of break-up and Aimurzina (2010) notes that every state from the former USSR decided on its own future – there was no group consensus. It appears that both scholars and respondents believe that stagnation of agriculture and agricultural policies in a developing country such as Kazakhstan was caused by the underdevelopment and default of the entire Kazakhstani economic system at the early periods of independence, since government's focus was drawn to more valuable (in their view) goals and achievements. The lack of thoroughness and completeness of agriculture programs in 2000's were influenced by the fact that agricultural policy in the early 1990's was not sufficiently taken into account and the same mistakes and omissions were repeated in subsequent years.

There is no doubt that lack of reliable scientific and agricultural research data also hampered the development of agricultural policy during the period just after independence, and it was not until Pomfret's studies in 2007-9 that any detailed academic studies were carried out into agricultural issues. In 2013 the government asked the OECD to conduct a review, but this was after a significant number of problems had continued over a long period. Respondents were well aware of the chaotic nature of the post-independence events in Kazakhstan but nevertheless were frustrated by the lack, which still existed, of reliable scientific data. This was exacerbated by the disbanding of the erstwhile Soviet Research Institutes which had been sources of science-based information for agrarians. Several respondents referred to the period of economic stagnation after independence – they realized that moving from a socialist system to a market economy was always going to be difficult, but there were still many problems to be solved twenty years later.

Some respondents (e.g. RP06) noted the uncritical application of “*foreign models*” to solve the problems in agriculture, a point also made by writers such as Maulenkulov (2001), and a tendency to focus on current problems – which might be described as symptoms of wider problems rather than strategic issues. However, given that in the former USSR such strategic issues had frequently been the concern of policy makers in Moscow it is perhaps not surprising that adapting to a new culture of market-driven organisations, with an emphasis on strategic decision making, proved difficult for many agrarians. The implementation of the new agricultural policy was associated with changes in the economic system: the new market-based economy system which was implemented in 1991 was completely different from the previous command-administrative system; people could not understand and orient themselves under the new system, as there were no standards, no rules to follow by agrarians, nor any theory and practice in management of agricultural business in the conditions of the new system, together with the changes in the agricultural structure.

As will be discussed in more detail in section 4.3 below, the drastic change to a market economy was exemplified by the process of land reform – where previously state-owned farms and agri-businesses were broken up into private ownership. The Information Agency of Kazakhstan admitted that this had not been a ‘painless process’ and at the time, respondents noted, there was little investigation of the legal basis of land reform. As a consequence there was a weakening of state control over land use and protection, as for a number of reasons which will be mentioned at 4.3.4, those who acquired the land in many cases lacked the management or administrative skills to be effective land owners.

The President of Kazakhstan summed up the problems of the post-independence period as: ‘*It was impossible to live in the old conditions but no-one had any idea of what we wanted, or what to do.*’ Respondents noted that this uncertainty from the state itself was passed on to agrarians who had been accustomed to responding to the state’s instructions in a command and control model, and now they appeared to be on their own. They had been used to responding to instructions, and now they were getting inconsistent ones – perhaps the new market economy would not last, even though the government now had an opportunity to break into world markets through sales of energy and raw materials. Since independence Kazakhstan has attracted foreign capital and investments in its economy. But, it must be acknowledged that strategic foreign investors have mainly invested their capital in the raw materials sector in Kazakhstan because this industry was more profitable in comparison with agriculture. For example, Sultanbekova (2001 p.3) claims that one of the important factors of the financing of the economy was a large influx of foreign capital, which contributed to the formation of both the business environment and adequate market behaviour of privatized enterprises. Foreign enterprise capital was actively involved in the privatization and direct investment, as opposed to, for example, from Russia. Strategic investors, including foreign ones, were fixed mainly in the raw materials sector (Sultanbekova 2001 p.3).

The other problem noted by respondents in the rapid move to a market economy was that of the human resource. There were winners and losers in the new economy, and some respondents wondered

whether the socialist system had been preferable as, for agrarians at least, there had always been employment opportunities, and now there was a significant problem of migration of citizens from rural areas to the towns where the new jobs were. Specifically, after independence and the years of economic crisis, many agrarians had left the country to seek employment, and several respondents mentioned the skills gap now existing – there were still insufficient training programmes available to develop new expertise.

What did respondents think the government was doing to tackle these problems? It was pointed out by several respondents that Kazakhstan is one of five nations that have all the necessary resources to be self-supporting. The energy reserves it possessed enabled it to escape from a major economic depression, but for some agrarians this proved a mixed blessing, as state concentration on this sector of the economy often meant ignoring other economic contributors to the economy such as agriculture.

Respondents were often less than happy about how the Kazakh government had acted, suggesting that, with hindsight, more harm than good may have been achieved by so many abrupt changes of policy, especially when these involved transforming Kazakhstan into ‘a great industrial region’ (KISS) and ignoring the problems faced by agriculture. They noted that funds were allocated to the agricultural sector on a much smaller scale compared with other sectors of the economy. A recurring issue, which will be considered in more detail below at 4.6, was the lack of transparency that respondents noted in awarding funding. Not only was there a lack of consistency in obtaining grants, but in some cases it was suggested that misappropriation of funds took place. Historically, the eventual economic success of the energy sector meant there was a possibility of using these resources to diversify the economy, but respondents noted that foreign investments continued to go to energy or raw materials rather than agriculture.

As suggested earlier, respondents such as RP06 questioned the tendency by government agencies to look towards the experiences of developed countries in agricultural policy – how valuable was it, and how might the practices of these countries be imported wholesale into Kazakhstan? More agrarians were visiting these countries, but were unsure how easily their practices might apply at home. Not least, the government appeared to have taken the view that their emphasis should be on supporting ‘big business’, when ignoring the economic potential of small and medium-sized enterprises (SMEs). Was this the best move, they asked, in a truly market-based economy? Surely it was not competitive, and did not encourage small businesses to compete. Could they not introduce import duties to protect small farmers from foreign competition? The lack of support for SMEs contrasted with the fact, noted by Darinov (2011), that SMEs accounted for the predominant share of production of feed, cotton, tobacco, wool and hides in the country.

4.3 Evolution of agricultural policy and its contribution to economic development

From the perspective of the literature review and the primary data, this section will discuss the evolution of agricultural policy since independence. OECD experts identified three stages of agricultural policy evolution:

i) 1992-1997 - initial structural reforms as emergence of new policy institutions; ii) 1998-2002 - stabilization and agricultural debt restructuring; iii) 2003 to the present - promoting agriculture as part of economy diversification (OECD, 2013 p. 112).

On the other hand, in the Human Development Report (HDR) from 2002, the evolution of agricultural policy development was divided into four distinct and more detailed phases:

- *1992-1994 - accelerating the reform of agricultural enterprises, creating a legal framework, land reform, privatization of state property;*
- *1995-1997 - accelerating the decline in agricultural production, reduction of acreage and livestock, reduced crop yields and productivity;*
- *1998-2000 - positive changes in the development, strengthening public support, preferential loans, and improvement of material and technical resources through leasing;*
- *2001-2002 - formation of rural credit cooperatives, reducing the cost of fuel and lubricants, the increase in government spending on agricultural development, increase of foreign investment, positive changes in the social sphere (UNDP, HDR 2002 p.13).*

The OECD report covers the period of twenty years since 1992, and this report is the latest, and fullest, account of Kazakhstan's agricultural policy development.

Regarding the evolution of agricultural policy, RP03 stated: *[it] has to be based on the actual processes and should be aimed at supporting the growth of agricultural productivity, competitiveness and sustainable development of the agriculture sector, together with supporting the development of rural communities.* The following sections will consider the three phases of the evolution of agricultural policies, namely: 1st phase (1992-1997), 2nd phase (1998-2002) and 3rd phase (2003 to present). The influence on GDP for the years 2003-2011 in comparison with 1993-2002 is related to the change of agricultural policy towards an increase of investments and subsidies to this sphere, and consequently, state support and orientation of agriculture economy to international standards will also be discussed.

4.3.1 First phase – initial structural reforms and new policy implementation

Discussing the objectives of agricultural policy since independence, RP03 suggested that agricultural reforms and regulations during the transition to a market-oriented economic system included the following development directions:

- Land reform implementation
- Reformation of agricultural farms and establishment of new agriculture system
- Changes in financial structure of agriculture

Goals set during the first ten years after gaining independence included a transfer of the economy to a market-based economic system (OECD, 2013 p 114-115). Consequently, the Kazakhstani government needed to introduce means of land reform, farm reconfiguration and reform of agricultural finance and support systems, as well as to improve the food security situation which had declined after the collapse of the Soviet Union.

As suggested earlier, in the respondents' opinion land reform took an especially important place among the other policies and regulations which were implemented in the period of transition in Kazakhstan. RP02 suggested that during the transition, *land reform was begun without necessary preparation of legal and financial issues; there were no clear principles and no methodology which has solved the current problems*. RP19 added: *three government attempts to regulate the major topic in agricultural policy are too much for only one reform. Moreover, taking into account that the land reform is one of the major policies in the agricultural policy of any state, it was necessary to have a well-prepared plan for its implementation*. Additionally, RP13 claimed that government did not undertake proper preparation and therefore during the transition lost their main functions such as: *the management of the land, the planning and forecasting of land use, monitoring the land, information management data for the land*.

Scholars who have studied the results of the unsuccessful implementation of land policy mention: *land taken out of agriculture output, followed by the decline of reclamation, ultimately causes the deterioration of land quality and thus complicates the prospects for recovery scale agriculture production. In a situation of voluntary and forced privatizations in agriculture and limited resources, there was a sharp decrease in the number of livestock* (Ziyabekov, 2006 p.3).

In the first phase (1992-1997) of agriculture development: *the number of cattle was 55.9% of 1990 levels, the number of pigs 39.7% of 1990 levels. Of the 35 million sheep in 1990 at the end of 2005 in the country, there were only 14.3 million heads*. The reasons are the same: *the artificial destruction of the economic infrastructure, cancellation of socialist property in connection with the transition to rights of private property. It was the result of privatization* (Ziyabekov 2006 p.3). Karbayev (2011) emphasizes that during the transition period land reforms changed the attitude of the citizens to the land and affected the interests of every citizen and society as a whole. In this context, Kurmanova states that *land reform was started without any proper preparation on legal basis and methodology which caused problems and is compounded by the reduced the role of land use which subsequently led to the loss of the main functions of the Government in the field of land management, which consists in the organization and implementation of State control over the use and protection of land, planning*

and forecasting their use, information management data for the land registrations and land monitoring (Kurmanova, 2010 p.32).

Therefore the first phase (1992-1997) is characterized by OECD experts as ‘initial structural reforms and emergence of new policy institutions’:

The principal policies in the 1990s were land reform and the privatization of collective farms, which formally divided the assets among workers, although in practice this did not change the way these entities functioned. As the government was focused on more pressing priorities, such as macroeconomic stabilization and the creation of a basic legal framework for a market economy other areas of agricultural policy remained largely neglected (OECD, 2013 p.112).

Considering the respondents’ opinions in comparison with that of academic experts, it appears that both sides have similar opinions about the role and influence of agricultural policy for that period. Due to the absence of proper preparation of new agricultural policies, agrarians could not change the situation in agriculture with its existing problems, and moreover, did not positively influence agricultural productivity growth. RP17 added that as a result, after the implementation of these agricultural policies, the standard of living of the population in Kazakhstan deteriorated sharply, and the government was faced with challenges in the area of food security. RP04 added: *trying to find a way to solve the current problems in agriculture after the implementation of new reforms, the policy makers studied the experience of developed countries to look for a way out of the current situation, to solve agricultural problems which were growing from year to year.* Despite attempts by state policy makers and agricultural experts to get out of the crisis in the agricultural economy of Kazakhstan, during the first decade of independence they could not find the answer. Thus, respondents suggested, all problems in agriculture were prolonged for the following fifteen years or more. Recalling that period, RP03 added: *most of the reforms had been developed and adopted in a hurry. Indeed, at the time of chaos and collapse in the country it was necessary to make quick decisions to exit from the current situation.* RP02 agreed: *it is true, for that period there was no time for deep discussions and testing of new policies, no possibilities to explain the principles and methods of policies for agrarians at each level of agriculture. As a result, agrarians accepted the new policies and adopted them at the level of their understanding.*

The respondents reflected on the rapid and spontaneous realization of new agricultural policies in the 1990s. RP06 commented on the lack of rational policies with systematic approaches: *the main cause of what is happening - inadequate measures taken by national and regional agricultural authorities, the scope and nature of the problems in agricultural industry of Kazakhstan - still leads to losses in agriculture.*

RP13 remembered that the problems in living conditions in rural regions increased (see also 4.2.2): *the decline in agriculture production had serious social consequences. There was an exodus of rural population, especially young people and the working population. All these things influenced the decrease in agricultural productivity after the implementation of several policies. Furthermore, the average salary of workers in rural areas was 3.8 times less than the wages of workers in industry.* Additionally, RP07 claimed that *one of the most negative consequences of agricultural policy for that period was a significant reduction in the productive capacity of agriculture and, as a result, a decrease in the quality of life in rural regions.* In the opinion of both respondents and scholars: *living standards and life quality in rural regions have decreased.* During the discussion on the implementation of agricultural policy at the beginning of the 1990's, respondents concentrated their attention on *low living standards in the countryside and the exodus of the population* (RP07, RP13). They noticed that in the initial stages of the economic transformation and new market relations in rural regions, consideration of the role of the human resource was not identified as a priority task. It was remiss in the initial stages of the transformation of the economic and management sectors, and there is now an understanding of the high human cost. *Later it was apparent that sustainable development was not possible without the creation of an appropriate level and quality of life in rural regions* (UNDP HDR, 2002 p.12).

Thus, the evolution of agricultural policies and their implementation for the period 1992-1997 did not result in successful development of agriculture in Kazakhstan, and, as a result, *agricultural productivity did not increase.* Rather, it created serious social consequences: *the living standards and life quality in rural regions decreased, followed by an exodus of rural population, especially young people and the working population.* So, the implementation of agricultural policy in the period of changes in political, financial and organizational systems of country did not improve the situation in rural regions at all, RP18 claimed that both sides – policy makers and agrarians, did not meet their expectations during the process of policy implementation, and, as a result, during the deterioration of the situation in the countryside, *most agrarians left the rural regions and migrated to big cities to earn money and support their big families. Usually the rural families in Kazakhstan have many children, more than 4-5 children in each family* (RP18).

Examining the problems which arose during the implementation of the new agrarian reforms, scholars suggest that *one of the most negative consequences of the market in agriculture policy during 1991-2004 was a significant reduction in the production capacity of agriculture and, as a result, reducing the quality of life in rural regions* (Ziyabekov, 2006; Sagadiev, 2006). At the same time, respondents (RP13; RP17) stressed that during the implementation of new agricultural policies, policy makers and key stakeholders should have concentrated their attention on the *low living standards in countryside and the exodus of the population* (RP07, RP13). Academics agree: *in the initial stages of the economic transformation and new market relations in rural regions, the role of human resources was not identified as a priority task. The deep crisis of economic growth that took place before 1996, hit the*

entire economic system (Sultanbekova 2001). Such was the first stage of post-independence agriculture development in Kazakhstan. The next stage 1998-2002 is now discussed.

4.3.2 The evolution of policy and its influence on the stabilization of agriculture

According to OECD experts the period between 1998 and 2002 was one of *stabilization and agricultural debt restructuring* (OECD, 2013 p.112). Sagadiyev (2006 p.18) identified the period as one of *stabilization with preparation for the further development of agriculture industry in Kazakhstan* which replaced the previous period – one of stagnation – in Kazakhstani agriculture. *Considering the agricultural production since independence in 1990s, in 1998 agricultural production in Kazakhstan achieved its lowest level and coincided with the Russian economic crisis in 1998 which influenced the whole economic system in Kazakhstan*, added RP05. Following the 1998 crisis, state policy support of the agricultural sphere was sharply limited and *the government's attention again focused on macroeconomic stabilization and overcoming the consequences of the crisis on the national economy* (OECD, 2013 p.113). At the same time, *the scope of support measures continued to be limited, although activities were emerging to later become the principal components of agricultural support in Kazakhstan, such as preferential machinery leasing and a new system of agricultural and rural credit* (OECD, 2013 p.113). Describing the problems which took place during the Russian crisis, OECD experts add:

Although the recession bottomed out, producers had a depreciated capital stock, lacked access to alternative market channels, faced limited financing options and operated in an unstable regulatory environment. Rural areas continued to suffer demographic, economic and social decline (OECD, 2013 p.113).

As an attempt to solve the continuing problems in Kazakh agriculture, projects were initiated by the Government, such as: *the technical base improvement, machinery and other agricultural equipment provision* (RP03). Financial organizations to support Kazakh agriculture were established in Kazakhstan, such as the State Agency 'KazAgroFinance' (1999) and later 'Agrarian Credit Corporation' (2001). All these organizations were responsible for coordinating and allocating state financial funds to support Kazakhstani agriculture. However, RP07 claims: *it was a period of stagnation in agriculture with economic and social decline, a time with a lack of alternatives to market business, limited financial support, and operation with depreciated capital stock.*

Moreover, respondents could highlight no essential changes in the evolution of agricultural policy which affected agricultural economic development. RP09 suggested: *the government focused on economic stabilization in the country to overcome the consequences of the crisis....and agriculture was relegated to the background again till 2003. Thus, for sorting out existing problems in the economy, monetary and fiscal policies were implemented by government.*

RP07 and RP09 noted that the problems in agricultural policy after the introduction of several reforms had not improved; the situation in agriculture had neither changed nor developed. RP04, however, disagreed. This respondent had strong reasons to believe that agricultural policies for that period had slowly changed the situation in the agricultural sector and, furthermore, evaluated those policies as 'progressive'. RP04 claimed: *in the middle of the 1990's the situation in the agricultural sector slowly started to improve. In fact, all the reforms in agriculture were gradually realized... So, the principle of step by step implementation of reforms in different stages of agricultural development secured the necessary conditions for the agricultural sector's escape from the [economic] crisis and created the conditions for its further development (RP04).*

RP03 agreed: *no doubt about the correctness of agricultural policies.... The problems with the poor results related to the agrarians – most of them did not have any skills and knowledge in management, finance and accounting, which were necessary to manage their business at their levels.* This respondent suggests that most villagers, or small-scale agrarians, were well-educated in agricultural facts, but they did not have any skills and knowledge in management to coordinate and control an agricultural business at their level in the conditions of the new market relations. As a result, they could not cope with many changes, especially with the new reforms and regulations in agriculture. On the other hand, the lack of professionals and managers in agriculture was related to the increase of migrants and emigrants at the beginning of 1990s, as described at 4.2.2. In fact, many people left the rural regions and moved to the cities, or even emigrated from Kazakhstan to other CIS countries.

During the discussions with respondents it was also evident that they perceived the lack of professionals and managers in Kazakhstani agriculture during the early stages of independence had a negative influence on the results of the implementation of new agricultural policies. This problem was discussed in section 4.2.2, but because this problem occurred in the second phase as well, it is necessary to discuss its causes in more detail and explore the following issues:

- i) Why this problem has still not been solved, after over twenty years since independence;
- ii) Why, up to now, agriculture has suffered an acute shortage in personnel or human resources for the agricultural sector.

Sagadiev (2006 p.214) believes that the deficiencies and shortcomings in the implementation of agrarian reforms have led to serious consequences. The majority of farms (52%) became unprofitable due to violation of parity prices, distortions in the financial and credit system and taxation. Moreover, the problems with human resources with the low educational levels in the agriculture sector, as well as additional skills and knowledge in management, finance, and accounting which are necessary to manage the small farms and agribusinesses – all of these weaknesses influenced the implementation of new agricultural policies (Sagadiev, 2006 p.214). The problem of an acute shortage in personnel for the agricultural sector was raised by respondents frequently. RP13 reflected on a new generation who might potentially replace agrarians in future: *young people after graduation from educational institutions do not want to return to the village, because of low wages and poor living conditions,*

workplaces with old machinery and equipment. They prefer to stay in the cities. While they have qualifications and theoretical knowledge, they even agree to take an unskilled job in cities. I think it is one of the main reasons why the problem with qualified professionals still has not been solved in the villages. Commenting on the USSR's educational system up to the 1990s, Olesik (2008 p.29) notes: *Soviet universities had a complex system of recruiting student population, and instituted changes in the rules to reflect the direction of the educational, economic and social policy, as well as ideological doctrine of the party and the state.*

These facts partially explain the reasons why the rural regions still seek professionals and agrarians in rural regions to become employed in the agriculture sector. Moreover, the lack of professionals, agrarians and managers is one of the problems existing in both Kazakhstan and other CIS countries with the same social and economic conditions. OECD experts state:

Well-coordinated education, research and development, and extension systems can contribute to strong productivity growth and the widespread adaptation of sustainable farming practices (OECD, 2013 p.29).

However, it was also pinpointed that agriculture lacked proper professionals who would be competent in the agricultural sphere, and due to this fact the agriculture of Kazakhstan could not make rapid growth. Thus, comparing the views of respondents and academic writers, the following key issues were highlighted for the period of 1998-2002:

- *It was a period of stagnation in agriculture with economic and social decline, a time with a lack of alternatives to market business, limited financial support (RP07, RP09). Conversely, RP04 and some writers (for example, OECD, 2013 p.113) described this period as one where new agricultural policy implementation in different stages of agricultural development secured the necessary conditions for agricultural sector's escape from the [economic] crisis and creates the conditions for its further development; preferential machinery leasing and a new system of agricultural and rural credit were implemented.*
- *The acute shortage of well-educated, experienced managers and qualified specialists of personnel in agricultural practice had a negative influence on the results of the implementation of agricultural policy (RP13; RP15; Sagadiev, 2006).*

Taken together, these points all suggest that steps were taken by government and agrarians to solve the problems post-independence, but plans were hampered by an exodus of skilled and trained specialist personnel.

4.3.3 Since 2003: the third stage of agricultural policy development

The evolution of agricultural policy since 2003 to the present time was identified by OECD experts as the third phase of Kazakhstani agricultural policy development. It was time *to promote agriculture as*

a part of economic diversification (OECD, 2013). This section presents the views of academics and respondents regarding the implemented agricultural policies with their influence on agricultural development. RP02 was quite clear that: *the absence of a strong theoretical base in agricultural policy led to a systemic crisis till the end of 2004.*

The success of state policy implementations, such as: ‘Village of 2003-2005’, ‘Agricultural and Food Program for 2003-2005’, ‘State Program for Rural Development of the Republic of Kazakhstan for 2004-2010’ was identified as the first positive trend in Kazakhstani agricultural development since independence. According to the Statistics Agency of the Republic of Kazakhstan the gross agricultural output increased by 7.5% higher than in 1999-2002 and 60.3% for the years 1995-1998. RP13 described the aim of these agricultural reforms as creating *the policies to provide the population with food, industry with raw materials, to increase the export opportunities in agricultural sector and to orient it to global market economy.* But in comparison with other spheres of the economy, agriculture still lagged behind in its development. RP02 claimed: *in the last 10 years since 2003 the government has paid more attention to agricultural economic development with providing different international projects, attracting investments and new technologies. It was time to promote the agricultural sector of economy as a part of the country’s economy diversification.*

It is noticeable that during the discussions many respondents were particularly concerned about land reform, privatization of collective farms, state financial investments and subsidy mechanisms in supporting agriculture. Moreover, the role of stakeholders in the process of policy creation and implementation was also identified by respondents as an essential topic for discussion.

4.3.4 Land reforms and the privatization process

RP11 described land issues as follows: *in 1995, a presidential decree ‘On Land’ became the subject for endless bargaining. It was the second land reform five years later, when the Law ‘On the Land’ was adopted with a circle of temporary owners with their rights which were clearly delineated.* The issue is discussed in detail in Appendix II. RP15 noted: *it was important to formulate clear objectives to achieve the level of economic efficiency which is comparable with the global market, and finally, solves the problem of Food Security in our country. There is a need to increase the monitoring and evaluation of these important reforms by experts and policy makers.*

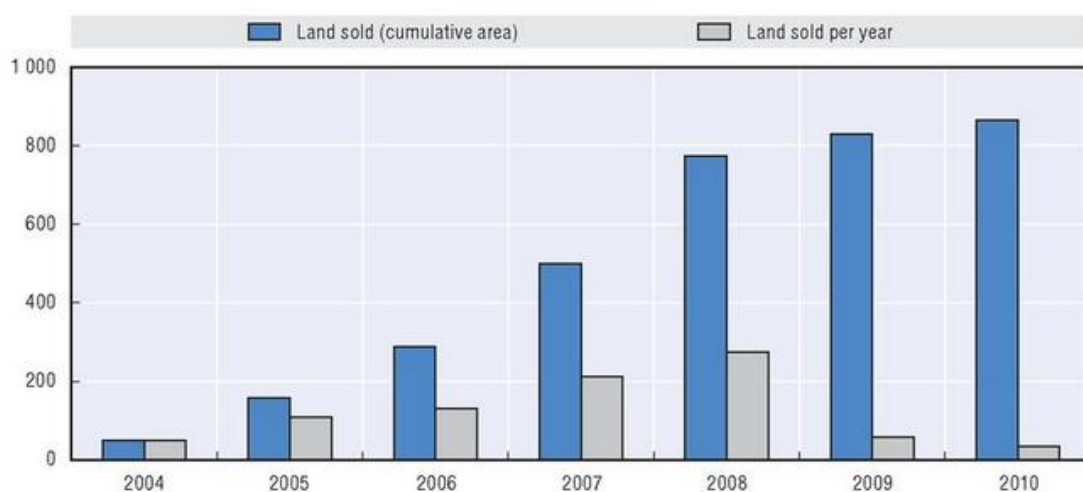
Discussing a successful experience in the respondent’s own large scale family business, during the new land reform policy implementation, RP12 claimed: *it was a business which was established at the beginning of the 1990’s and developed during the following twenty years following independence... I cannot say that the state agrarian policies were unsuccessful programs. Specifically for me and my family it was a great opportunity to start my own business in agriculture in conditions of new market relations.....We have done a tremendous job in terms of the private business. It was hard work, but now we can see our successful results. Moreover, our big enterprise is one of the major suppliers of*

grain in Kazakhstan with access to the international market. This is an example of the positive results, which have been achieved by some Kazakhstani farmers after more than twenty years of independence. RP12 highlighted that there are other farmers who made valuable achievements starting their own business during the new market-based economy. This respondent claims that such examples demonstrate the advantages of agricultural policies implemented in Kazakhstan after independence. Media attention towards the successful experience of enterprises and farmers in agriculture of Kazakhstan has not helped to inform other farmers of what might be achieved, RP12 suggests.

On the other hand, RP14 was skeptical in his attitude to the land owners and highlighted that the land reform in 1995 and farm privatization processes were problematically implemented in his region: *people who had money bought the lands... during the following two decades the land was not cultivated or used for its intended purpose... Now, we can see - lots of arable land completely degraded. The state has to review this problem on an urgent basis.* in this context, Ziyabekov (2006 p.3) claims: *as the result of the implementation of land reform, the area of agricultural land decreased from 197.6 million hectares in 1990 to 78.3 million hectares in 2005, including arable land from 35.5 to 22.1 million hectares.*

RP14 suggested a need for policy makers to reconsider the existing agricultural policies *because land degradation can cause permanent damage to the economy of Kazakhstan.* It was apparent that as a result of problems surrounding the implementation of land regulations, farm privatization had still to be sorted out. OECD experts (2013 p.89) suggest that the introduction of the Land Code in 2005 allowed private ownership with universal property rights and led to structural change as individual farms could now be enlarged, therefore allowing an agricultural market to emerge. In the years from 2004 to 2010, over 860 000 hectares of state agriculture land was acquired by non-governmental entities; however, due to the economic breakdown in 2008, purchases decreased rapidly. Thus, examining the sales of state agricultural land in Kazakhstan, Figure 10 presents the results.

Figure 10. Sales of state agricultural land, 2004-2010 (thousand hectares)



Source: Agency on Management of Land Resources of the Republic Kazakhstan.

Summarizing the results of land reforms and privatization reforms with sales of state agricultural land in Kazakhstan it is apparent that private ownership would cause an increase in the number of private farms; however, due to the fact that the implementation of land reforms was not operating properly, the state lost a significant amount of arable land, thus causing degradation of agriculture in general.

4.3.5. Financial investments and subsidies in supporting agriculture

With regard to agricultural policies which directly supported agrarians, RP14 highlighted the state support of rural regions in Kazakhstan in allocation of low-cost credits in agriculture sector. The positive influence on GDP for the period of 2003-2011 in comparison with 1993-2002 is related to the change of agricultural policy towards an increase of investments and subsidies to this sphere, state support and orientation of agriculture economy to international standards. The problems regarding the state's allocation of funds were reviewed in Sections 4.2.3 and 4.2.4 with its main weaknesses surrounding agricultural policy, theory and practice. Among the other regulations and reforms which were implemented since independence, loan distribution policy was discussed many times by respondents (i.e. RP14, RP15), because it has a practical significance for agrarians in their business and in their opinion it has many weaknesses requiring improvement.

Investments and subsidies to the agriculture sphere were eventually initiated by government to support farmers in their operating expenses and compensate for the losses in livestock. Later, there were many different projects of state fund allocations to develop the agricultural economy. All these projects were initiated by the government, and the Ministry of Agriculture had authority to arrange and provide all procedures for funding allocations in all oblasts, districts and farms. RP14 referred to the problems which occurred: *the lack of detailed information and also bureaucratic approaches in the process of arranging the documents to receive the financial support complicated the whole process.* RP15 added: *the procedure of loan distributions has to be very clear, understandable and accessible to agrarians. Sometimes villagers are not even aware about the programs that are initiated by the State, because the information is not available or incomplete.*

There appears to be an inefficient distribution of micro and macro-credit loans for agrarians. RP19 claimed: *the distribution of credit loans was inefficient and not transparent. For example, the farmers who really needed financial support to develop their business could not take out a credit loan because there were lists of requirements, among them: provision of collateral, guarantees to repay the loan. As well as the procedure of credit system being opaque it is also very confusing and complicated.* RP20 added: *on the basis of bureaucratic approaches to the process of loan distribution, many agrarians could not receive the loans or they received them too late, for example in late autumn, when the season of agricultural operations has already ended. As the result, in these cases, the loans have become useless, and the farmers had to pay the interest rates on loans from their own pockets.* On this subject, RP14 added: *sometimes agrarians cannot even participate in the programs, because the*

procedures for document collection, with the need for participation in several Committees for allocation of loans at various levels (in district then in regional centers) are very complex and highly bureaucratic.

RP20 suggested: *with the lack of information about the fund allocation mechanisms in practice, there was a problem - the funds were directed for full supporting of large-scale productions in Kazakhstan, while the farmers' economy was based by its nature on medium and small-scale farms.*

Discussing the state's loans allocation and its hindering of the development of agriculture in the country Khramkov (2014 p.3) claims that compensation which logically should accrue to agrarians without too much trouble, is in fact, very difficult to get: *This usually occurs by the end of the year which is not the right time when the money is needed for the production and you can start to use money in turn.* Khramkov (2014 p.3) adds: *both state and regional subsidies for fertilizer, feed and seed are technically difficult to obtain. It is not that someone does not want to give money, just there are trouble areas: officials often applying rules for obtaining state support which are far from the realities of production and unwittingly applying conditions which are impossible to meet, and strict control mechanisms which actually limit the possibility of obtaining such support.*

Darinov (2011) shared this view regarding the bureaucratization of the processes for registration to obtain state subsidies and loans: *as a rule, review and approval of applications of potential borrowers are stretched out over many months, and sometimes years. Agriculture producers argue that the inability to register credits in the region, or remotely via communications, due to their absence, complicate the situation of getting subsidies and loans...Subsidies for farmers cause major complaints, but especially their size, condition, and distribution mechanisms. For example, the state's funds for these purposes in plant do not fulfill its mission to support and encourage.* On the other hand, the Chairman of the National Economic Chamber of Kazakhstan 'Union Atameken' Oshakbaev (2012) reports: *Kazakhstan's banks have sharply increased lending to the agricultural sector after the state began its investments in this industry. On the basis of the National Bank's data analysis, we can conclude that the lending of agriculture has recovered - it even exceeded the pre-crisis level. There is a clear trend to increasing the role of public finances in lending to the villages; it is now about 30 percent.* In Oshakbaev's opinion there has been a positive shift in lending to farms at the banking level, and despite the high risks, financial institutions are now looking quite optimistic for lending to the villages (Oshakbayev, 2012).

Darinov (2011) reflects that *86% of all funds allocated to the financing of agriculture go to large rural business accounts.* In contrast, Oshakbaev (2012) suggests: *if we look at profitability indicators of small and medium-sized farms, we can say that situation in these farms is better financially than in larger farms.* So, on one hand, Darinov (2011 p.6) states that subsidies for farmers cause major complaints, but especially their size, condition, and distribution mechanisms. On the other hand, Oshakbaev (2012) highlights positive changes on this issue, claiming that there was a *trend of increasing the role of public finances in lending to the villages; it is now about 30 percent.* It must be

said, though, that Oshakbaev is speaking from an official position, and therefore more likely to stress the positive story; respondents were generally less enthusiastic. For Darinov (2011 p.6) it is noticeable that state plant funds do not fulfill the state's mission to support and encourage farmers. For example, in the EU grant of 360 euros per 1 ha of agricultural land, or nearly 50% of the gross output of agriculture, whereas Kazakhstan has respectively 1.7-2 euro per 1 ha of arable land, or less than 2%. Additionally Darinov (2011 p.6) points out: *for farmers in Europe, there is no problem with the purchase of agricultural machinery, the use of advanced technologies, with the use of fertilizers and herbicides*. And on the contrary, Kazakhstani farmers receiving tiny subsidies have to literally survive by working on overage technology and applying less expensive conventional technologies.

Taking into account the importance of this policy in agriculture development and noting divergences between scholars' and respondents' opinions on the problems around loan distribution, it is clear that the policy of the state's funding allocation in agriculture is a major area for concern, requiring attention from experts, policy makers and official state organizations that are responsible for the state's funds distribution.

4.3.6 The role of stakeholders in agriculture policy creation and monitoring

As it was noted in Section 4.3.1, during the discussions many respondents' comments were particularly concentrated on the following issues: land reform, privatization of collective farms, state financial investments and subsidies mechanisms which were detailed in the previous paragraphs. At the same time, the issue about the role of stakeholders in the process of policy creation and implementation was also identified as a key issue. RP17 commented: *exactly those people who have practical experience and knowledge in agriculture, not only theoretical; who can make sufficient useful suggestions in the process of policies' elaboration for effective development of this sphere – their participation in the process will be very valuable and important*. RP12 noted that *policies have to be improved by strengthening the monitoring and evaluation from practitioners in agriculture. Due to the wide informational sources during the policy creation needed by interested groups and people examining new directions in agricultural policy, they can attempt to forecast the expected results*.

Analysing the role of stakeholders in the process of policy creation, *monitoring and evaluation* of implemented policies were identified as important and necessary points (RP12 and RP17). This suggests the need to increase the involvement of experienced agrarians, such as stakeholders from different levels of agriculture in the process of the creation, implementation and adaptation of agricultural policies and their further monitoring and evaluation. However, it seems from the interviews that stakeholders in many cases do not participate in the process of new policy creation and review, and respondents highlighted the following reasons: .

- Policy makers concerned in the process of creation and revision of new policies did not pay attention to the participation of agrarians and stakeholders from rural regions. They did not evaluate the importance of agrarians' involvement in the process of policy improvement. As a result, many policies were updated and developed several times. Moreover, the participation

of stakeholders and agrarians in the process of development of policies has advantages such as the use of agrarians' practical knowledge, experience and skills (RP12).

- Stakeholders were not proactive in their interests and readiness to participate in the process of new agricultural policy creation or updating (RP17).

Thus, it seems that both sides tended not to be proactive in joint cooperation. In this context, OECD (2013 p.115) experts offered to increase involvement and consultation of stakeholders in the review and monitoring policy-making process to balance the different groups' interests. Despite the requirement to involve NGO's in the policy-making process, most stakeholders were not active; did not appreciate the benefits of involvement in the process and reluctant to contribute to the costs of policy-making. On this issue there appears to be agreement between respondents and the literature sources: there is absence of *a more pro-active behavior on the part of stakeholders, who do not yet appreciate the benefits of collective action* (OECD, 2013) which can directly to influence the final stages of the policy documents' preparation, the process of review and monitoring policy-making process to balance the different groups' interests.

4.3.7 Summing up

Summing up the key issues which impact upon the development of agricultural policies and their potential contribution to economic development, the following points emerged from the data:

- The lack of studies about successful experience of farms and enterprises in Kazakhstani agriculture and the practice of growth from small-sized to large-scaled enterprise (RP12);
- The acute shortage of well-educated, experienced managers and qualified specialists of personnel in agricultural practice (RP02, RP03, RP13; Sagadiev 2006);
- The need to increase the monitoring and evaluation of current agricultural policies, among them: land reform, food security policy and other related to agriculture development (RP12, RP14; Ziyabekov 2006; OECD 2013);
- The need to increase the involvement of experienced agrarians as stakeholders in the process of policy creation, review, analysis and revision (RP12, RP17; OECD 2013);
- The need to revise and audit the current state loan policy for the efficient allocation of these budgetary resources, in accordance with their purpose; to make these processes more efficient and transparent for agrarians at all levels of agriculture (RP14, RP19, RP20; Khramkov 2014; Darinov 2011).

As suggested above, three distinct periods can be noted in the development of Kazakh agricultural policy, 1992-1997, 1998-2002, and 2002- present. The first phase saw the introduction of the controversial Land Reform, which in effect forced privatization of the land by dividing assets among agricultural workers. Respondents noted once again the lack of preparation on legal and financial issues, and although it was presumably intended that privatisation would involve individuals taking responsibility for their parcel of land, respondents noted that this did not always happen and in fact

agrarians did not necessarily understand what was involved – they had to accept and adapt the policy in line with their own level of understanding. It did not help, respondents felt, that agrarians who lacked business and management skills were left to develop these skills for themselves: state help was not forthcoming.

As noted above, while this was happening the exodus from rural areas to the towns was continuing. Respondents pointed out that agrarians had tended to have fairly large families, partly to support their farming activities, and simply now lacked the resources to support them, so had no choice but to abandon the land and move to the towns to seek employment. Sustainable development in rural areas, as respondents stressed, was impossible without a reasonable quality of life and in many cases after land reform this was lost. The move to a market economy in agriculture did not give sufficient consideration to the human factor, felt the respondents. Thus, examining the educational system in Kazakhstan on the basis of comparison before independence and after, fundamental changes have occurred. For instance, in the USSR during the Soviet regime, education was free and financially was supported by the state – it was a system based on complex mechanisms of cooperation between state and all different types of state enterprises. This meant people could study for free and, moreover, in comparison with urban dwellers, rural citizens had special privileges to study in educational and professional centers with obligations to return back to rural regions after graduation. Olesik (2008 p.31) adds that one of the problems of the Soviet economy, which decision-makers tried to solve using the rules of admission to universities, was to provide the necessary expertise to rural and remote regions of the USSR. Since the ever increasing number of university graduates and numerous decisions of the party and state bodies aimed at improving the distribution of graduates failed to achieve their goals, so, the admission rules were introduced which benefited people living in rural and remote areas. As a result, rural youth received benefits and privileges for university entrance. Moreover, RP13 adds: *earlier in the Soviet Union there was a principle of family succession, when an agrarian's son became agrarian and usually most rural youth were oriented to study agrarian disciplines.*

However, at the beginning of the 1990's the rules of admission to universities were simplified and democratized (Olesik 2008 p.45): *almost all of the benefits to all categories of applicants who enjoyed privileges were abolished, which played a greatly increased role in the formation of the competitive selection of the student population.*

Later, with the transfer to a new economic system since independence in the 1990's, free education was cancelled and, as a result, parents had to pay themselves. But rural citizens could not financially support their children, due to the absence of savings and due to their very low incomes in comparison with urban citizens. Devaluation and the introduction of a new cash equivalent (tenge) played its definite role on Kazakhstani citizens' further decision making. As a result, due to the low salary in countryside, poor social conditions and low standard of life in countryside, the young people in case of graduation from the educational centers and universities prefer to remain in the cities. *Moreover, most*

of the villagers - parents are reluctant for their children to return back to the village, and usually advise them to stay and work in the cities (RP15, TM).

After 1998, the government took steps to stabilize the agricultural situation, but respondents generally felt their actions amounted to ‘too little and too late’. Some steps were taken to improve funding in agriculture such as the creation of the state agency KazAgroFinance and the Agrarian Credit Corporation, but it was felt that there had still been more emphasis on other areas of the economy, and firms continued to be unprofitable. The human resource problems continued: graduates did not want to return to the land when they could get better-paid jobs in the cities, and respondents also pointed out that a similar situation prevailed in Russia, as since the breakup of the USSR education had to be paid for. Previously it had been free, with certain privileges for rural students. As respondent RP13 pointed out: *Farmers’ sons used to become farmers, but no longer.*

It was only early into the twenty-first century that Kazakh agricultural policy began to be promoted as part of a plan for economic diversification – respondents referred to the initiatives ‘Village of 2003-5’, the Agriculture and Food programme, and the Rural Development programme as examples of government policies aimed at re-energizing agriculture. Respondents felt that some of these initiatives had been partially successful, as some businesses prospered while other agrarians were motivated to set up their own businesses. But these had tended to be the ‘entrepreneurial types’, and ‘people who had money [already] bought the land’. In spite of land reform, there were many examples of the degradation of land.

As to the financial policies at this time, respondents criticized the process of loan distribution which, it seemed, had not become more transparent since the early years of independence. A number of new government funding projects were set up after 2003, but they were still very bureaucratic in operation, with rules which respondents described as opaque and not easily accessible. They referred to the fact that loan finance was often handed out at the wrong time – that is, in the autumn, when the agricultural year was drawing to a close, rather than in spring when it was just getting underway. Conditions were often impossible to meet – and although official commentators suggested that the situation was improving, respondents generally were unconvinced.

It was ironic that respondents believed more input into the development of agricultural policies was needed from agrarians, yet experts and specialists in the agriculture field were still hard to find. They could, it was felt, help significantly with evaluation of the success or otherwise of policies – but they needed to overcome their cynicism based on seeing so many policies come and go with mixed, less than positive results.

The chapter now moves from the general background of agricultural policy development in Kazakhstan, to the specific issue identified as key to the current thesis: that is, the role and management of information in the field of agriculture.

4.4. The role and management of information in agriculture

At this point in the interviews, after gaining insight into the respondents' views on the general situation in Kazakhstan with regard to the development of agricultural policies, the researcher had to move the respondents on to consider the role of AIM in this context. Interestingly, in many cases the respondents, especially those from the districts and rural regions, tried immediately to refuse to answer and even to stop the discussions. Those who did so stated that their business related neither to computers nor other new computer technologies. They highlighted their qualifications in the agricultural sphere but pointed out they had none in IM or ICT. Additionally, some of them noted the absence of computer skills and knowledge in the IM sphere in their business. This issue of the agrarians' embarrassment over their lack of skills (together with other factors that will be examined in the following sections), may shed further light on why IM in Kazakhstani agriculture has not assisted agricultural policy development. It was necessary to explain once again to the respondents that the researcher's main aim was to investigate the role of IM in the agricultural context. Most then agreed to discuss the issue, in the absence of any attempts by the researcher to test their computer skills or IT knowledge.

4.4.1 Classification and the role of information in agriculture

With regard to the types of information required in agriculture, Respondents RP02, RP05, RP11, RP13 were able to discuss the place and role of information in their businesses. In general, respondents suggest that any sphere of the economy exists in a specific environment and that any sector of the economy generates its own internal environment. RP05 stated: *in agriculture there are many different types of information. Here, [in agriculture] there are two main different types of information – external and internal, but both of them interrelated. External information is about the market, competitors, changes in agriculture and the state of international markets, customers, requirements, customers and competitors, changes in legislation. Internal information fully reflects the financial and economic situation of the agriculture sector. On the basis of installed standard procedures and programs usually the internal information can be processed and formalized.* RP04 added: *in many cases external information is usually the same for all units in agriculture and there are few differences, but internal information is different for each business unit, farm, and region.*

RP06 divided information into two other types – *variable* and *constant* information: *Constant information for agricultural units remains stable information for a long time (Standards, State requirements, Official State policies and regulations). Variable information refers to the information that periodically changes its content, for example, agriculture production program, plans of development, reports, job assignment, and the like.* RP04 highlighted that agricultural information

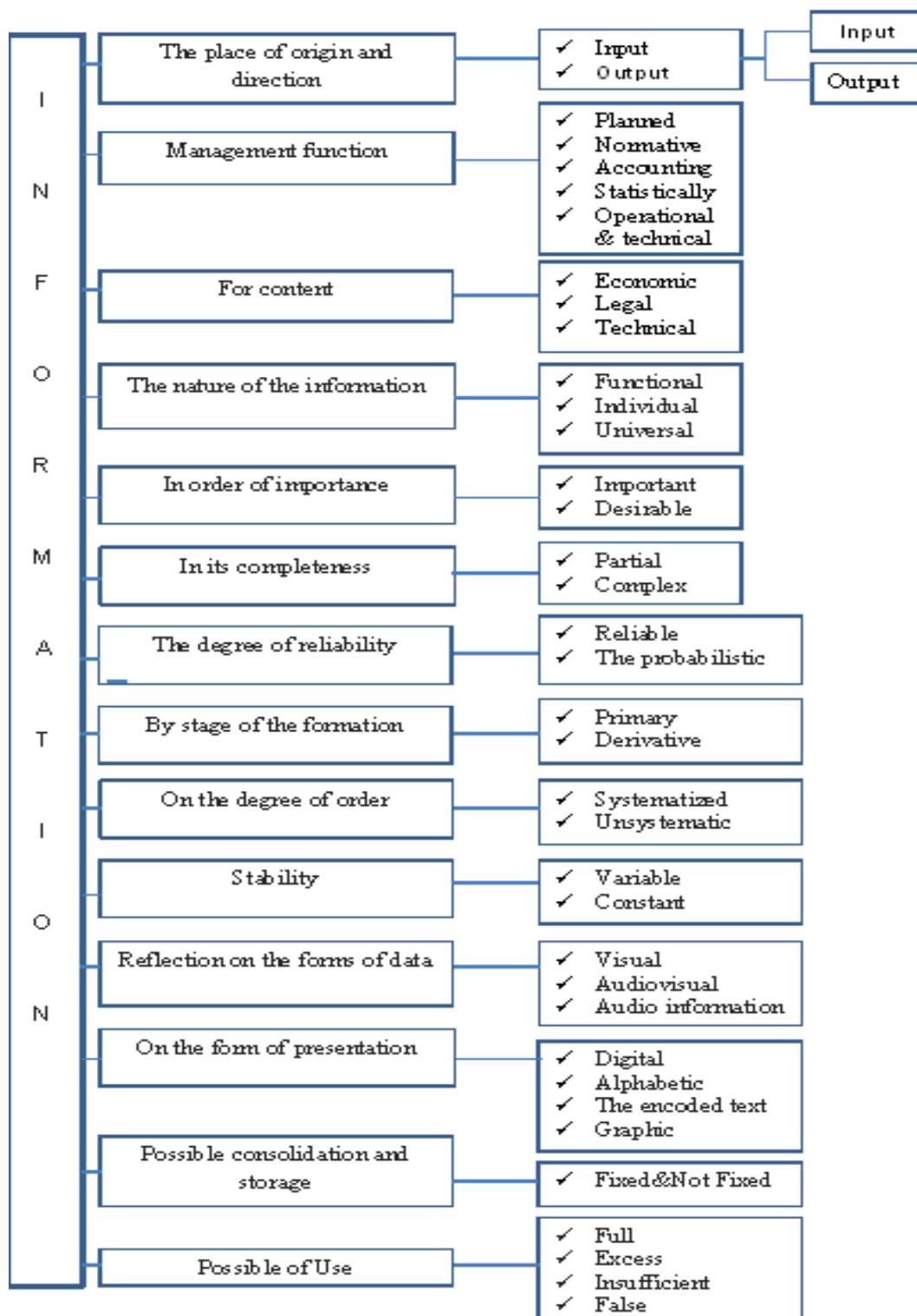
depends on its original nature and adds: *the information in agriculture is divided into **input and output**. Input information describes the state of the agricultural system, and the output is created on the basis of input/ incoming information and is intended to affect the managed objects, for example districts, farms, and enterprises. Both of these types, input and output data, can be either external or internal. RP13's view was that: information is divided into **analytical, predictive, background, evaluation, recommendation and others**.*

It was clear from these responses that agricultural information can be classified by the different nature of its formation and factors, for example: by the degree of order, by the stability of information (lifetime of information), by the possibility of consolidation and storage, by the direction of the distribution information and its movement, and so on. Commenting on the types of information in agriculture in another developing country, Russia, Kabanova (2001 p.19) states: *there are various reasons and signs of classification of information. From a management perspective, the source of information is an important basis for the classification of information.*

With regard to the current AIM in Kazakhstan, RP04 noted that there are gathered datasets and information flows for all regions, and there exists detailed information about agriculture productivity and production for all regions, districts, farms, livestock and fishing. All the details about agriculture land, together with databases about rural population and migration processes necessary to support agricultural strategy at state level, is kept on the internal servers of state organizations. For example, the Ministry of Agriculture, KazAgro, and KazAgroMarketing National Holding keep their internal information on servers and do not locate them on a publically accessible server. Databases are located on a server accessible only for agricultural officials from strategy levels of agriculture, through their permissions to automated systems and databases. Informational sources are not accessible for other agrarians from tactical and operational levels of agriculture. Furthermore, due to the lack of network connection between scattered rural areas, the process of collecting information and data from operational levels of agriculture is time consuming, and as a result the datasets cannot be updated timely and automatically (RP04). This respondent added: *on the basis of existing data and informational sources which were gathered from all regions of agriculture and located on our servers we can analyze the situation in agriculture and forecast, prepare reports, make decisions and so on. It is very useful for strategic management but, on the other hand, it is useless for agrarians from regions and districts due to the absence of access to these IM systems.*

Considering the classification of information by academic writers, such as Ponomareva and Kuzmin (1991), and Baranovski and Vaskin (1991), Vesnin (1996) classified information by the different features on the basis of their role in management. Taking into account their identification of information, Kabanova (2011) created the following classification of information presented in Figure 11.

Figure 11. Classification of Information. Created by Kabanova (2001)



This scheme demonstrates the classification of information in agriculture. The wide nature (functional, individual, technical) and the use of information with content in economic, legal and technical issues for planning, accounting, operating and technical managing agriculture sector of economy is apparent. The forms of information presentation (digital, alphabetic, encoded text, graphic) with possibility in use (full, excess, insufficient, false) in agriculture were all considered by Kabanova (2001).

The evidence of respondents on the nature of information can be summed up as: *informational sources and data, regardless of their types and place of saving, take an important place in agriculture development. In this context, Ekhlakhova (1997 p.238) suggests: it should be noted that in theory and practice of information management the central and most important place is taken by information.... 'Information' reflects the specific needs of management and serves as the basis of information management process, the preparation, adoption and implementation of solutions.*

Commenting on the role of information resources in agriculture, RP04 suggested: *information and informational sources have always existed, but they are too specific for different spheres of the economy and business, and earlier they were not considered as an economic category, although information has always been used by people to control and manage the business and whole industry. At the same time, Kabanova (2001 p.14-15) claims that among the other useful resources, in practice information is the kind of resource, which is not only being depleted but also accumulates quality development, at the same time contributes the most efficient and effective use of all other resources, their conservation, and in some cases, expands and creates new ones. According to this, information is one of the types of economic resource needed for decision-making, and to identify strategic, tactical and operational objectives of economic object. Korotkoe (1997 p.304) claims: there is a very popular point of view in which information is regarded as a critical factor in understanding of information management and its practical implementation, and IM considered only as a process of information flow, or as a process of transformation of the initial information to a command or the resulting information. Kabanova (2001 p.23) adds: The value of information is closely linked to its completeness, reliability and accuracy.*

RP01 agreed with Kabanova: *information in its different types - planned, regulatory, financial, statistical, operational and technical, is one of the types of economic resource which are generally used for decision-making processes, and for the creation of different strategies and development plans. And it accords to the management functions we consider. Information reflects the specific needs of management and serves as 'the basis of information management process, the preparation, adoption and implementation of solutions' (Ekhlakhova 1997 p.238).*

Discussions with respondents about the role and management of information in agriculture, in comparison with literature, produced the following key findings:

- *'Information' reflects the specific needs of management and serves as the basis of information management process, the preparation, adoption and implementation of solutions (RP04, Ekhlakhova 1997);*
- *A process of information flow and transformation of the initial information to a command or the resulting information is generally used for decision-making processes, and for the creation of different strategies and development plans (RP01, Korotkoe 1997, Kabanova 2001)*

The similarity between the opinions of respondents and scholars on the role of information is apparent: information plays an important role in AIM and has to be used for decision-making processes, for the creation of different strategies and development plans. From examination of the current role of AIM, the following section will consider respondents' views on the changes in AIM of Kazakhstan and its evolution since independence.

4.4.2 Information management in the agriculture of Kazakhstan and its evolution since 1991

When discussing the evolution of IM in Kazakh agriculture since independence, two phases of development can be noted: 1991- 2002 and 2003 to the present. In Section 4.3 the phases of agricultural policy development in Kazakhstan were characterized by OECD experts (2013, p.63) as a period of *deep transition and initial structural reforms* (1992-1997), then the next period *stabilization and agricultural debt restructuring* (1999-2002). Those periods were characterized by agrarians as a period of *significant reduction in the productive capacity of agricultural, and decrease in the quality of life in rural areas*.

So, taking into account a number of serious problems in agricultural productivity, such as poor rural social conditions, and the absence of qualified agrarians and managers in market relations for the period of 1992-2002, RP03 suggested there were *no changes in information management, nor any attempts to improve the role and management of information in agriculture*. But after 2003, the situation in agriculture started slowly to change because the government initiated several policies and programs to support the agricultural sector (RP03). Since 2003 *promoting agriculture as a part of economic diversification* (OECD 2013 p.89) the implementation of state programs was identified as the first positive trend in Kazakhstani agricultural development. RP01 claimed: *further development of civilization is closely linked to the global information update and the role and management of agricultural information with its intention to promote the development of the agriculture industry in Kazakhstan*.

Discussing the period since independence, RP03 suggested: *at the beginning of the 1990's during the chaos in agriculture, information and data were not gathered accurately, thus, the absence of some important information and data for that period makes some difficulties in the process of statistical analysis and scientific research*. RP03 added: *the role of IM in other spheres of economy which is based on computers and new technologies can be considered as relevant IM systems*. But with regard to IM in agricultural policy development, both RP13 and RP18 claimed: *the process of introduction of computers to support IM in agriculture of Kazakhstan started in 2003 from regional centers, but many districts, farms, small and medium-scaled enterprises were not covered by those projects*.

From the perspective of using information technologies, the intensity of the penetration of computers and technologies into the general economy of Kazakhstan in comparison with 1990s had sharply increased, but the computerization process in agriculture started later, more than 10 years or so after

independence. “Village of 2003-2005”, “Agricultural and Food Program for 2003-2005”, “State Program for Rural Development of the Republic of Kazakhstan for 2004-2010” became the first positive trends in development of the agriculture sector in Kazakhstan and the adoption of these programs for the period of 2003-2005 was a turning point in the development of agricultural policies (RP03, RP13);

- Additionally, the driving factor for that progress was the oil boom, which yielded significant income, part of which was aimed at providing state support (RP01, RP13);
- Another reason was the growing concern about the state’s lack of economic diversification (RP02, RP03).

Thus, from this perspective, it is evident that the situation in agriculture started to improve since 2003. But how did IMS become involved in this process? Discussing the development of new technologies in supporting AIM, RP05 noted: *agrarians from the tactical level of management (oblasts) can use computers and software applications in their daily work; most of them can work in Word and Excel for entering, analyzing data and other information.* As mentioned earlier, the ‘computer boom’ in Kazakhstani agriculture only started in 2003 and agriculture was one of the last sectors of the Kazakhstani economy to implement such technologies. *Unfortunately, we cannot talk about wholesale computerization at all levels of agriculture in Kazakhstan,* added RP05.

Taking into account the state’s main objective, that is, to expand the production of the agricultural sector in Kazakhstan, and considering this objective as a part of strategy to diversify the economy, RP04 claimed that to achieve the main goal of the agricultural economy it was *necessary to improve the management of land and water resources, to improve IM based on new technologies, to provide the agricultural sector with professional staff and specialists, to improve training in ICT for agriculture, to support scientific research and studies in the field of agricultural science, IM in agriculture.*

The next section therefore explores ways in which agricultural IM can support effective decision making.

4.4.3 The role of information management in decision-making processes

Discussing the current role of information management based on new technology in Kazakhstani agriculture, respondents highlighted its role in decision making processes. For example, RP09 suggested: *the use of computers is helpful in daily work, it makes many processes easy, from creating different types of reports to the decision making processes for agricultural strategic development.* At the same time, RP03 claimed: *the further development of the agricultural sector depends on the choice of development strategy and implementation of economic decision-making processes. But, at the beginning of 1990’s the lack of information in the agricultural economy created certain difficulties in the process of planning and decision-making in agriculture.*

Thus, taking into account the social-economic changes in rural regions during the transition to the new market-based economy system, it is evident that due to the lack of centralized IM systems and databases, many decisions in agriculture were implemented spontaneously without preparatory analysis (RP03). RP03 claimed: *it has to be understandable that any solutions must be based on the analysis of data and information resources in this industry, and on the experience of other countries' agriculture with similar social-economic development, climatic conditions, together with stakeholders' participation in the process of decision-making.*

It appears then that the lack of a centralized database with access for agrarians at all levels of agriculture management, together with the lack of an automated knowledge system in agriculture, the difficulties in cooperation and exchange information and data between managers from different oblasts, districts, and farms due to the absence of communications and network connection between them – all these issues had a negative impact on the process of decision-making in agricultural management, and as a result, spontaneous and often rash decisions were forced through by policy makers and managers (Kabanova 2001; Orazgalieva and Urazalinov 2011).

RP10 added: *the processes in current AIM were not fully centralized and automated because of several reasons: lack of computers and new technologies to support IM, shortage of expenses, and lack of specialists with skills in information technologies. Consequently, the collection, analysis, data processing and a large volume of information is time consuming and usually involves many people for these processes. In districts and farms, in many cases the hard copy of information is simply kept on shelves and folders. In oblasts the situation is a bit different: some information is saved in hard copies and some in an electronic version.*

From an academic view, Kabanova (2001 p.4) suggests: *in practice, the agriculture sphere in the implementation of economic management functions has been faced with the lack of external information as well as information on its financial and economic activities. Furthermore, the importance of the management of information resources and the use of their potential were not taken into account. As the result, untimely, ill-conceived and not well-grounded, inadequate and inefficient economic solutions were often accepted. In this context, one of the ways to improve the quality of economic decisions should be to improve their information systems.* According to Shanchenko (2006 p.9), *improvement of IM based on new IT can create conditions for effective management of agricultural resources for the production of fundamentally new products, agricultural production orientation on perspective effective demand, creating long-term stable relationships with other enterprises, harmonization of interests and cooperation of all stakeholders.*

Thus, during the interviews, the role of AIM based on new technology introduction was identified as a key point in quality decision-making processes. It meant that the opinions of respondents and scholars are fully aligned; furthermore, the information system was identified as a fundamental basis of decision-making processes. It was evident that the lack of information in agriculture meant *untimely*,

ill-conceived and not well-grounded, inadequate and inefficient economic situation solutions in agriculture since independence (Kabanova 2001 p.4). The development and selection of effective economic decisions in management has to be associated with the research process and analysis of reliable and relevant information. In this context, Kabanova (2001 p.4) claims: international and domestic experience demonstrates that improving the quality of governance depends on the quality of its informational systems. Information is subject to administrative work, a means of management decisions, without which the process of influencing the control subsystem for management and their interaction impossible.

It is clear that both respondents and academic experts agree that the poor quality of information management in Kazakhstan has had a negative impact on economic decision making, and the absence of efficient AIM is seen as a major problem in agricultural development. At the same time, there were a number of other problems which negatively influenced the development of the agricultural economy of Kazakhstan which will be detailed in the next section.

4.4.4 The problems in current agricultural information management

Examining the current AIM of Kazakhstan, RP10 highlighted the importance of automated IMS in agriculture: *the absence of centralized automated IMS in agriculture is due to the lack of computers and new technologies on each levels of agriculture including districts and rural territories, farms, and, at the same time, the absence of skills and knowledge in sphere of new IT of agrarians creates definite problems in the process of AIM development and improvement in Kazakhstan.*

RP05 added: *we have weak equipment in supporting agriculture production, lack of computers and other new technologies - all these hinder the implementation of software and hardware systems, we cannot create local, regional and district networks, databases, databanks and banks of knowledge.* In his opinion, agriculture needed a qualitative leap in solving the problems of production, distribution and management in agricultural sector by improving the current IM based on new technologies to support agricultural policy. RP05 believed that the unified centralized IMS based on computers and new technologies in other spheres of the economy, with the establishment of permissions for each category of specialists on different levels of management, has significantly improved IM processes with gathering, processing, analyzing, saving, and reporting information. The agricultural sector needs a similar IMS based on new ICT.

Highlighting the advantages of IM based on ICT in other spheres of the economy, RP05 pointed out: *the implementation of new technologies in the oil and gas industry, the banking system and other spheres of the economy with centralized IMS demonstrate the privileges of ICT-based IM system. And the implementation of ICT in agriculture, covering all levels of agriculture, has to be a very expensive project, but, on the other hand, it will be a reasonable decision with efficient and valuable results to influence further agriculture development (RP05).* RP08 highlighted significant changes: *previously,*

all administrative processes in agriculture were done manually without computers, but now many procedures have changed, and as a result, we can use computers and other ICT in processing information, making analysis and preparing reports. It makes our job easy.

Considering the situation in rural regions, RP08 added: *the rural producers need to obtain analytical and operational business information based on operational information services to support their business. Solutions to this problem are needed, such as extension services in each rural region; and service centers have to be equipped with computers, tele- and other communications equipment, office equipment and Internet access.* Agrarians from tactical management note that the implementation of this project is very time consuming and costly. RP13 commented: *regarding the disadvantages of information and data processing in current AIM, due to the absence of a unified network system between all districts and villages, farms, together with the lack of computers and network communication, consulting centers based on ICT with Internet access, we cannot say much about the efficiency of current IMS, it needs to be improved.*

On the basis of respondents' statements, the following are currently seen as problems in AIM:

- *agriculture is weakly equipped with computers and other new technologies (RP05);*
- *there is a lack of a centralized automated informational system in rural regions (RP10, RP13);*
- *there is a lack of ICT-based Consulting Service Centers (ICCs) in rural regions with access to global resources (RP08, RP13);*
- *there is a shortage of specialists with skills and knowledge in ICT (RP04).*

It seems that many small and medium-sized farms and districts still provide information in hard copy, paper versions. The situation is different in large agro-industrial complexes, regional centers, as they have more opportunities to work with partly automated IM systems, and have basic or intermediate computer skills. Respondents from an operational level of agriculture management added:

- *Reporting processes for the last 10 years have significantly improved: several districts in agriculture from manually data processing slowly moved to automated processes and now some agrarians can use local computers in their work, but most of them cannot because they do not have any computer skills and lack knowledge in new technologies. Probably this is one of the main reasons (RP15);*
- *The outdated machines and equipment, lack of funds for their purchase by farmers, lack of herbicides and pesticides to boost crop yields and quality of crops, does not give us the opportunity to think about new technology implementation to improve current IM. We have lots of high priority issues to solve now. In my opinion, it is not the right time to discuss ITC-*

based IM in agriculture, maybe later, after 10 years or more we can start to discuss this issue (RP20).

It is clear that the views of respondents from operational level management differed significantly from those of tactical and strategic management. Operational managers appeared to retain their current systems of information processing and were apparently less willing to change. Respondents were divided regarding this issue. Strategic managers RP16 and RP19 were focused on the improvement of current AIM, understanding the important and valuable role of IM in agriculture. RP16 commented: *if the new IM will be able to provide access to data of knowledge and information for agrarians from all levels of agriculture it can be helpful in their daily work. In my practice, I understood information provision is the basis of the management process and the quality of economic operation of agricultural object depends on information with its management. In fact, the role of IM is important and valuable in agriculture for further development of this sector of the economy.*

Regarding the processes of gathering information and data in the current AIM system, RP04 added: *analyzing the components of IM based on ICT, how it interacts in our business I can say that the absence of centralized access to unified automated system, the lack of computers in districts and farms, the absence of network connections between agrarians from regions, districts, farms, on the basis of new technologies, all these demonstrate the shortcomings of the existing AIM, especially in the process of data collection, analysis, reporting, forecasting and so on. Moreover, due to the lack of systematic analysis of information and data, managers cannot improve the decision-making processes.*

Due to the lack of studies on this issue in Kazakhstani agriculture, as mentioned earlier, the researcher consulted literature from another post-Soviet state, Russia. Discussing the latest implemented programs in Russian agriculture since 1991, Kabanova (2001) argues the inability to implement new technologies in agricultural sector to support IM due to existing financial, social and psychological problems: *it cannot be implemented in the practical activities of agricultural enterprises, because they are not based on the extensive use of computer technology and radical change on the basis of this information and communication processes is an issue for investigation.*

Kabanova adds that the dynamics of the market situation require a speeding up of the collection and processing of information and the development of its core solutions to complex problems that require multivariate calculations and huge investment of time to carry them out by hand. All these circumstances explain the relevance and determine the practical significance of the problem (Kabanova 2001 p.6). On the other hand, summarizing respondents' statements it is evident that information provision is the basis of the management process and, moreover, the quality of economic operation of any agricultural object depends on information provision and its management. For example: *the progress of the economy inevitably leads to specialization and diversification, increased financial and economic independence of enterprises with the activity of economic entities in the*

achievement of its own local purposes, to complicate economic relation, the emergence of complex systems. The consequence is an increase in the volume of information. Before the control system in such circumstances there is a problem of efficiently processing this information and of how to “keep” a control object in a given mode of operation (Kabanova, 2001 p.49). This author adds that the production of effective management is impossible without improving the management structure, optimizing of the information flow, and automation of labour management and economic IS based on computer technology.

Thus, during the discussions two negative opinions emerged about the improvement of AIM based on new technologies and introduction of computer systems: it could be expensive and it was not a priority. The points are summarized by the researcher as follows:

- *Instead of the task of improving current AIM it is necessary to solve other urgent problems, among them: to buy new tractors, equipment, or to improve the social conditions in rural regions, to solve the problems with specialists and managers for agriculture business (RP20);*
- *The task of improving current AIM based on new technologies can create additional difficulties with additional expenses, for example: to buy computers and programs, training people to work on computers; to hire new employees to involve them to project – to enter data, information for previous and current periods, to change existing procedures and so on (RP13, RP16).*

The following similarities emerged between respondents and the literature:

- *Market dynamic development requires acceleration of the collection and processing of huge flows of information (Kabanova, 2010; RP05);*
- *Introduction of new technologies can positively influence management processes in agriculture – it can make them more effective and transparent (Ekhlakhova, 1997; Ananyev and Ukhtinsky, 2013; RP15, RP19).*

Both groups referred to the underdevelopment of IM system in Kazakhstan and suggested that for IM to prosper the economy should also thrive, including agriculture that had faced so many problems since independence. However, they held different opinions on the possibility – or otherwise – of a vast extension of IM in agriculture. Several respondents claimed that AIM is not needed at present, since there was an absence of IT skilled personnel among agriculture specialists, as well as lack of computers to provide those specialists (RP20). Several more respondents reported that creation of the centralized IM system would cause spending on buying new computers, improving the database system and hiring new professionals (RP19). However, Kabanova (2001) and RP05 from Strategic Management believe that, despite IM implementation being an expensive project, creation of a centralized agriculture database will result in new employment opportunities. It will also allow IT specialists to control, monitor, archive and sort through the results of agricultural activities, volumes of production and other relevant to agriculture information. The literature also suggests that setting up

AIM can generate new ideas, solutions and fast responses to any matters connected to agricultural economy development.

4.4.5 Summing up

The following represent current problems in AIM:

- *agriculture is weakly equipped with computers and other new technologies (RP05);*
- *there is a lack of centralized automated informational system in rural regions (RP10, RP13);*
- *there is a lack of ICT-based Information and Consulting Centers (ICCs) in rural regions with access to global resources (RP08, RP13);*
- *there is a shortage of specialists with skills and knowledge in ICT (RP04).*

Views on strategies to solve the problems were offered:

- *Instead of the task of improving current AIM it is necessary to solve other urgent problems, such as purchase of new tractors, equipment, or to improve the social conditions in rural regions, to solve the problems with specialists and managers for agriculture business (RP20, OM);*
- *The task of improving current AIM based on new technologies can create additional difficulties with additional expenses, for example: buying computers and programs, training people to work on computers; hiring new employees to involve them to project – to enter data, information for previous and current times, to change the existing procedures and so on (RP13, RP16);*
- *Market dynamic development requires accelerating of the collection and processing of huge flows of information (Kabanova, 2010; RP05);*
- *Introduction of new technologies can positively influence management processes in agriculture – it can make them more effective and transparent (Ekhlakhova, 1997; Ananyev and Ukhtinsky, 2013; RP15, RP19).*

The issue about the improvement of IM in agriculture on the basis of the introduction of new technologies and a unified centralized IM to solve the complex problems that require ‘multivariate calculations and huge investment of time to carry them out by hand’ was mentioned by both respondents and scholars. Moreover, taking into account that information serves as one of the fundamental tools of management, Kabanova (2001) adds *theoretical studies in recent years have to be aimed at redefining the role of IM in agriculture.*

The researcher mentioned above that many respondents appeared nervous about commenting on information systems which involved IT issues, and almost embarrassed about their lack of knowledge about the topic. They eventually agreed to comment, but only after they stressed that their expertise was in farming, not computing. Those at strategic level were more positive, but the operational level respondents, who seemed to have less expertise or knowledge, were more nervous about commenting.

This may have simply been a case of unwillingness to comment on an area which was not their specialism, but there is a suggestion that they were embarrassed as they believed they should be more aware of the issue than they were. However, given the previous finding about lack of government or other training to bring agrarians up to speed with the latest technology, their lack of knowledge was unsurprising.

The more senior strategic respondents were clearly au fait with what Agricultural Information Management (AIM) should involve. They spoke of computerised data being available, but stressed there were few common servers and access to them was patchy. Lack of network connections between regions meant difficulties in collating information. Yes, respondents suggested, information had always been used to inform the agricultural sector, but it had been information that could be incomplete, unreliable, or inaccurate.

With regard to the specific situation in Kazakhstan, the low level of development of AIM appeared to reflect the more general problems in agriculture and agricultural policy development which were noted earlier. Computers had been promoted as part of the new government initiatives since 2003, initially from the regional centres discussed in detail at 4.4.2. But the same caveats applied: focus was on large farms and agribusinesses – SMEs tended not to benefit, and respondents noted that agriculture had been one of the last economic sectors to implement IT systems.

This did not mean that respondents were unaware of the value of IM in decision making – they referred to it frequently – but it should be remembered, as mentioned at 4.3.1 and 4.4.3, that one of the reasons policies were implemented without proper research and planning was that in the chaotic period of the breakup of the SU there was very little research data available to consider – huge amounts of data were completely destroyed. ‘Spontaneous and rash’ decisions were made mainly because of lack of relevant information, and respondents stressed frequently that the quality of information was a key factor in the quality of decision-making processes. In agriculture, changes were happening, but in a slow and costly fashion, respondents referring to ongoing problems such as the weakness of existing equipment and the lack of up to date computer hardware and software, which impacted on the possibility of creating large databases. ICT in rural regions was still at a basic level, or even lower. *The Energy sector and the Finance sector have both achieved this [development of IT systems]. Agriculture needs to catch up*, they suggested. But as they themselves as agrarians had difficulty in gaining the appropriate expertise, it was unsurprising that things were not happening rapidly.

It was perhaps surprising that so much information was still kept in hard, paper copy by the respondents. They suggested that this was the case in many SMEs, where farmers were still using these systems from decades earlier. At operational level, they suggested that it was ‘too soon’ to embark on computerised systems as there were too many other problems in agriculture that required more immediate attention – such as lack of equipment, machinery, agricultural chemicals, technical

and scientific expertise. Ironically, of course, improved IT networks can help with these problems, as suggested earlier. Failing to address the IT issue could result in a vicious circle of inaction.

In Russia, Kabanova (2001) has noted a similar reluctance for agrarians to take up IT systems after the breakup of the SU for financial, social and even psychological reasons (such as were demonstrated by the respondents here – perhaps the concern not to be thought ill-informed if you used the wrong terminology, for example). As in Kazakhstan, people were aware of the potential opportunities for new jobs generated by the IT sector, but were still reluctant to engage with it. Yet again, the Kazakh respondents were aware of the benefits but were in the main reluctant to become too involved, after so many previous government initiatives had been at best only partially successful. Yet respondents still argued that new technologies were needed, and needed the involvement of a range of stakeholders in the agricultural sector, especially from the more conservative operational level. They were aware that in the USSR period, agriculture, like other sectors of the economy, was based on a hierarchical command and control model in which paper-based statistics progressed from one level to the next, eventually ending up in Moscow – a highly centralized reporting system. It may be suggested that twenty years or so after independence, Kazakh agrarians were still attempting to move on from this culture. Political revolutions may be relatively rapid but cultural revolutions take much longer.

It was noted by several respondents that rural areas were still the ‘losers’ in this revolution: rural areas still faced many problems – not only in the inadequate network connectivity, but the low living standards, the shortage of younger people when many had migrated to the cities, and the lack of technical specialists, particularly in the IT field. If Russian electronic sales are relatively low, the volume is even lower in Kazakhstan, where the dispersed nature of the country might have suggested it as a useful strategy.

4.5 The respondents’ reactions to the process of IM system improvement within the Kazakh agricultural economy

It was evident that most of the works of scholarship and research in the area of development of IM in the agriculture of post-Soviet states were written in the 1960’s and 1970’s. Moreover, a lack of academic research exists regarding the case of Kazakhstan, a gap which the current research aims to fill. The introduction of new ICT to support Kazakhstani agricultural IM development began in the mid 1990’s, first at a strategic level and gradually, at the beginning of the 2000’s, on a tactical level. Consequently, the next part of the chapter will focus on the key stakeholders’ opinions of issues within the Kazakhstani agriculture economy since independence in 1991, and to discover their views on the actions required to update the current AIM on the basis of ICT introduction. Where appropriate, comparisons will be drawn with other sectors of the Kazakh economy.

4.5.1 The key stakeholders' concerns about AIM improvement based on ICT introduction

Nowadays the dynamic development of the market situation requires accelerating collection and processing of huge flows of information in all spheres of the economy and agriculture is no exception (Kabanova, 2001). Computers and other ICT-use make the processes of IM in the economy much easier and transparent (Reut, 2001). During the discussions, it was evident that a solution was needed to address complex problems that require different calculations requiring huge investment of time and other resources to carry them out manually. Clearly, it has to be reasonable to use new technologies to make the procedures in agriculture management simpler and IM more systematic. RP05 would appear to agree: *information and information flows have become a resource, which defined a new phase of agriculture economy development. Management of information and information flows on the basis of the introduction of new technologies is an important task for the agriculture industry to achieve their goals and objectives, to accelerate collection and processing of huge flows of data and information.* The economic IM of any economic subject, including agriculture, is based on information which includes five pieces of information consolidated. These are: legal and regulatory information, normative reference books, accounting and statistical reporting, nonsystematic data (Kabanova 2001 p.39). Additionally Danay (2002) states: *actually, ICT and computers were gradually implemented in many spheres of the economy in Kazakhstan since independence, and it demonstrates the positive influence on IM development...On the other hand, taking into account many advantages of ICT-based IM, this problem still does not appear to have been investigated in agriculture of Kazakhstan and other CIS countries as well.*

Considering agriculture as one of the priority spheres of Kazakhstan's economic development, and understanding the current situation in agriculture during the discussions and literature review, ICT introduction to support AIM was identified as an important issue for respondents. RP05 claims: *in particular, there are a number of industries, where the processes of the introduction of new technologies were initiated and successfully implemented since the 1990's. All these systems were established for information processing and datasets, to control, manage and store huge amounts of data. IM was improved on the basis of ICT introduction in the banking system, mining, oil and gas, manufacturing, energy and other sectors of economy of Kazakhstan, but agriculture lags far behind and needs to be improved.* Reut (2001 p.5) highlights *'the rapid and successful development of IM'* and adds: *IM has a special place in a modern market economy. Since the second half of the twentieth century, information has become an integral part of the factors of production, and there was a need to establish special institutions, ensuring the creation, storage, processing, selection and transmission of information. At the end of the century, the role of these institutions has increased dramatically due to structural changes in the economy, an increase in turnover of information and the emergence of new information technologies.*

In this context, RP09 added: *the introduction of new technologies in other spheres of economy in Kazakhstan influenced its development and made easy many processes - from creating different types*

of reports on the basis of centralized databases till the decision making processes on different levels of management. I can suggest the advantages of ICT-based IM to support agriculture policy to make processes more effective and transparent. However, RP05 had some doubts on the issue: given the variety of current problems which take place in agriculture sector, among them: financial problems, low living standard in countryside in comparison with urban, social tension, the problem with human resources for rural regions and others, the issue about improvement of IM with the introduction of new technologies can be considered as a non-priority direction for the current situation, but in comparison with other spheres of economy the importance of further development of ITC-based IM in agriculture is apparent and realistic.

Discussing the problems with the processing and managing of large volumes of information without computers, RP11 stated: *there were problems in the processing of huge amounts of information and data that we faced in our work until 2005, and only after the introduction of computers in regional centers did we understand the practical advantages of computers in IM. Now, reviewing the current situation in the agriculture of Kazakhstan I can say that many districts and farms still do not have computers and the processes are still non-automated. Furthermore, due to the lack of centralized IMS with obtaining information at all levels of agriculture, agrarians cannot cooperate and share data and information, their knowledge and experience on the basis of new technologies and computers in agriculture business.*

Examining the respondents' opinions on this issue in comparison with the literature, it was observed that stakeholders are concerned that *there are a variety of current problems which take place in the agriculture sector, such as financial problems, low living standards (RP05), and this issue (ICT-based AIM) can be considered as a non-priority direction but, at the same time, as RP09 mentioned before, it is evident that the advantages of ICT-based IM to support agriculture policy are to make processes more effective and transparent'. This finding reveals not only extensive consideration of this issue by the respondents, but may also highlight the importance of this issue to scientists in the areas both of agriculture and IT. At the same time, the process of ICT introduction, with network connections covering all rural regions to support and improve the agricultural policy of Kazakhstan, clearly requires the involvement of scientific experts, IT specialists and key stakeholders in Kazakh agriculture.*

4.5.2 Current information management in rural regions of Kazakhstan

Commenting on the differences between operational management in rural regions in comparison with strategic and tactical levels of agricultural management, RP09 claimed: *unfortunately, at the operational level of agriculture computers were not introduced, and as a result, processes are still not efficient because they are not automated. Moreover, it's clear there needs to be a change in agrarians' attitude to the necessity of improving current IM based on new technologies to support agricultural business including farms, districts, and agricultural units in rural regions.*

In districts, small and medium enterprises and farms still use the old methods of data gathering, collection and processing because in many cases agrarians cannot use computers. This is due both to the lack of automated workplaces, together with lack of knowledge in new technology and absence of skills to work on computers (RP09). RP19's views were somewhat different: *working in the agricultural economy and starting from the position of agronomist to becoming a manager for more than 35 years, I passed through all stages of [IT] development and can say important things regarding IM in agriculture. I know how and where all information is saved and how to find archived information for previous periods of time. In my opinion, it is easy to work with hard paper documents, for example, easy to find documents or reports for any periods of time, calculate or make analyses without computers.* Further, there is still an absence of equipment, mechanisms, and machines for increasing agricultural productivity in Kazakhstan: *the idea about improvement of IM based on the introduction of new technologies and a network covering all agriculture districts and rural areas is persuasive, but in my opinion it is a long-term task and a very expensive project.* Moreover, considering the urgent existing problems such as *low agricultural productivity, poor quality of life in countryside, a lack of equipment and machinery and so on*, RP19 suggested: *the introduction of new technologies in agriculture management can create other problems with additional financial expenses.* He highlighted the problems of ICT introduction and noted the additional expenses involved: *to buy computers and programs, to train agrarians to work on computers; to find IT specialists for supporting of new IM systems, to hire new employees for entering huge amounts of data and information for the previous periods, to change all existing procedures and so on.* The same problems were noted by RP13 and RP16. Additionally RP19 said: *I think the idea of improving current IM in agriculture is not so important now because we have other urgent priority problems and tasks to solve as quickly as possible. These are – to buy new tractors and equipment, to improve the social conditions in rural regions, and to increase productivity... it is not necessary to move all regions to centralized or unique system, because we can contact each other in meetings, and by phone. Also, it is not clear for me how the introduction of new technologies in agriculture can influence increased agricultural productivity.*

Thus, RP13, RP14, RP19 were generally not convinced by the idea of implementing new technologies at the operational level of agriculture to improve current AIM. At present, taking into account the problems in Kazakhstani agriculture such as low productivity, and lack of agrarians and professionals in management, their view was to avoid change just now and to continue to use the existing paper-based IM systems. Examining experts' research on this significant finding, it seems that many studies and academic papers were based on the role of IM in administrative-command economic systems which existed till the end of the 1980's – which was not based on ICT or computers. Comparing the agricultural sector with other spheres of the economy in Russia, Kabanova (2001) notes a strong lagging behind by the agricultural sector in the implementation of managed information:

Studies have shown that analytical work on farms is weakened, and the analysis of the results of its operations did not have a system. It is too simplistic in nature, and the frequency and quality of its execution do not meet the needs of managers in the summary of analytical information for developing the right economic decisions (Kabanova 2001 p.112)

On the other hand, Danay (2002 p.12) notes that due to the dynamic development of information technologies in Kazakhstan, today, free Internet access is virtually available to all categories of the population, and partly to agricultural producers. In order to facilitate access to information, such as the strategic development of agriculture, it is necessary to provide financial support programs and credit lines to increase agricultural productivity, and government programs aimed at supporting producers of agricultural commodities are necessary to improve an access to informational resources through the introduction of ICT in rural regions. Danay claims that the introduction of ICT in rural regions is a complex issue that clearly requires time for implementation and financing associated with the procurement of computers and equipment, training of specialists for IT support in regions, and training of farmers at the user level. RP13 adds: *given the sparseness of agriculture units and districts, the project will be costly enough, but at the same time, the introduction of computers and ICT will give the agricultural sector an opportunity to create a unified IMS to support agricultural policy.*

Considering the stakeholders' negative reaction (in some cases) to the introduction of new technologies at the operational level in supporting agricultural policy and on the basis of comparison this finding with literature, the researcher found attitudinal differences. Respondents RP13, RP14, and RP16 disagreed with the introduction of new technologies on the operational level of agricultural management due to: *the lack of automated workplaces, the lack of IT specialists to support the ICT-based IM systems, the lack of skilled agrarians to work on computers.* They summarized that it needs time and state financial funds. At the same time, they highlighted the problem of additional expense – *to buy equipment, to train IT specialists and agrarians.* The opposite opinion was held by respondents RP05, RP09 and many scholars: *[there is a need to] improve current IM based on new technologies to support agricultural business including the farms, districts, all agricultural units in rural regions; taking into account that analytical work on farms is weak, the analysis of the results of its operations does not have a system, is too simplistic, and the frequency and quality of its execution do not meet the needs of managers in the summary of analytical information for developing the right economic decisions (Kabanova 2001 p.113).*

Clearly considering the differences between the respondents' opinions and literature, the introduction of new technologies to support IM at the operational level of agriculture with covering all regions, districts, and farms requires more investigation by agrarians, agricultural economists and scientists in agriculture, and information technology experts.

4.5.3 Respondents' views about improvement of existing IM based on new technologies

In Section 1.4 the role of information management was identified by Shanchenko:

Information management performs strategic, operational and administrative tasks. Among the strategic objectives are - information infrastructure of organizations and information technology management. Operational and administrative tasks are narrower and of subordinate nature (Shanchenko 2006 p.6).

Shanchenko (2006 p.6) highlights IM as an independent direction in recent years and increasingly acquiring specifics. IM covers all aspects of management in the creation and use of information resources. Describing AIM in the past, RP04 noted: *all information used to be gathered in statistical centers. Districts reported to the oblast statistical centers where the statistical data were sorted and consolidated for reporting to the higher authorities: centrally reported from farms to districts, from districts to oblasts/regional centers, from oblasts to Republic Center of Statistics, then all Soviet Republics on the basis of centrally-planned and administrative system had to be reported to Moscow. It was the IM system which existed till the beginning of the 1990's. At the same time, during the socialist regime, there were Kazakhstan's Ministries of Agriculture and USSR's Ministry of Agriculture – all were centralized management reporting systems.*

Since 1991, with the changes in the political and economic systems of Kazakhstan after independence, the information management process in all spheres of the economy changed. Many respondents noted that over the first 20 years since independence the IM systems in many spheres of economy significantly improved, but the agriculture sector did not develop as fast. RP18 commented: *till the end of the 20th century the agricultural sector of Kazakhstan's economy did not have any possibilities and funds to buy computers and implement new information technologies to support the agriculture industry in Kazakhstan. Only a few spheres of economy, such as the banking system and resource companies with foreign investments, had financial assets with which to buy new computers, to implement new information and communication technologies in their business and then to train people.*

It has been noted that several respondents believe agrarians could not consider the role of computers in AIM, or even imagine the introduction of new technologies in agriculture because of the many other problems. Only at the beginning of the 2000's, when the situation in agriculture started slowly to recover, did this sector of Kazakhstan's economy slowly start to change the existing IM system. RP18 claimed: *2005 became the year of progress in the agriculture industry of Kazakhstan after many years of stagnation and backlog.*

Taking into account the main purpose of IM as *improving the efficiency of the company through the use of information systems (IS) and technology (IT)* (Shanchenko, 2006), since 2005 several new reforms and policies were established and implemented in Kazakh agriculture to improve the IM situation in rural regions. Computers and new technologies were introduced in regional centers and

agrarians were trained. But, in rural regions the situation frequently remained unchanged. In the interviews, agrarians from operational levels shared their willingness to consider new IT systems, but had concerns arising from the absence of knowledge and skills in computers and IT. For instance, RP16 noted: *the introduction of new technologies and computers to support agriculture policy at the operational level of management needs professionals in IT and also additional expenses to buy computers. In any case, if the funds which were allocated to increase agricultural productivity will be reallocated to the improvement of IT systems, this issue will immediately fall by the wayside because for agrarians the important task is to increase agricultural productivity, and to improve social conditions in rural regions. Other things we can put on the back burner.*

In spite of concerns, some agrarians from the operational level regarded the project of improvement of the current IM based on ICT as offering 'a promising future'. *Comparing the current reporting process in agriculture with the beginning of the 1990's*, said RP19, *it still needs to be improved... at present, for example, some agrarians from districts can use local computers and send their reports in electronic version to oblasts. We can see the gradual introduction of new technologies in rural regions. But other districts still cannot use any computers, neither through local nor network connections.*

In sum, respondents from strategic and tactical levels of management were keen to improve the current AIM for support of agricultural policy whereas some operational level agrarians were not completely convinced. For instance, strategic and tactical management agrarians identified AIM as a unified system including all agriculture divisions and subdivisions, for establishing a centralized informational management system. RP20 notes: *discussing agrarians' reaction to improvement of AIM, I can say that many agrarians from operational level think this means the procedure of reporting, but in my opinion improved AIM has to include not only reporting processes, but also has to collect and retain information about innovations and knowledge in agriculture, statistical reports and data. It will give an opportunity for agrarians to cooperate with access to new IMS.* RP15 added: *current IM needs to be improved. In comparison with other sectors of economy, IM in agriculture is less developed. The IM has to cover all levels of agriculture; the system has to be unified for whole agricultural sector and support the agrarians in their daily work. There is no integrated system with a complex approach to solve the problematic issues in current situation on the basis of the available data.*

Respondents' views of existing AIM noted that currently, IM in agriculture still is non-automated and the agricultural industry is lagging behind in the use of new technology in comparison with other industries, for several reasons, as mentioned by RP12: *the age level of the villagers, the poor education in rural areas, the lack of financial resources to purchase equipment and computers, the reluctance of graduates to return to their home villages and work in the agricultural sector because of low incomes, the lack of specialists in IT, all these points influence the slow development of IM in Kazakh agriculture in comparison with other spheres of the economy.* Respondents understood that the use of new technologies in various sectors of economy could facilitate agrarians' tasks. RP16, for

example: *lots of grants and loan projects which were initiated by government are usually presented on Internet sources. So, due to the lack of connection through the Internet, agrarians cannot remotely participate in those projects to apply for grants... So, I cannot say that agrarians have an effective current IM system and moreover, it needs to be improved. And, from RP11: the idea of the implementation network of connection and unified integral information system to support agriculture policy in Kazakhstan is good, but I guess it is difficult to realize in the near future.*

It is evident that the potential of IM in the Kazakhstani economy is still not used to the full in spite of the rapid development of information technologies and e-commerce in the world economy. RP05 noted: *at present, the share of electronic sales in agriculture in total turnover in Russia stands at 1.6% and only 0.25% in Kazakhstan... the absence of unified approaches for implementation of agriculture policy at all levels of agriculture, the absence of network communication between all divisions and subdivisions in agriculture system create many difficulties in reporting, managing, coordinating and cooperating at all levels of agriculture management.*

There was, then, general agreement that current AIM requires improvement. On the other hand, agrarians from operational level were currently less prepared to respond to these changes, possibly because they were more aware of other pressing challenges at grassroots level.

At the beginning of the 1990's there were no significant reasons to discuss potential improvement of IM based on new technologies, although the state did make several attempts to change and improve the situation after breaking from the soviet IM system. With regard to Russia:

The State informational system was almost completely destroyed, and the rural producers found themselves in an information vacuum. The need to solve this problem led the Ministry of Agriculture of Russia and the region to look for new forms of interaction between the participants in the reproduction process in the agricultural sector
(Kabanova, 2001 p.51)

Kabanova (2001) studied the practice of developed countries to find suitable and effective mechanisms and models for developing AIM and identified the need to improve AIM as one of *the most important directions in agricultural economic development*. Shanchenko (2006 p.9) supports the need: *from the quality of the resource and its efficient use largely depends the effectiveness and viability of enterprises and therein lies the importance of the role of information management in modern economic conditions*. Not least, Borisov (2011 p.8) suggests: *agriculture in the information society requires continuous production of information from external sources (via the external Internet) at anytime from anywhere. For example, continuously updated weather forecasts may be available to farmers throughout the day... modern IT enables farmers to receive tips, advice, regardless of the time and place of their location. Farmers can describe their problems through common speech, illustrate with photos or videos. Time and location of a farmer has to be determined automatically. Also via e-*

mail a farmer can send his materials to supported agricultural experts and get an answer after a while, or farmer can discuss his problem in on-line regime directly over the Internet.

It is clear that the increase in the volume of information and data in agriculture for gathering, processing, analysis, and transmission, all require the use of new information technologies in AIM. Consequently, the state authorities decided to follow Russia's example and create Informational and Consultative Centers (ICC) in Kazakhstan to support agriculture policy and agrarians in their business.

4.5.4 Information and Consultative Centres (ICCs) in agriculture

At the beginning of the 2000's the governments of Kazakhstan and Russia created a system of Informational and Consultative Centres (ICCs) in oblasts/ regional centres and districts. This decision was taken urgently to support agrarians and farmers with information and consultation due to the lack of internet and network connections in rural regions. It was an urgent state solution to keep agrarians informed of the implementation of new regulations and policies, credit loans and other financial support programs. The main task of ICCs was formulated as: to inform producers about the changes in the various fields of economy, science, public policy, providing them with assistance in the conduct of industrial activity. This creates a structure within the system should not make decisions for producers and are required to operate on their behalf (Lapin, 2006 p.5). As a result, ICCs played a significant role in providing information and consultancy to support farmers and villagers in their business. On the other hand, these centers had several disadvantages mentioned by respondent RP17: *Informational and Consultative Centers were arranged in regional centers first and then in districts, but due to the lack of Internet connection in our district the consultants could not support agrarians and farmers with information in a timely fashion, especially about the agriculture market, different international projects with foreign investments, financial credits and loans to improve our business and increase productivity.* RP19 added: *later, in the district offices these centers provided agrarians with food information and advice service led by marketing experts and price monitoring. At the same time, villagers need consultancy advice on legal and financial issues especially with business plans and applying for state loans and credits. But due to the absence of significant experts such as legal advisors, economists, and finance specialists, it was impossible to provide appropriate consultancy advice for agrarians.* RP14 claimed: *ICCs were helpful in providing information and clarification of new policies in agriculture. Later, these centers began to provide general information on loans and subsidies state programs for agrarians, but could not give us all the details. As a result, agrarians could not understand how to prepare all the required documents to apply for these state programs. Furthermore, many agrarians with experience and knowledge in agriculture were eager to participate in the development of policies for the agricultural sector of Kazakhstan, not only to accept and use them. But ICCs could not help agrarians with these tasks.* Thus, as mentioned above, due to the absence of a centralized IM system and access to Internet sources in rural regions of Kazakhstan to support agricultural policy, ICCs have played a significant role in several directions, helping villagers in their business and supporting agricultural producers with general advice. The organizational

structure of these ICCs was created to reflect the structure of rural producers on three levels: farms, agriculture enterprises – districts – oblasts/ regional centers, and these Centers were funded by regional and local budgets (RP01). Additionally, RP05 said: *taking into account the existing problems in AIM the decision of establishment of ICC in rural regions definitely played an important role, but did not solve many existing problems of villagers and agricultural producers of Kazakhstan.*

From respondents' opinions on the creation of ICCs, it seems that they partially supported agrarians in their business. Sarsenbiyeva (2013 p.9) states that *the objectives of Centers were identified by state policy makers and covered the following directions: the formation of informational-consulting database for agricultural producers; processors of agricultural products and their partners in agribusiness; promoting innovations and investment activities of agricultural enterprises and assistance on planning of economic activities; business plan development; business restructuring of agricultural organizations; center of crisis management; dissemination of new knowledge, skills, development of advanced technologies and new techniques; the marketing activities for development of the rural regions.*

Kabanova (2001 p.52) notes: *the establishment of ICCs [in Russia] had an impact on changing the organizational and management structure of the agricultural administration. Thus, under the Ministry of Agriculture were established departments of external and regional ties, price monitoring, marketing, enhanced communications service in terms of equipment. The responsibilities of the heads of departments included the collection of information on directions and passing it on to the appropriate service.*

Kabanova identified the main responsibility of ICCs as *to improve the efficiency and sustainability of the agricultural enterprises of all forms of ownership in a market economy by providing information and assistance to rural producers to make informed economic decisions* (Kabanova, 2001 p.51-52)

Concerning the role and practice of ICCs in Kazakhstan, Sarsenbiyeva (2013 p.19) states: *interest in the formation and further development of information and consultancy services in the present conditions of Kazakhstan's economy is growing at all levels of the agro-industrial complex. In the effective operation of ICCs the following should be involved, first, agricultural producers, the effectiveness of which depends directly on the rapid and complete the necessary information, and secondly, the management of agriculture, because the service is the most effective form of agrarian policy implementation by introduction of science, technology and best practices in the agricultural sector.*

Respondents seemed to agree that due to the absence of experts such as legal advisors, economists, and finance specialists, it was impossible for ICCs to provide appropriate consultancy advice for agrarians (RP19). For villagers the problems with the preparation of documents required to apply for different international projects with foreign investments, state financial credits, and participation in the development of agricultural policies were identified by key stakeholders as priority issues in their

agriculture businesses (RP14). In practice, this suggests the necessity of solving existing problems in established ICCs and to improve the quality of consultancy, for providing agrarians with timely and detailed information. Considering Sarsenbiyeva's view (2013 p.19) that there is *interest in the formation and further development of information and consultancy services* this suggests that agricultural producers and managers would be interested in the effective operation of ICCs services. This finding shows not only extensive consideration of the process of information provided by ICCs, but also pinpoints the significance to the technology providers of improving the existing ICCs on the basis of implementation of ICT. Taking into account the increase of investments and loans to support agriculture in Kazakhstan for the last years, most of respondents shared their opinion of the need to improve the current AIM on the basis of introduction of new technology and internet connections.

4.5.5 Summing up

Analyzing the agrarians' responses it may be suggested that since independence the IM system in agriculture has been developing step by step along with new technologies. However, the current AIM of Kazakhstan still needs to be improved on the basis of the implementation of new technologies, due to the rapid growth and volume of information and the exchange of data between different levels of agricultural management.

In Russia, in an attempt to bring rural businesses up to speed, the system of setting up ICCs (Informational and Consultative Centers) was considered to be helpful, and one that was also developed in Kazakhstan, initially to keep agrarians informed of the progress of the government's various agricultural policies. Kazakhstan has followed the example of Russia and introduced ICCs to assist agrarians. Respondents suggested ICCs 'partially' supported agrarians, but were hindered by lack of internet connections in some areas, and possibly more important, an absence of staff who could provide specialist consultancy advice – it even seemed that in some cases the agrarians were wanting to forge ahead but the advisers did not know much more than the agrarians they were supposed to be assisting. Respondent RP05 highlighted the importance of ICT-based analytical AIM which can influence strategy development and the right economic decisions for the further development of Kazakhstani agriculture.

Discussing the role of ICCs it was noted that consultants should help consumers to information and consulting services to organize production properly, to advise on the reforms and innovations, to provide quality services for the effective management of agriculture economy. In practice, the respondents' agreement on these issues could indicate the possibility of improved decision making and management processes, in cooperation between agrarians from different levels of agriculture with the aim of improving current AIM at the operational level of agriculture, creating ICT-based centralized informational system covering rural regions, and improving the services of existing ICCs in rural regions. But arguably more government support is required.

4.6 Respondents' views on a framework to improve current IMS

Respondents' proposals for a framework of action to improve current AIM on the basis of the introduction of new technologies to support agricultural policy will be discussed in the following sections.

4.6.1 Current IM improvement for influencing decision making processes in agriculture

Regarding the role of IM based on new technologies and innovations in different spheres of economy, the respondents noticed advantages in the development of those economic sectors and considered agriculture as a potential sector for further introduction of new technologies to improve current AIM. However, respondents were also concerned about difficulties in the process of ICT implementation, such as:

- shortage of specialists in IT-sphere to support network communication in rural regions,
- shortage of agrarians with computer skills and knowledge in IT,
- scattered and dispersed nature of rural regions, and
- limited financial resources.

With regard to financial aid, respondents highlighted the need for significant investment to support the technical aspects of this project. The respondents suggested covering all regions by one centralized network system including all districts, farms, agricultural units, enterprises. The project was considered by policy makers as *a very ambitious, strategic project, and challenging from a technical point of view as well as financial*. RP11: *regarding the role of AIM for developed countries and its successful implementation in other spheres of economy of Kazakhstan, we have to agree with the importance and urgency of new technologies' introduction to support agriculture industry in Kazakhstan. This project needs detailed preplanning of all processes on technical, financial and other issues.*

RP05 noticed that information management processes on operational levels of agriculture were still not automated. Given that information is a subject of managerial work for decision making, it is evident that information serves the fundamental tasks of management. For improvement of the quality of information in agricultural management RP05 suggested: *taking into account the importance of the role of information in agricultural management and decision making processes, in my opinion, it is necessary to improve the current AIM on the basis of new technologies and innovation. A new automated IM system will make the management and controlling processes to support agricultural policy much easier and transparent.*

RP04 claimed: *the introduction of a network in rural regions to support agriculture needs detailed investigations on technical issues due to the dispersion of the territories, and the remoteness of agro farms. For understanding the possibilities of implementing new technologies and innovations for*

covering all regions, furthermore, to avoid the problems in further practice, it will be necessary to study the experience of other developed countries and the experience of other spheres of the economy in Kazakhstan to find an effective decision on this issue.

When this finding is compared with Russian literature (due to the absence of research in Kazakhstan), Kabanova (2001) states: *in current socio-economic conditions, rural producers must take a huge amount of economic decisions independently... In practice, in the process of implementation of economic management functions it is necessary to note the lack of daily operational information, and information on its financial and economic activities, which does not consider the importance of IM and the use of its potential. As a result, untimely, ill-conceived and inadequate economic solutions occur* (Kabanova 2001 p.5). She adds: *one of the areas to improve the quality of economic decisions should be the issue of improvement of their informational management supports with the introduction of new technologies.*

Considering how AIM improvement could support agricultural managers, Kabanova's view is that: *managers from rural regions have an urgent need for all kinds of information to carry out their management responsibilities: market of agricultural products, prices, supply, customers, economic, financial, taxation and auditing standards of labor costs and many other items, and highlights: the lack of operational information in rural regions creates for agrarians certain difficulties in the process of planning, managing and decision making.* The main area to enable significant improvement of economic decisions was identified as *improved IM [which] has to be based on the use of new information technologies* (Kabanova, 2001 p.146). RP04 stated: *introduction of ICT to improve the current AIM will give for agrarians an opportunity for close cooperation and timely solving of existing problems on the basis of operational information and data. They will also be able to create a strategy for agriculture development in all their directions, to support agricultural policy and regulations. The advantages of ICT-based IMS in the decision making process are demonstrated in other spheres of the economy in Kazakhstan* (RP04).

At the same time, considering the problems involved in the issue of existing IMS based on ICT, Parshev (2006 p.21) reviews the advantages of Kazakhstan joining the World Trade Organization (WTO), where each participant of agricultural production already has free access to the information and communication infrastructure, and whereby the level of agricultural development in countries with developed market economies appears significantly higher than in Kazakhstan. *And if not in the short term to ensure a minimum level of information and communication infrastructure, the countries that have accession to the WTO, Kazakhstan would be almost totally dependent on the production of agricultural products from Western countries, as agricultural production in our country is certainly not competitive with the West* (Parshev, 2006 p.21). This highlights once more the non-readiness of Kazakhstani agrarians to work in conditions of developed information and communication infrastructure in the case of admission to the WTO.

4.6.2 The role of knowledge management in rural agricultural IM

Respondents considered that the practical and scientific-based experience of agrarians and farmers, together with the theoretical knowledge of experts and policy makers all needed to combine to ensure the development of rural economy. RP06 proposed a framework which is related to the transferring of knowledge base management through the ICT-based IMS: *modern research publications, for example, about the different methods of protection of the lands from diversification and their efficient use, approaches to improve the current irrigation system in Kazakhstan with effective water use in agriculture, mechanisms to increase agricultural productivity on the basis of new innovations in agricultural science, experience of agrarians from different agriculture units, and the development of mechanisms of crop storage: all these approaches are inaccessible for agrarians at operational levels of agriculture management due to the lack of modern scientific publications, magazines, books and Internet sources in districts and rural regions.*

Thus, the need to introduce the new technologies to support agriculture informational sources in rural regions for transferring knowledge and best practice was identified as an important finding (RP13). RP10 agreed: *improved IM based on ICT will give an opportunity for agrarians to cooperate with each other through the network connection, to share knowledge and experience on the basis of access to informational sources, to find suitable and useful information for developing agricultural business and making the right decisions to improve agriculture on the basis of the best practices in agriculture.*

Due to the absence of research on Kazakhstan, Russian writers were consulted:

Informational - consulting and knowledge management to ensure the development of rural economy, including the establishment of centers for providing advisory services in various fields and areas, informatization of rural regions, support of initiative centers, dissemination of scientific and technical knowledge and technological innovation: all these new approaches are now becoming as topical and urgent. First steps in this direction have already been made (Naidenov and Dolgonosov, 2005 p.5)

Both respondents and writers suggest that the first step in this direction was the establishment of ICCs (see 4.5.4) for providing information and consultancy for agrarians in rural regions, in spite of the deficiencies of these centres. Clearly a new IM system can play a significant and important role in agricultural development. Agrarians from rural regions who have very limited access to internet sources and knowledge base system (electronic books, magazines, researches, publications), and moreover, no access to the best practice of agrarians from other countries or other regions of Kazakhstan could have an opportunity for distance learning, self-study and self-education.

4.6.3 Implementation of network connectivity and ICT-based technology infrastructure to support the agricultural policy of Kazakhstan

Respondents highlighted the possibilities of network connectivity and technology infrastructure implementation based on new technologies in rural regions and proposed frameworks to improve the current AIM on the basis of implementation new technology. RP05 referred to: *currently, the lack of network connectivity and technology infrastructure in rural regions of Kazakhstan is the result of certain difficulties, such as: the low-density and scattered nature of regions, the problem with Government financial support of ICT introduction, and the absence of IT specialists in rural regions to initiate and support this project. At the same time, improvement of current AIM based on the introduction of new technologies and network communication at operational level of management is an important task for agrarians and policy makers in management and decision-making processes.*

At the same time, taking into account the implementation of innovative projects in Kazakhstan with the goal of introducing new ICT in education and healthcare systems in rural regions, it is noticeable that in practice many projects are progressing slowly, with difficulty, and sometimes unsuccessfully. The case of ICT introduction in rural regions was initiated by government for many sectors of the economy, but the agricultural sector was not considered. And also, due to the absence of network connectivity in rural regions and qualified specialists to support these innovative projects, it seems that most of those projects were not completed. RP03 explained: *the project of network communication and new technology implementation to support AIM has to be sufficiently effective, but it has tremendous difficulties and barriers to its realization, in particular, on the part of technical connectivity and technology infrastructure in rural regions with its support services. The government's support is another important issue for detailed investigation.* RP05 highlighted the necessity of analyzing the complexities of network connectivity and technology infrastructure introduction for the successful realization of projects in rural regions. On this note, Economist Intelligence Unit (EIU) judges Asian and Pacific countries in comparison with Kazakhstan:

High scores to Hong Kong, China; Singapore; the Republic of Korea; Japan; and Australia for connectivity and technology infrastructure (Table 10). In contrast, Kazakhstan, Indonesia, Pakistan and Viet Nam have modest standings. Even China and India, which serve as major global nodes in the ICT economy and are among its largest and fastest-growing consumers and producers of technology, have low rankings for connectivity and technology infrastructure (EIU, 2006 p.58).

Table 10: Connectivity and technology infrastructure score for selected Asian and Pacific countries and areas.

| | Connectivity and technology infrastructure |
|-----------------------------|---|
| Hong Kong, China | 8.10 |
| Singapore | 7.65 |
| Republic of Korea | 7.20 |
| Japan | 6.90 |
| Australia | 6.75 |
| Taiwan Province of China | 6.70 |
| New Zealand | 6.10 |
| Malaysia | 4.10 |
| Thailand | 3.05 |
| China | 2.50 |
| Iran (Islamic Republic of) | 2.35 |
| Kazakhstan | 1.70 |
| India, Indonesia, Sri Lanka | 1.40 |
| Pakistan, Viet Nam | 1.25 |

Source: *The Economist Intelligence Unit, The 2005 e-readiness rankings: A white paper from the Economist Intelligence Unit (London, EIU, 2005).*

Further, examining the role of telecommunications companies in providing ICT infrastructure in developing countries including the Kazakhstani case for rural areas, the Economist Intelligence Unit (EIU) explained:

Until recently, public telecommunications companies had the dominant role in building and maintaining core network infrastructure and providing universal access. However, privatization, liberalization and policies aimed at increasing competition in this strategic sector have increased the role of the private sector in providing ICT infrastructure. They have also hastened the adoption by many developing countries of new networking and telecommunications technologies, helped by their rapidly declining costs (EIU, 2006 p.57).

One of the main reasons why telecommunications companies in Kazakhstan hesitate to provide infrastructure for rural regions is the dispersion and low-density of rural regions and direct state investments (RP02, SM). In this context, EIU experts add:

private telecommunications companies hesitate to provide infrastructure for rural and low-density areas and Governments still have a critical role to play in direct investment, creating an enabling environment or such interventions as setting up universal access funds by which companies can help Governments pay for community networks and public access points (EIU, 2006 p.57).

Both respondents and writers agree that providing informational infrastructure for rural regions depends on different factors: the critical role of the Kazakhstan Government on the issue of direct investment into this project, the creation of an enabling environment for setting up universal access funds by which companies can help Government pay for community networks and public access points (EIU, 2006), and at the same time, low-population densities and scattered nature of rural territories.

4.6.4 Proposals for a framework for effective ICT-based information management

Discussing the role of ICT-based IM in supporting agricultural policy of Kazakhstan, RP03 pointed out: *IM in agriculture performs all agricultural strategic, tactical and operational tasks. Among the strategic objectives include the creation of IM infrastructure and IT management.* RP13 added: *improved IM has to obtain detailed and timely updated datasets and internal information from all agricultural districts, regional centers, agricultural entities, etc. Moreover, ICT-based AIM system has to contain detailed information about each agricultural unit in Kazakhstan: names of agricultural units, types of property, cadastral/identification numbers, the names of owners, territories, population and so on.* Further, RP20 believed that *ICT-based AIM has to contain the information about arable land in hectares, the cultivated areas under certain crops, the size of degraded areas; land for animal enclosures; the number of pieces of equipment/mechanisms and technics, types of equipment operated in farms; the use of pesticides and herbicides, fertilizers; fuels and lubricants in a variety of seasonal and non-seasonal periods; the number of people involved in farm work, including personal information for each employee.* RP13 additionally proposed: *to create a centralized database in Kazakhstan for the agricultural sector with detailed informational sources about all agricultural subjects, suppliers and consumers, agricultural credit rating, dynamics of sales, productivity and profitability, agricultural product quality and purchases.*

Suggestions like this involve the creation of databases covering of all the above mentioned detailed datasets to a unique AIM system. RP11 points out: *IM in the agricultural economy is increasingly based on unlimited opportunities of ICT and Internet connection;* at the same time, he draws attention to the current situation in rural regions of Kazakhstan which relates to the lack of new technology, network and internet connectivity: *the changes in current AIM with introduction of new technology, network and internet communication will improve the existing IM, make it more transparent and systematic, and at the same time help agricultural business become more competitive and trade marketable.*

With regard to the situation at the operational level of Kazakhstani agriculture, RP07 supposed: *IM has to contain all detailed statistical information and reports for the previous periods of time since 1991. All datasets have to be gathered to a unique informational database with different access and certain permissions for agrarians at each levels of agriculture management including agrarians from operational levels. Also, it is necessary to standardize and automate all process in new improved AIM*

starting from data collection, analysis, reporting, providing rational economic decision-making in agricultural management.

RP18 drew attention to the role of an irrigation system in supporting agriculture and proposes the framework to improve current AIM in this important direction: *the new improved ICT-based IM has to contain information about the irrigation system (or water use system) with its distribution in the agriculture sector, including the operational levels of agriculture, information about the main and secondary channels; information about all irrigation system in Kazakhstan: rivers, lakes, canals, artificial reservoirs; and schedule of their capital and current repair.*

Concerning the role of investments, subsidies and financial aid projects for agrarians and the lack of Internet access for these types of information for rural citizens, RP21 claimed that farmers and agrarians need this type of information with remote access: *network connection and Internet access can provide remote access for agrarians and farmers to information about agricultural policy directions including state financial projects, loans and subsidies for rural regions. Only in case of introduction of network and Internet connection in countryside can the agrarians participate in different projects remotely - to gather required documents, send them for the Commission's consideration, and find the results of competitions with remote access to the information system. Thus, network communication with access to Internet sources can make all procedures for agrarians on operational level more understandable, simple and accessible.*

As technology, the Internet provides the additional advantage of significantly reducing the barriers to accessing and processing information for farmers, regardless of where the farm is and where the information is used. On the other hand, the role of Internet connection in agriculture of developed countries was described in the following statement highlighting its advantages: *moreover, due to significantly lower costs for Internet connectivity and services for the collection of information, commercial benefits from its use can give farmers new incentives for the development of business cooperation, including the ability to buy resources and sell manufactured products* (NY City, 2013).

In general, respondents saw the importance of addressing this issue, but had doubts around the level of state financial support, the absence of professionals to support ICT-based IM system, and of farmers with computer skills and knowledge in ICT, as well as the remoteness and sparseness of agricultural units and farms. According to Shanchenko (2006 p.9) *the processes of integration and cooperation in rural regions, should be focused on development of the most promising activities and provide a basis for future viability of agro-industrial sphere, rural settlements and small towns included in the orbit of economic activity in rural areas, small and medium-sized businesses. Furthermore, improvement of IM based on new IT implementation can create conditions for effective management of agricultural resources for the production of fundamentally new products, agricultural production orientation on perspective effective demand, creating long-term stable relationships with other enterprises, harmonization of interests and cooperation of all stakeholders* (Shanchenko, 2006 p.9). This statement

demonstrates the significance of AIM based on the introduction of new technologies which can create effective management in agriculture. Kabanova agrees: *the availability of quality knowledge with sharing between farmers and agrarians - all this makes the management of agriculture more efficient and helps maximize the interests of all participants in agro-industrial formations of rural regions, territories and the country as a whole* (Kabanova, 2001 p.7).

Shanchenko identifies IM as *a rational choice of forms of ICT, as well as characteristics of information resources needed to achieve the organization's objectives*. Shanchenko (2006 p.3) adds: *specialists, employees, supervisors are not just consumers who supplied the information, but also they are directly involved in the informational processes, in the most important part of the structure - information management*. In the context of agriculture, Kabanova notes: *modern design, for a variety of reasons, such as the financial, social and psychological problems in agriculture, cannot be implemented in the practical activities of agricultural enterprises, as they are based on the extensive use of computer technology and radical change on the basis of this information and communication processes* (Kabanova, 2001 p.7). With regard to developing countries the Economist Intelligence Unit suggested:

Developing member countries are being called on to invest in the development of network infrastructure capacity to take advantage of newer, cost-effective telecommunications and computer technologies (EIU, 2006 p.58).

Noting that agricultural development and the agricultural market requires the timely collection and processing of operational information, Kabanova adds: *the dynamic market situation requires accelerating of the collection and processing of information, the development on the basis of its solutions to the complex problems that require multivariate calculations and huge investment of time to carry them out by hand. All these circumstances explain the relevance and determine the practical significance of improving IMS based on the introduction of new ICTs* (Kabanova 2001 p.7).

4.6.5 Summing up

Taking into account Shanchenko's statement about the dual role of agrarians with regard to the process of development of current AIM: that is, agrarians as IM customers and as participants in the process of AIM improvement, it seems clear that: *AIM improvement requires the participation of agricultural policy makers, key stakeholders and ICT professionals for decision making in technical and programming issues, and state's financial support*. It appears that agricultural policy and strategy largely depends on the quality of information provision and economic decision-making which is based on reliable information datasets and its management at all levels of agriculture (Shanchenko, 2006). The frameworks for development proposed by respondents to improve current AIM with the ultimate aim of improving Kazakh agricultural processes at all levels, covering all the scattered agricultural business units, appear to assume timely implementation of new technologies and network connections

with access to Internet sources, and the development of a robust knowledge base system with wide-ranging operational datasets.

Throughout the discussions respondents identified a number of barriers to the development of AIM in Kazakhstan: shortages of finance from government funding together with lack of transparency in its allocation, shortage of IT specialists, together with a shortage of IT literate agrarians, the dispersed nature of the Kazakh rural regions, and the (apparently) limited amount of money available from government sources to support initiatives such as ICCs offering a full range of services. Acknowledging that a major project to develop AIM with emphasis on ICCs would require significant investment of time and money, respondents suggested looking not just at developed countries for solutions, bearing in mind Kazakhstan's unique challenges, but also to other economic sectors in Kazakhstan itself (RP04). Some respondents believed that full membership of the WTO would be helpful – Kazakhstan's accession to the organisation is imminent (2015) after many years of negotiations.

Kabanova (2001), commenting on similar problems in Russia, noted the importance of involving the full range of agrarian stakeholders in such a project, something also referred to by respondents in the current study. It might be suggested that during the USSR period people were used to working collectively, albeit under a command/control model, but this had been followed in Kazakhstan by over twenty years of agrarians having to act independently, and to try to make sense of a range of initiatives which had been only partially successful. This suggests that much work would need to be done – by ICCs or others – to develop a climate where close co-operation would be successful.

Respondents frequently commented on the need for practical agrarian knowledge to be supplemented by that of IT experts to develop the economy of rural regions. This could be made available by a developed system of ICCs. But at present, network connectivity is still a significant problem in dispersed rural regions. Improved networks are being established gradually with regard to education and health, but slowly and not without problems. As suggested in the Literature Review (section 2.9) mobile telephony could be a step forward, as it has been in Sub-Saharan Africa and India, as providing the landline infrastructure could be prohibitively expensive. Even with lower costs, providing a mobile infrastructure in dispersed areas of Kazakhstan with low population density would be challenging. There are, of course, areas of the UK which have poor mobile access and broadband facility.

Examining how AIM may be improved to support better agricultural policy development, the role of innovation in developed countries clearly shows that the efficiency of agricultural production is achieved mainly due to innovative activity, i.e. the successful co-operation of science and technology sectors. The end result is the creation of innovation is innovation with its development directly in production, which will facilitate the systematic and increasingly progressive organizational, economic, technical and technological renewal of agricultural production and improve its efficiency (Ushacheva et al., 2007 p.3).

4.6.5.1 Framework for development of ICT-supported AIM

Respondents were very clear about what they wanted and needed in a nation-wide AIM system:

- *creation of unified ICT-based IM system with integration of all countryside including farms, districts, agricultural entities, regions (RP15);*
- *development of a centralized database with detailed information about all agricultural subjects, suppliers and consumers, agricultural credit rating, dynamics of sales, productivity and profitability, agricultural product quality and purchases (RP13); about the irrigation system (water use system) (RP13, RP18); marketing with the procedures of collection and analysis of information about the competitive advantages the best farms or enterprises (RP13);*
- *provision of remote access for agrarians at all levels of agriculture management including operational level to network and Internet resources (RP21);*
- *provision of training courses for agrarians from tactical and operational management to improve their computer skills and knowledge in new technologies (RP13).*

They acknowledged the various challenges that this would entail, for example, inputting large amounts of older information (taking into account that much had been lost in the chaos following the break-up of the USSR), and a commitment by the state to provide funding sufficient to complete the project. Ability to overcome the agrarian crisis in agriculture of the Republic of Kazakhstan appears to depend on the effective and targeted actions of leaders of agrarian formations at different levels of agriculture - strategic, tactical and operational. It should be noted that the main choice of strategy and implementation of agricultural policy largely depends on the quality of information provision and economic decision-making based on reliable information datasets and its management. Thus, taking into account the role of information to support agricultural policy and regulations, respondents emphasised the management of information at all stages of its life cycle, and strategic development of AIM in all parts of the agricultural sector.

It should be borne in mind, however, that agrarians are both customers and participants in the process of development of AIM. The respondents are representative of the range of stakeholders in the agrarian sector and thus aware, especially at the strategic level, of the need to combine agrarian and IT expertise, whilst also taking into account the experiences of both developed and developing countries in responding to Kazakhstan's unique challenges.

4.7 Summary of Analysis and Discussion

The aims of the current study, as stated in the introduction, are:

- to conduct a review of Agricultural Information Management (AIM) based on the implementation of new technology in developed countries, to enable better understanding of

the barriers to effective development of current AIM in Kazakhstan since its independence 1991;

- to identify the barriers and opportunities that affect the development of existing AIM systems in Kazakhstan and other former Soviet countries, including Russia, with a similar socio-economic system of development;
- to develop a best practice model, based on the experiences of Kazakh key stakeholders, and taking into account the strategies of both developed and developing states, for the effective improvement of AIM in Kazakhstan in the post-Soviet era.

The current chapter has aimed to meet all the attendant objectives, based on the perceptions and views of the research participants. In order to shed light on the perceptions of agrarians at all levels regarding the theory and practice of agricultural policy implementation since Kazakh independence, a range of issues was investigated in the current chapter. Discussing the state's role in Kazakh agricultural policy in comparison with experience of agricultural policies of developed countries the following findings emerged from the data:

- *the need to improve Kazakh agricultural policy with re-orientation to small and medium-scale rural business development* (RP14 and RP15, amongst others; Ryabsev, 2004; Darinov, 2011);
- *to provide agrarians with detailed agricultural information; to protect local agrarians from cheap imports and excessive price fluctuations* (RP14, amongst others; Orazgalieva and Urazalinov, 2011).

For understanding the contribution of agriculture policy to economic development, the evolution of agricultural policy since 1991 was discussed with the respondents. As a result, the following barriers and challenges for agricultural development with its contributions to economic development emerged from the data:

- *the acute shortage of well-educated, experienced managers and qualified specialists of personnel in agricultural practice* (RP02, RP03, RP13; Sagadiev 2006);
- *the lack of studies about successful experience of farms and enterprises in Kazakhstani agriculture: the practice of growth from small-sized to large-scaled enterprise* (RP12);
- *the need to increase the monitoring and evaluation of current agricultural policies, among them: Land reform, Food security policy and others related to agriculture development* (RP12, RP14; Ziyabekov 2006; OECD 2013);
- *the need to increase the involvement of experienced agrarians, e.g. stakeholders in the process of policies' creation, review, analysis and revision* (RP12, RP17; OECD 2013);
- *the need to revise and audit the current state loans' policy for the efficient allocation of these budgetary resources, in accordance with their purpose; to make these processes more efficient and transparent for agrarians at all levels of agriculture* (RP14, RP19, RP20; Khramkov 2014; Darinov 2011).

To understand the experience of developed countries in using AIM successfully, and to discover relevant factors for identifying and understanding the barriers in current Kazakh AIM, two phases of its development were reviewed separately: 1991-2002 and 2003 to the present; the role of ICT-based IM in the process of planning and decision-making in agriculture for strategic development of this sphere was described in sections 4.3.1– 4.3.3. At the same time, the problems and barriers in current Kazakh AIM emerged from the data as:

- *agriculture is weakly equipped with computers and other new technologies (RP05);*
- *there is a lack of centralized automated informational system in rural regions (RP10, RP13);*
- *there is a lack of suitably resourced ICT-based Consulting Service Centers in rural regions with access to global resources (RP08, RP13);*
- *there is a shortage of specialists with skills and knowledge in ICT (RP04).*

Respondents' views to improve the current AIM included the following points: instead of the task of improving current AIM it is necessary to solve other urgent problems, such as purchase of new tractors and equipment, to improve the social conditions in rural regions, and to solve the problems with the lack of specialists and managers in the agriculture business (RP20, OM). It was also suggested that the task of improving current AIM based on new technologies can create additional difficulties with further expenses, for example, the need to buy computers and programs, training people to work on computers; to hire new employees to enter data for previous and current information, to change existing procedures and so on (RP13, RP16).

Understanding the opportunities of current AIM in Kazakhstan and other post-Soviet states with similar socio-economic systems, academics and respondents generally agreed that dynamic development of the market requires acceleration of the collection and processing of huge flows of information (Kabanova, 2010; RP05), and that implementation of new technologies can positively influence management processes in agriculture – it can make them more effective and transparent (Ekhlakhova, 1997; Ananyev and Ukhtinsky, 2013; RP15, RP19).

AIM was identified as a subject to influence management and controlling processes in agriculture. And in practice the findings indicate ways to improve current AIM on the basis of introduction of new technologies and computers, ICT-based consulting service centers with access to global resources and centralized automated system in rural regions. The issue about the improvement of AIM based on new ICT and unified centralized IM to solve the complex problems that require 'multivariate calculations and huge investment of time to carry them out by hand' was discussed by respondents and scholars. Taking into account that information serves as a fundamental basis of management, Kabanova (2001) adds *theoretical studies in recent years have to be aimed at redefining the role of IM in agriculture.*

Taking into account the practice of ICT-based IM systems in other spheres of Kazakhstan's economy and the experience of developed countries, the key stakeholders' opinions and concerns regarding the

improvement of IM on the basis of implementation of new technologies and computers to support agriculture policy of Kazakhstan, the role of Information and Consultative Centres (ICC) in agriculture was examined in section 4.5.4, and the following points emerged:

- *there is a need to improve the current AIM at the operational level of agriculture;*
- *there is a need to create an ICT-based centralized IS covering all rural regions;*
- *services of existing ICCs in rural regions need to be improved and developed.*

Regarding the role of IM based on new technologies and innovations in different spheres of economy, the respondents noticed advantages in the development of those economic sectors and considered agriculture as a potential sector for introduction of new technologies to improve the current AIM. In this context, the role of knowledge management, Internet sources, network connectivity and ICT-based technology infrastructure to support agricultural policy in Kazakhstan was examined and discussed with respondents. During the interviews proposals for a framework to improve the current IMS was summarized in sections 4.6.1 to 4.6.5:

- *creation of a unified ICT-based IM system with integration of all countryside including farms, districts, agricultural entities, regions (RP15);*
- *creation of a centralized database with detailed information about all agricultural subjects, suppliers and consumers, agricultural credit rating, dynamics of sales, productivity and profitability, agricultural product quality and purchases (RP13); about the irrigation system (water use system) (RP13, RP18); marketing with the procedures of collection and analysis of information about the competitive advantages the best farms or enterprises (RP13);*
- *provision of remote access for agrarians at all levels of agriculture management including operational level to network and Internet resources (RP21);*
- *provision of training courses for agrarians from tactical and operational management to improve their computer skills and knowledge in new technologies (RP13).*

In general, during the discussions the respondents indicated their readiness to address this issue, although some of them raised valid concerns, such as a lack of state financial support, absence of professionals to support ICT-based IM systems, lack of farmers with computer skills and knowledge in ICT, as well as the remoteness and sparseness of agricultural units and farms. Additionally Shanchenko (2006) highlighted: *AIM improvement requires the participation of agricultural policy makers, key stakeholders and ICT professionals for decision making in technical and programming issues, and state's financial support.* Having presented and initially explained the research findings, the study will now proceed to its conclusion, through reflection on the explanatory theory emerging from the data, together with a discussion of how the study's main aim and objectives were met. The study's unique contribution to the literature on ICT-based AIM is described and justified, and the thesis ends with a number of derived recommendations for further research.

CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction and structure of chapter

Chapter 5 sums up the explanatory theory emerging from the data and demonstrates how the research objectives were met, demonstrating the study's unique contribution to the literature on AIM in Kazakhstan and other post-Soviet states with a similar socio-economic and political development. Recommendations for future research and Kazakh state action are made, together with an acknowledgement of the limitations of the research.

5.2 General conclusions

This study set out to investigate and theorise on the topic: understanding barriers and opportunities in agricultural information management in post-Soviet states: a case study of Kazakhstan. The researcher aimed to add to the limited Kazakh literature on the topic by supplementing the mainly positivist studies, based on economic or statistical data, with an examination of the perceptions of agrarians at all levels in Kazakh agriculture, who are both customers of IT-based AIM and its end users.

It was clear both from the limited literature and the interviewees' comments that ex-soviet states all faced – and in fact are still facing – a time of unprecedented change after the break-up of the former USSR. It can be forgotten that it is only just over twenty years since this literally world-changing event, and the situation is still fluid: in 2015 Kazakhstan is hoping its application to join the WTO will shortly be successful. The European Union, set up in 1957, only included Britain nearly thirty years after the end of the Second World War, and over fifteen years since the EU's inception as a response to the economic destruction in Europe. The EU is still evolving after nearly sixty years. Change takes time to become embedded in a nation's culture, and so it may be over-optimistic to expect that all Kazakhstan's agricultural problems will be solved in a relatively short time.

In the current study, respondents were well-informed about their country's recent history and in many cases had to live through the 'chaos' as it was described of the move in agriculture from a state regulated system of large farms run by a command and control centre in Moscow, to a market economy. This also ignored the fact that even under the state system, small private farms had enabled many Kazakhs to be self-sufficient. Not unnaturally, the move to a market economy privileged large farm agribusinesses at the expense of 'SMEs', in part, perhaps, because the former most resembled the previous large state enterprises. However, in market economies such as USA, UK and Germany similar decisions were taken and it is only recently that these states have begun to pay attention to the economic contribution of small farmers: centralizing followed by decentralizing of agricultural businesses appears to be a world-wide phenomenon.

Respondents described winners and losers in the privatisation of agricultural land. Some had done well from land reform, but several respondents criticized the opacity and bureaucracy of a process which

frequently depended on the whim of state administrators. Eventually, the difficulties caused by inadequate implementation of the reforms, the migration of many agricultural specialists to new jobs in the cities, and the degradation of much agricultural land, caused the government to intervene, but as more than one respondent noted, it was ‘too little too late.’ Economically, the government had focused attention on the key ‘money spinners’ for the country – large enterprises such as energy and mineral mining, where it could ensure foreign investment. Despite its enormous potential, agriculture was neglected because it could not offer immediate profits. It is only recently that Kazakhstan, like other ex-soviet states, is waking up to the importance not only of having a coherent agricultural policy, but also one which is aided by an up to date information management system, well supported by ICT. In the Soviet period information gathering had been centralized, and in the early 1990s the potential of ICT was only just beginning to be developed. Consequently, the chaos of the USSR’s breakdown not only destroyed or lost much valuable data, but left post-soviet states well behind in the computerization process. It is only recently that Kazakhstan has followed the example of Russia and introduced ICCs to assist agrarians to make the most of ICT supported AIM, and it was noteworthy that many of the respondents, even those in strategic roles in agriculture, were demonstrably embarrassed about their own lack of expertise in this field, stressing they were agricultural experts, not computer specialists. But all were aware of the advantages of ICT-supported AIM. Change is coming, but not as quickly as many would like.

5.3 Conclusions relating to the research objectives

The six specific research objectives are reiterated below, with the conclusions reached by the researcher on the issue.

Objective 1: *to describe and critically discuss the history of agriculture and agricultural policy in Kazakhstan since independence in 1991:* the recent history of the Republic of Kazakhstan has been described in detail in Appendix I and II, and provides the basis of critical discussion in the Literature Review, chapter 2. The perceptions of the respondents, key players in the agricultural sector at strategic, tactical and operational levels, were analysed and discussed in chapters 4 and 5. As suggested above, respondents were well informed about the impact of the state’s agricultural policies on their work. In general, despite good intentions, many of the reforms introduced by the government had mixed, if not entirely negative, results. However, given the enormity of the changes experienced by the nation as a whole following independence, it was perhaps unsurprising that agriculture’s fortunes had been mixed, and although respondents were understandably skeptical of further government initiatives, after so many had apparently failed, there was hope that future developments, such as the development of ICCs, would speed the positive impact of ICT-based AIM to assist successful agricultural policy.

Objective 2: *to investigate the experiences of developed countries in order better to understand the theory and practice of agricultural policy development in these areas;* and ***Objective 3:*** *to theorize on the experience of developed countries of using AIM successfully, to discover relevant factors for*

identifying and understanding the barriers in current AIM in supporting agriculture policy for developing countries: Three nations were selected for comparison with Kazakhstan: Germany, the United Kingdom (UK) and the United States of America (USA). In no case did the country's agricultural experiences exactly mirror Kazakhstan's own, for the latter, as indicated throughout the thesis, has its own unique opportunities and challenges. However, Germany had similar economic chaos to cope with after the reunification of Germany, but it had the benefit of significant economic success in the west of the country, together with the western part's role as an early adapter of the EEC, which gave it advantages in the area of innovative technology that nations such as Kazakhstan lack. Germany has also in the past concentrated on turning agriculture into 'big business' by support of large farms. Like other EU nations, it has only recently realized the importance both for the economy and the environment by subsidizing smaller farms.

Similarly, the UK's agriculture had to feed the nation during World War 2, and like Kazakhstan it still contains a significant proportion of agricultural land which has been extensively developed. Again, the state is now offering support to smaller farmers, a strategy which for both Germany and the UK has partly emerged from EU membership and the application of the CAP. Perhaps as it joined the EU at a relatively late stage after its inception, the UK has often challenged the CAP, and the decisions of the EU in general: it is by no means a quiescent member and its continued membership of the EU has been challenged by some.

Similarly, there are certain factors of size and economic sophistication which make the USA a very different example from that of Kazakhstan, but its various problems in agriculture following the economic depression in the 1930s illustrate the fact that a large country can face these issues and design effective solutions. In particular, the massive amounts of state support to agriculture to help the sector out of depression are noteworthy, together with the more recent reorientation of effort towards supporting smaller farms. Technologically, of course, the USA is probably the most advanced nation in the world and there is every reason to suggest that study of their ICT methods to support agricultural policy would be useful regardless of the size of the country.

Objective 4: *to identify key players in the agricultural sector of Kazakhstan to determine their views from all levels of management on the barriers and opportunities for AIM in the country; and **Objective 5:** *to analyze the situation in post-Soviet states regarding new ways of organizing agriculture from its low baseline in the 1990's, and thus to develop effective understanding of the evolution of Kazakh agricultural policy reforms and their contributions to economic development since independence:* The exemplar state selected for comparison here was Russia. Given its role as head of the ex-USSR, it was the most developed soviet nation and has faced similar socio-economic changes to those faced by Kazakhstan. Although its soviet information systems and gathering were efficient on a command and control basis, it had not developed far in terms of ICT-based AIM before the collapse of the USSR, and as has been pointed out, its information base was largely lost or destroyed. Like Kazakhstan it still relies on large scale agribusiness, and ICT is rarely available for SME framers to use. One feature it*

has introduced, however, which Kazakhstan has followed, is the use of Informational Consultative Centres (ICCs) which not only collect information to forward to the appropriate agency, but also to advise small farmers not only on agricultural innovations but on using ICT to support AIM.

In some ways, Kazakhstan is in a more fortunate position than some CIS nations to seek assistance for its agricultural challenges, as it does not carry with it the economic, political and ideological ‘baggage’ of Russia as former head of the soviet bloc, a position which might make it in some cases ashamed to admit its weaknesses, whereas Kazakhstan, as a former satellite nation, is ideologically freer to maintain effective diplomatic relationships with communist states such as China, former soviet nations like Russia, and the democracies of western Europe. Given its favourable position in terms of mineral deposits, energy reserves and potentially fertile agricultural lands, Kazakhstan can use its unique position to learn from both developed and other developing nations. In the field of agriculture it now has significant opportunity to develop effective ICT-based AIM to support its agricultural aims and objectives.

Objective 6: *to propose a framework for AIM development in Kazakhstan based on the implementation of new technology which both recognizes the nation’s unique problems and opportunities, but seeks also to learn from the experiences of both developing and developed countries:* The respondents in this study were very clear about what they perceived as the needs of Kazakh agriculture, from technical and scientific support to introduction of new technology. In that context they proposed an ICT-based central information system covering the whole of Kazakhstan’s rural regions, an initiative which could fall under the aegis of the ICCs, which could have a much expanded role. The creation of a centralized database could provide detailed and systematic documentation and information of all agricultural information resources from any agricultural information producers about all agricultural subjects, suppliers and consumers, agricultural credit rating, dynamics of sales, productivity and profitability, agricultural product quality and purchases, the irrigation system, and marketing, together with the procedures of collection and analysis of information about the competitive advantages of the best farms. At the same time, the suggested conceptual framework has to improve existing administrative and functional linkage between all producers, providers and consumers of agricultural information in Kazakhstan on the basis of new ICT-based AIM. In anticipation of entry into the WTO, the way forward for evolving AIM in Kazakhstan includes exploitation of current ICT capabilities in harnessing AIM Kazakhstan’s agricultural information users to international information data bases.

Additionally, taking into account that *the most developing countries are faced with a crisis of efficient information resource management* (Hann cited in Omekwu, 2003 p.444) and the fact that *a well-organised, carefully planned national information system can accelerate progress and enhance development* (UNESCO 1981 p.3), the study highlighted the importance of developing and maintaining such an AIM system would require provision of remote access for agrarians at all levels of agriculture management, including operational level to network and Internet resources, and last but

not least, the provision of training courses for agrarians from tactical and operational management to improve their computer skills and knowledge in new technologies.

If such a project became the responsibility of expanded ICCs to implement, not only would a major state cash injection be required, but process for funding would need to be transparent and straightforward. However, as stated above, Kazakhstan has the advantage that it can seek help from a number of very different world states, recognizing that both its advantages and challenges are unique.

5.3.1 To what extent were the objectives met?

Because of the researcher's professional contacts, it was feasible both to consult the extant literature on ICT-based AIM and also to obtain access to a purposive sample of agrarians at strategic and tactical levels of agricultural business. However, objectives 5 and 6 were ambitious. The research sample consisted of individuals who were well qualified to speak on the issue, as some of them had been actively involved in trying to make government initiatives work, but because of their high status in the Kazakh agricultural hierarchy, it was not always easy to challenge their responses, especially when they might have been concerned to present their own decisions in a good light. Senior managers are generally reluctant to be associated with failure, as they perceive it. In terms of objective 6, a framework has been produced from respondents' answers, but arguably it could have benefited the achievement of the objective if a purposive sample of operational farmers – the ultimate end users, had been consulted.

5.4 Contribution to new knowledge

Most students, when they hear the phrase 'significant contribution', think in terms of a new theory, crucial experiments, technological breakthroughs - the stuff of Nobel Prizes. For a PhD, the truth is that 'significant' need not mean 'revolutionary' or 'major' or even 'large' (Petre and Rugg, 2004, p 13-14). When considering the contribution to knowledge of the current thesis, the researcher was initially no exception to this way of thinking. Later, having reflected on Petre and Rugg's comments, and understanding that 'making a significant contribution' means 'adding to knowledge', or 'contributing to the discourse' - that is, providing evidence to substantiate a conclusion that is worth making (ibid.), the researcher proposes to discuss the thesis' contributions to new knowledge below.

The original contribution to new knowledge in the study derived from the findings of this research relate to:

- contributions relation to the understanding of the barriers and opportunities facing ICT-based AIM in supporting agriculture development in Kazakhstan;
- contextual contributions relating to the particular issues surrounding Kazakh history, geography and culture.

Before the current research, there were very few empirical research studies investigating the role of information in agriculture management, and no studies had been conducted examining the role of new technology in supporting agricultural information management in Kazakhstan. Understanding that ICT is a very rapidly evolving sphere, examination of the role of computers and new technology in AIM development was challenging but at the same time could be relied upon to discover original insights.

As discussed at 4.5, investigation of the barriers and opportunities facing current AIM in Kazakhstan with policy makers and agrarians from different levels of agriculture who participated in the process of agricultural policy implementation since independence enabled the researcher to discover why ICT-based AIM in Kazakhstan has developed in the way that it has. Consequently, the study needed to bring together literature from the field of politics and public administration, economics, agriculture and management of information, and to synthesise these in the discussions with key decision makers in the agricultural field.

In researching the links between ICT-based IMS in the agricultural sector of a post-soviet state, the researcher has added a new dimension to the statistical and scientific data by focusing on the management of information as perceived by the agrarians as customers and end users. Previous research studies, such as those by Kabanova (2001) do not make the issue clear that, given its complex history, Kazakhstan has unique problems and challenges with AIM, and consequently, the experiences of both developed and developing countries in establishing ICT supported AIM were appropriate for investigation during this study. Critical analysis of a purposeful selection of 'developed' and 'developing' states allowed for both an overview of agricultural policy development since independence for post-soviet states and analysis of the problems in current AIM.

The secondary data collection was based on review of academic literature, state statistical reports and other 'grey literature' and this was compared with the attitudes and opinions collected during the face-to-face interviews with agrarians from all levels of agriculture management and policy makers. Thus, it was possible to support earlier quantitative studies of the development of AIM in Kazakhstan with a deep understanding of the reactions of key 'movers and shakers' to the phenomenon. A further original contribution from the current study is the examination of the evolving agricultural policy in Kazakhstan for the period 1991-2011 in comparison with analysis of the experiences of developed countries (case of UK, Germany, USA), as well as those of developing countries (Russia). There are very few quantitative research studies on this issue, and no studies have involved qualitative analysis of data collected during the in-depth interviews on the subject with key agrarian stakeholders. The current research has highlighted the appropriateness of this methodological approach within the Kazakh context.

Explanatory theory focuses on the perceptions of the respondents as to why ICT-based AIM is still at an early stage of development in Kazakhstan after 25 years or so since independence. As mentioned earlier, it is sometimes overlooked that the whole of the ex USSR was in administrative chaos at the time of its breakup, and many statistics and agricultural data at the time were lost or destroyed. Some

respondents had personally suffered from these losses. They had also lived through some ‘half-baked’ schemes to improve the situation in agriculture which were unsupported by scientific or other research data. Not surprisingly they were somewhat skeptical of yet another government initiative when others had failed or at best been partially successful. They had also in some cases been involved in the exodus from rural areas following the mixed success of land reform which tended to privilege those who could afford to buy up land but left small farmers unsupported. Not least, the process for obtaining state loans for agricultural development could be opaque or even dishonest in some cases. The problems of individuals in these rural areas was described in strong language: they were ‘victims’ and psychologically unable to cope with the changes – for many, therefore, ICT-based AIM was at the bottom of a list of rural problems. And also it should be borne in mind, however, that agrarians are both customers and participants in the process of development of AIM. The respondents are representative of the range of stakeholders in the agrarian sector and thus aware, especially at the strategic level, of the need to combine agrarian and IT expertise, whilst also taking into account the experiences of both developed and developing countries in responding to Kazakhstan’s unique challenges.

Shanchenko’s (2006) statement about the dual role of agrarians with regard to the process of development of current AIM proposes agrarians both as IM customers and as participants in the process of AIM improvement. It therefore seems clear that: AIM improvement requires the participation of agricultural policy makers, key stakeholders and ICT professionals for decision making in technical and programming issues, and state’s financial support. Agrarians from all levels of agriculture management, together with Kazakh policy makers, participated in discussions of the research objectives, and thus enabled the researcher to offer new insights into the barriers and opportunities in ICT-based AIM.

5.4.1 New knowledge derived from discussions of the barriers to ICT-based AIM

According to Kabanova (2001), Omekwu (2003), Shanchenko (2006) most developing countries are faced with a crisis of efficient information resource management in agriculture. Agricultural policy and strategy development largely depends on the quality of information provision and economic decision-making which is based on reliable information datasets and its management at all levels of agriculture. As discussed at 4.6, examining the nature of this problem throughout the discussions with respondents, the barriers in Kazakhstani agriculture information management were identified as: shortage of finance from government funding, together with lack of transparency in its allocation, shortage of IT specialists, together with a shortage of IT literate agrarians, the dispersed nature of the Kazakh rural regions, and the (apparently) limited amount of money available from government sources to support initiatives such as ICCs offering a full range of services.

Additionally, as discussed at 4.2, the respondents confirmed from first-hand experience that the Kazakhstani authorities still ignore the problems in human resources management in agriculture.

These include: internal migration (Asanbayev 2009), a lack of experienced and qualified professionals – both professionals and managers – in rural regions and staff shortages in agriculture, and at the same time, they confirmed a lack of research studies on this issue in Kazakhstan. The new insights from key stakeholders emphasise the extent of the problem and the need for timely solutions.

Concerning the role of investments, subsidies and financial aid projects for agrarians and the lack of Internet access for these types of information for rural citizens, respondents emphasised that farmers and agrarians need agricultural information with remote access, and that effective network connection and Internet access can provide remote access for agrarians and farmers to information about agricultural policy directions including state financial projects, loans and subsidies for rural regions. Although respondents were in some case embarrassed about their own lack of expertise in IT related issues, they understood that network communication with access to Internet sources could make all procedures for agrarians more comprehensible, straightforward and accessible. At the same time, respondents highlighted the need to revise and audit the current state loan policy for the efficient allocation of these budgetary resources, in accordance with their purpose; to make these processes more efficient and transparent for agrarians at all levels of agriculture on the basis of efficient information management system.

Due to the absence of empirical studies on these problems in previous studies, the researcher proposes that discussions of the existing barriers in current AIM in Kazakhstan with key stakeholders and end users made a significant contribution to new knowledge in this area.

5.4.2 New knowledge derived from discussions of the opportunities for ICT-based AIM

Kabanova (2001) noted the rapid growth and volume of information to solve complex problems that require ‘multivariate calculations and huge investment of time to carry them out by hand’ (Kabanova, 2001). This author also noted the requirement for an effective exchange of data and information between different levels of agricultural management. With regard to the opportunities of AIM based on the implementation of new technology, the following paragraphs illustrate the original contribution of study to new knowledge.

During the study, respondents described the challenges in acquiring, retrieving, processing and disseminating various types of information faced by policy makers, agricultural managers and knowledge workers. However, their suggestions can be helpful in terms of the need to integrate the theory and practice of agricultural policy with extant scientific theory of agrarian relations in order to create a system of information and knowledge which is interrelated, and which can build valid and effective AIM providing access for agrarians at all levels of agricultural management. This topic has not previously been discussed in research studies, and consequently emphasises the study’s contribution to new knowledge in Kazakhstani agricultural development.

Respondents proposed the creation of a centralized database, which could provide detailed and systematic documentation and information of all agricultural information resources from any agricultural information producers about all agricultural subjects, suppliers and consumers, agricultural credit rating, dynamics of sales, productivity and profitability, agricultural product quality and purchases, the irrigation system, and marketing, together with the procedures of collection and analysis of information about the competitive advantages of the best farms. The proposals uniquely came from individuals who needed such data and would be end users of such a centralised database. Agrarians supposed, in anticipation of Kazakhstan's entry into the WTO, that the way forward for evolving AIM in the country should include exploitation of current ICT capabilities in harnessing AIM from Kazakhstan's agricultural information users to international information data bases, an issue particularly important in view of what is hoped to be Kazakhstan's imminent entry to the WTO.

Discussing the role of Internet connection in agriculture as an opportunity for AIM to exploit, as noted at 4.5-4.6, Kazakhstani agrarians added that the Internet provides the additional advantage of significantly reducing the barriers to accessing and processing information for farmers, regardless of where the farm is and where the information is used; and commercial benefits from its use can give agrarians new incentives for the development of business cooperation, including the ability to buy resources and sell manufactured products.

Due to the lack of research studies on opportunities of ICT-based AIM to support agricultural development in Kazakhstan, the researcher argues that discussions with respondents on the above opportunities made a significant contribution to new knowledge.

5.4.3 New knowledge derived from discussions of the development of ICCs: the positive impact of ICT-based AIM to assist successful agricultural policy

Given the enormity of the changes experienced by the nation as a whole following independence, and although respondents were understandably skeptical of further government initiatives, after so many had apparently failed, there was hope that future developments, such as the development of ICCs, would speed the positive impact of ICT-based AIM to assist successful agricultural policy. The development of an evaluation of the existing ICT-based AIM based on the interpretation of functioning of the ICCs in Kazakhstan as a part of whole ICT-based AIM system in comparison with Russian ICCs was examined during the qualitative data analysis to extend the existing literature and contribute new knowledge on this issue.

Taking into account that ICCs are based on state regional agriculture organizations, it was suggested to separate them from government management bodies, because the roles of advising and managing are not the same thing, and in a market economy the state normally has no right to interfere in the internal activities of private enterprises. Kazakhstan still relies on large scale agribusiness, and ICT is rarely available for SME farmers to use. One feature that Russia has introduced, which Kazakhstan has followed, is the use of Informational Consultative Centres (ICCs), which not only collect information

to forward to the appropriate agency, but also aim to advise small farmers not only on agricultural innovations but on using ICT to support AIM. Discussions with respondents suggested that an ICT-based central information system covering the whole of Kazakhstan's rural regions could be an initiative which could fall under the aegis of the ICCs, which could then develop a much expanded role.

Most developing countries are faced with a crisis of efficient information resource management (Hann cited in Omekwu, 2003 p.444), and a well-organised, carefully planned national information system can accelerate progress and enhance development (UNESCO 1981 p.3). The study highlighted the importance of developing and maintaining an AIM system which would require provision of remote access for agrarians at all levels of agriculture management, including operational level to network and Internet resources, and last but not least, the provision of training courses for agrarians from tactical and operational management to improve their computer skills and knowledge in new technologies. However, an important caveat, in view of the respondents' enthusiasm for ICCs, was their admitted lack of knowledge and expertise to enable them to be competent commissioners of such a project, and their skepticism of 'yet another new initiative'.

5.4.4. New knowledge derived from discussions of the Kazakh context

During this study, it was clear that research participants – key stakeholders and agrarians from various levels of agricultural management – had not previously participated in any discussions relating to the study's research objectives. Respondents confirmed the existing priority outstanding problems in agriculture since the 1990's, (outlined in chapter 4), which have lacked the interest of researchers into the role of IM in the agriculture of Kazakhstan. The current research has demonstrated the importance of reflection on respondents' own perspectives as key stakeholders, as well as making it possible to learn about the experiences and business relationships of agrarians at various levels of agriculture management, as well as their engagement with the process of AIM development based on the implementation of new technology. For example, during these discussions, respondents highlighted that the work done towards the process of Kazakhstan's WTO accession in 2015 had demonstrated the need for a structured and well-organized AIM system, and highlighted the importance of ICT-based AIM for Kazakhstani case. Respondents expressed their concerns regarding the crucial lack of availability and timeliness of information. At the same time, the study discovered these respondents' attitudes to ICT as a support to AIM, finding not only a significant lack of knowledge, but also some embarrassment about respondents' lack of knowledge of the issue.

The research methodology selected for the current study clearly demonstrates the need to secure participation from agrarians and policy makers as end users of new technologies in supporting AIM and in the development of internet-based environments which can be used to store and transfer agricultural information and knowledge at various levels of agricultural management. Empirically, though, as mentioned above, the researcher was able to discuss the situation with people who had been witnesses in some cases to the post-independence chaos, and as a Kazakh citizen, the researcher could

appreciate their concerns. Should Kazakhstan follow the examples of developed or developing nations in using ICT to inform its agricultural policy? The answer is that both can provide assistance: Kazakhstan's situation is unique both in its advantages and challenges.

Thus, in Kazakhstan there were no methodological standards for investigation the research objectives prior to the commencement of the research objectives and this study has contributed to an understanding of how to investigate the topic. The study presents the first in-depth qualitative analysis investigation based on participation of agrarians from all levels of agricultural management and policy makers in discussion of the role of ICT in supporting a Kazakhstani AIM system.

In comparison with other studies of AIM in Kazakhstan and other ex-soviet states, a significant amount of current research is mainly based on quantitative or statistical data analysis. Methodologically, the current research departs from the usual quantitative studies and considers the views and perceptions of the experience of the end users of those directly involved in trying to make government initiatives work, who ultimately will be able to make or break any ICT-based AIM system.

This research provides an opportunity to develop a better understanding of the role of ICT-based AIM in supporting agriculture policy development both for the researcher and for the respondents operating within an agriculture and information technology context, and subsequently provides a basis for change.

5.5 Limitations, and proposals for future research and strategic planning

As is arguably appropriate for a piece of qualitative research, not all of the researcher's findings are necessarily generalizable beyond the context of Kazakhstan. Indeed the researcher proposes at 5.5 that this piece of research might be considered as a starting point for further investigation into the development of ICT systems in Kazakhstan. The thesis stresses the point that Kazakhstan's situation is in many ways unique and so it is not necessarily appropriate to suggest that it exhaustively follows the example either of developed or developing countries in pursuing ICT-based AIM. However, the other Commonwealth of Independent States (CIS) countries which formed a loose association after the breakup of the Soviet Union – and indeed Russia itself – have all faced a period of chaos in terms of data retrieval after independence, so the views and perceptions of key stakeholders in the agricultural policy of Kazakhstan will be of particular interest to these states. The Kazakh sample were in the main weary of unsuccessful initiatives and their skepticism of new ones should be borne in mind by other CIS states wishing to develop ICT systems. Not least, the current aggressive (as perceived in the West) foreign policy of Russia in Crimea and Ukraine may potentially hamper the former's ability to learn from other developed nations, whereas Kazakhstan has less historical 'baggage' and so able more easily to seek advice and assistance from several world-wide bodies such as WTO. Its experiences will therefore be relevant to other post-soviet states.

Consequently, although the current study has theorized on matters regarding ICT-based AIM in one specific post-soviet country: Kazakhstan, there are potential lessons for other CIS countries still engaging with the process of moving to a market-based economy and the attendant challenges for the agricultural sector. Furthermore, policy makers and international aid organizations can take into consideration the results of this study when deciding how to allocate funds aimed for improving AIM-supported agricultural development in developing countries.

However, the sample for this research was arguably limited in focus, as it was made up of agrarians at a strategic and tactical level, which potentially enabled them to take action on the points raised, or at least lobby politicians and state decisions makers to take action on their behalf. Small farmers from what would be termed in Kazakhstan ‘peasant farms’ were not consulted, neither were IT experts or staff from existing ICCs. Their views would provide a useful counterweight to the points raised by end users and might form the basis of further study.

A case study approach to investigate the overall current situation of Kazakh agriculture would be a useful project, perhaps in collaboration with one of the global research organisations mentioned in the glossary of terms at 1.7. Not least, it was noteworthy that the samples in the study were almost embarrassed – certainly challenged – by their lack of IT knowledge. There are questions about whether this is a universal phenomenon, or one shared by decision makers in Kazakhstan. In either case, a study might shed light on why business managers take up, or fail to take up ICT-based solutions. Age may also be a factor here, but further research could investigate this. In the course of the study it was clear that significant governmental expenditure, in particular on the infrastructure of agriculture, together with investments to rural regions for agricultural development, may facilitate the agricultural economic growth in this main sector of Kazakhstan’s economy. Respondents had personal experience of the opacity of the procedure for obtaining state loans which had damaged confidence in the integrity of the process. Therefore, a detailed study could be conducted in order to examine investments and subsidies in the agriculture sector of Kazakhstan.

The shortage of human resources for the agricultural sector was described by Asanbayev (2009 pp.2-3) as a *spontaneous and massive outflow of villagers to the cities of Kazakhstan [which] means the need of qualified specialists and professionals, educated people in the agricultural sector of the economy in rural regions. From the fact that the authorities ignore the problem of internal migration, it will not go away by itself and will not be resolved. Moreover, the massive outflow of rural population to the cities every year will only increase.* This problem needs deep investigation beyond the scope of this study and is also recommended for study as a separate topic. Lastly, there appears to be a dearth of studies about the practical experience of **successful** agricultural farms in Kazakhstan, and the agrarians’ experiences of growth from small-sized to large-scaled enterprise in market-economy system – the findings from such a study could form the basis of subsequent research.

Notwithstanding these possible areas of further investigation, the study has highlighted the important fact that although the agricultural environment of every nation is in some ways unique, it is possible to learn from the experiences of other nations, or at least benefit from their expertise, regardless of their status as ‘developing’ or ‘developed’. Many mistakes may have been made in Kazakh agricultural policy after independence, but given the chaotic situation after the collapse of the USSR, this is unsurprising. The respondents consulted, the ‘movers and shakers’ – significant stakeholders in other words – in Kazakh agriculture, were eager to move on from earlier mistakes, but also recognised the way in which IT-based AIM could help them to make the most of the country’s natural resources. ICCs might be a significant positive force in embedding a nationwide computerised AIM system. As potential customers and end users of a nationwide AIM system based on effective ICT, the respondents in this study appear to be able to overcome their understandable skepticism about the concept and are generally prepared to welcome its benefits.

REFERENCE LIST

1. ABDRAKHMANOVA, A.S., 2007. State regulation of economy / Государственное регулирование экономики. Educational and methodical complex: Karaganda press
2. ACHALOVA, L.V., 2007. *Features of the development of economy of Germany at the present stage / Особенности развития экономики ФРГ на современном этапе*. Unpublished Thesis (Candidate of economic science).
3. ACKRILL, A., 2000. *The common agricultural policy*. Sheffield Academic Press. pp. 243.
4. AGARWAL, A., 2011. *Ecological modernization and the development of the UK's green industrial strategy: the case of the UK national industrial symbiosis programme*. Unpublished Thesis.
5. AGRICULTURE in GREAT BRITIAN. Support Website of exports / Сельское хозяйство Великобритании. Портал информационной поддержки экспорта. [online]. Available from: http://www.export.by/?act=s_docs&mode=view&id=2196&doc=64 (Accessed 5 January 2015)
6. AGULIN, I.A., 1997. *In search of management concepts. System analysis of the millennium (theory and practice) / В поисках концепции управления. Анализ систем на рубеже тысячелетия (теория и практика)*. Moscow: Intellect.
7. AIMURZINA, B., 2010. Investment regulation of agriculture of Kazakhstan at the present stage of development / Инвестиционное регулирование агропромышленного комплекса Республики Казахстан на современном этапе развития. *Journal of Economics and Statistics*, № 2, pp. 108-112.
8. AKER, J.C., and MBITI, M., 2010. Mobile phones and economic development in Africa. Centre for Global Development Working Paper 211, June, 2010.
9. AKHMETOV, A., 2011. The first years of Kazakhstan economy independence / Первые годы независимости Казахской экономики. *Republican political newspaper "Liter"*, 35-2011.
10. AKIMOV, A. and DOLLERY, B., 2008. Financial System Reform in Kazakhstan from 1993-2006 and its socioeconomic effects. *Journal of Emerging Markets Finance and Trade*, 44(3), pp. 81-97
11. ANANYEV, M.A., UKHTINSKAYA, J.V., 2012. Application of information technology in agriculture. *System Management (Electronic scientific periodical publication)/ Применение информационных технологий в АПК. Системное управление (электронное научное периодическое издание)*, № 4. [online]. Available from: http://sisupr.mrsu.ru/2012-4/PDF/Ananev_Ukhtinskaya.pdf (Accessed 1 November 2014)
12. ANNAN, K., 2000. Media Centre, UNITED NATIONS (UN). [online]. Available from: http://www.unescap.org/unis/press/G_05_00.htm (Accessed 15 November 2012)
13. ANTAMOSHKINA, E.N., 2012. The content and actual directions of agrarian policy. *Vestnik Volgogradsk State University, Series 3, Economy and Ecology №1 (20) / О содержании и*

- актуальных направлениях аграрной политики. Вестн. Волгогр. гос. ун-та. Сер. 3, Экономика. Экология. № 1 (20)
14. ARYSTANBEKOV, K., 2002. Kazakhstan and the WTO: opportunities and omissions / Казахстан и ВТО: шансы и упущения. *Journal of Kazakhstan's economy* N4-5, pp. 15-17
 15. ASADOV, P., 2007. Foreign Investment and Economic Growth in Tajikistan. *Journal "Problems of Economic Transition"*, 50 (6), pp.32-84.
 16. ASANBAYEV, M., 2009. "Shanyrakskie" events and issues of internal migration in Kazakhstan/ «Шаныракские» события и проблемы внутренней миграции в Казахстане. *Newspaper of Kazakhstan Center for Humanities and the political situation*, 29-2009.
 17. ASHIMBAYEV, M.S., KURGANBAYEVA, G.A., GUSEVA, L.Y., 2007. *The main economic priorities of Kazakhstan at the present stage / Основные внешнеэкономические приоритеты РК на современном этапе*. Almaty: Bilim, pp.216.
 18. ASHUROV, I.S., GULOV, I.S., BOBOEV H.Sh., 2012. Agrarian policy in developed countries and countries with transition economies/ Аграрная политика в развитых странах и странах с переходной экономикой. *Economy, labor, agricultural management: Scientific Journal / Экономика, труд, управление в сельском хозяйстве : научно-практический журнал* No 1-2012, pp.62-65
 19. AUBRY, M., 2009. *Organisational project management: an approach based on actor network theory*. IRNOP IX, Berlin.
 20. BADIANE, O. and KOESTER, U., 1991. *The CAP - World Markets and Developing Countries*. ACE-EEC: Partners in Cooperation, pp.199-229.
 21. BAUMGART-GETZ, A., PROKOPY, L., FLORESS, F., 2012. Why farmers adopt best management practice in the United States: A meta-analysis of the adoption literature. [online]. *Journal of Environmental Management*. no 96, pp.17-25. Available from: www.elsevier.com/locate/jenvman (Accessed 25 May 2015)
 22. BAUTIN, V.M., 1990. *Organizational and economic problems of the information support of agribusiness / Организационно-экономические проблемы информационного обеспечения агропромышленного комплекса*. Moscow: VNIITEI agroprom / ВНИИТЭИ агропром, pp.200.
 23. BAUTIN, V.M. and LAZOVSKI, V.V., 1999. Agricultural Consultancy in Russia in the XX century. M: Kolos, p.139 / Сельскохозяйственное консультирование в России в XX веке.
 24. BECK, H., 2008. Evolution of Database Designs for Knowledge Management in Agriculture and Natural Resources. *Journal of Information Technology in Agriculture, University of Florida* 3(1) pp.23
 25. BERGENOV, A., 2004. Features of state support for the agricultural sector in the conditions of accession to the WTO / Особенности государственной поддержки аграрного сектора экономики в условиях вступления Казахстана в ВТО. *Poisk, Scientific journal of the Ministry of Education and Science, RoK*. No 1, pp.27-32.

26. BLANDFORD, D., 2007. Information Deficiencies in Agricultural Policy Design, Implementation and Monitoring. *OECD Food, Agriculture and Fisheries Working Papers, No. 6, OECD Publishing.*
27. BLEEK, W., 1987. *Lying informants: a fieldwork experience from Ghana.* Population and development review, Vol.13, No.2 (Jun, 1987), pp.314-322.
28. BLUMER, H., 1969. *Symbolic Interactionism; Perspective and Method.* Englewood Cliffs, NJ: Prentice-Hall
29. BOGDAN, R. and TAYLOR, S.J., 1975. Introduction to qualitative research methods -A Phenomenological Approach to the Social Sciences. New York: John Wiley & Sons, 1975, pp.259.
30. BOGOMOLOV, O.T., 2005. It was not named "China" / Ее звали не «Китай» *Newspaper: NovayaGazeta.Ru*, No.45, 27.06.2005
31. BORISOV, A. B., 2003. *Great Dictionary of Economics / Большой экономический словарь.* Moscow: World of Books. pp.895
32. BORISOV, D.V., 2011. New information technologies in agriculture of Tajikistan / Новые информационные технологии в сельском хозяйстве Таджикистана. [online]. Available from: <http://www.kazedu.kz/referat/196944> (Accessed 15 November 2013)
33. BRYMAN, A. and BELL, E., 2011. *Business Research Methods.* 3rd Edition. Oxford: Oxford University Press
34. BRYMAN, A., 2001. *Social research methods.* Oxford university press.
35. BUREAU OF LABOR STATISTICS, n.d., U.S. Department of Labor. Nature of the Work. [online]. Available from: <http://www.collegegrad.com/careers/manag11.shtml> (Accessed 2 February 2012)
36. BUSINESS DICTIONARY.com, Available from: <http://www.businessdictionary.com/definition/European-Commission.html#ixzz3Sk2rhYoO> Accessed 25 February 2015
37. CHAPARRO, F., 1999. ICT, Networking and Knowledge Systems in Agricultural and Rural Development. *Paper: Second Conference of the EFITA, Bonn*, pp.21.
38. CHARMAZ, K., 2006. *Constructing grounded theory: A practical guide through qualitative analysis.* Thousand Oaks, CA: SAGE.
39. CHECKLAND, P. and HOLWELL, S., 1998. *Information, systems and information systems: making sense of the field.* Chichester, UK: John Wiley and Sons.
40. CHELINTSEV, A.O., 1999. On the construction of agricultural cooperatives. Agriculture - control economy. pp. 72-75 / О строительстве сельскохозяйственной кооперации.
41. CHIFWEPA, V., 1993. *Agricultural library co-operation in Zambia. Information Development*, Vol. 19 No. 1, pp.76-81
42. CHUVASH STATE AGRICULTURAL ACADEMY (CSAA), 2006. Information and advice to ensure the agro-industrial complex of the Republic of Chuvashia / Информационно-

- консультационное обеспечение агропромышленного комплекса (АПК) Республики Чувашия. Available from: <http://bibliofond.ru/view.aspx?id=41239> . Accessed 13 March 2015
43. CIS Declaration, 1999. *Declaration of the Heads of CIS member states on the main directions of development of 04/02/1999 / Декларация глав государств-участников СНГ об основных направлениях развития от 2.04.1999.*
44. COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS (EC), 2010. The CAP towards 2020: Meeting the food, natural resources and territorial challenges of the future. Brussels, 18 November 2010. [online]. Available from: http://ec.europa.eu/agriculture/cap-post-2013/communication/com2010-672_en.pdf (Accessed 21 December 2014)
45. COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS (Communication from the Commission), 2010. *The CAP towards 2020: Meeting the food, natural resources and territorial challenges of the future.* pp.14
46. CONSULTATION ON AGRICULTURE INFORMATION MANAGEMENT (COAIM), 2000. Access to Agricultural Information. [online]. *Working document.* Rome. Available from: http://www.fao.org/docrep/meeting/x7035e.htm#P33_164 (Accessed 21 December 2013)
47. CORBIN, J.M. *In Vivo Coding.* 2004, The SAGE Encyclopedia of Social Science Research Methods, Vol.3 (pp.413-886). By Michael Lewis-Beck, Alan E Bryman, Tim Futing Liao.
48. COURTOIS, P., and SUBERVIE, J., 2014. Farmer bargaining power and market information services. [online]. *American Journal of Agricultural Economics.* Available from: <http://ajae.oxfordjournals.org/> (Accessed 23 May 2015)
49. CUFFARO, N., 2003. Economic Development, Agriculture and Macroeconomic Policies. Training materials. Published by National Agriculture Policy Center (NAPC) with the support of the FAO Project. Damascus
50. DANAY A.I., 2002. *The role of new technologies in Kazakhstan's economy development after 10 years since independent / Роль новых технологий в развитии экономики Казахстана после 10 лет приобретения независимости.* Almaty: Otan pp. 118
51. DANENOV, N., 2008. Economic and Social Council. New York, [online]. Provisional Programme. Available from: <https://www.un.org/ar/ecosoc/docs/programme/08%20HLS%20Programme.pdf> (Accessed 31 May 2012)
52. DANILOV, A.A., 1994. *Russia and the World: Learning history book.* In two parts. Part II / Россия и мир: Учебная книга по истории. В 2-х частях. Часть II.
53. DARINOV, A., 2011. Farmers of Kazakhstan are not satisfied with the state Agricultural Policy / Фермеров Казахстана не устраивает государственная аграрная политика. *Business Weekly Journal "KURSIV" №4-2.*

54. DEMBITSKI, S., 2010. Grounded theory: strategy for the collection and analysis of qualitative data with theoretical validation / Обоснованная теория: стратегия сбора и анализа качественных данных при теоретической валидации. *Sociology: theory, methods, marketing*.
 55. DEMIRYUREK, K., 2000. *The analysis of information systems for organic and conventional hazelnut producers in three villages of the Black Sea Region, Turkey*. Unpublished doctoral dissertation. University of Reading. UK.
 56. DEMIRYUREK, K., ERDEN, H., CEYHAN, V., ATASEVER, S., UYSAL, O., 2008. *Agricultural information systems and communication networks: The case of dairy farmers in Samsun province of Turkey*. *Information research*, 13(2).
 57. DEMIRYUREK, K., 2010. *Journal of Agriculture Economy*. Information systems and communication networks for agriculture and rural people. *Agriculture Economy, CZECH*, 56, 2010 (5): 209–214.
 58. DENZIN, N. and LINCOLN, Y., 2001. *A Handbook of Qualitative Research*. 2nd Edition. Thousand Oaks, CA: Sage
 59. DENZIN, N.K., LINCOLN, Y.S., 2003. *Strategies of qualitative inquiry*. California: Sage publications
 60. DHAHRAN BRITISH GRAMMAR SCHOOL (DBGS). Farming in the 1920's. [online]. Available from: http://www.dhahranbritish.com/history/A9_Farming20s.htm (Accessed 20 February 2009)
 61. DICTIONARY.COM. The American Heritage. New Dictionary of Cultural Literacy, Third Edition. [online]. Available from: http://dictionary.reference.com/browse/european_union Accessed 25 February 2015, from
 62. DICTIONARY OF PHILOSOPHY / Новейший философский словарь. [online]. Available from: http://dic.academic.ru/dic.nsf/dic_new_philosophy (Accessed 20 February 2009)
-
63. DIESING, P., 1971. *Patterns of Discovery in the Social Sciences*. Chicago: Aldine-Atherton, Inc.
 64. DIMITRI, C., EFFLAND, A., CONKLIN, N., 2005. The 20th Century Transformation of U.S. Agriculture and Farm Policy. Electronic Report from the Economic Research Service. *Economic Information Bulletin* No.3.
 65. DODABAYEV, U., 2007. *Analysis of economic activity / Анализ хозяйственной деятельности*. Almaty: Economics, pp.476с.
 66. EASTERBY-SMITH, M., THORPE, R., and JACKSON, P., 1991. (1st ed.) *Management research*. Published: Great Britain by Ashford Colour Press Ltd, pp.144.
 67. ECOLOGIC INSTITUTE: SCIENCE AND POLICY FOR A SUSTAINABLE WORLD. German Perspectives on the Current CAP Reform. [online]. Available from: <http://www.ecologic.eu/2871> (Accessed 18 November 2014)
 68. ECONOMIC RESEARCH SERVICE, U.S. DEPARTMENT of AGRICULTURE (ERS, USDA), 2007. *Agricultural Resources and Environmental Indicators*. [online]. Economic

- Information Bulletin 16, Washington, DC. Available from: <http://www.ers.usda.gov/publications/arei/> (Accessed 25 September 2007)
69. ECONOMIST INTELLIGENCE UNIT (EIU), 2006. Enhancing regional cooperation in infrastructure development including that related to disaster management. [online]. Report, pp.58. Available from: http://www.unescap.org/pdd/publications/themestudy2006/10_ch4.pdf (Accessed 31 May 2012)
 70. EGAN, M., 2002. Grounded theory research and theory building. *Advances in Developing Human Resources* № 3.
 71. EKHLAKHOVA, U.P., 1997. *Information technology in management and decision-making / Информационные технологии в управлении и принятии решений*. Tomsk: TGU, pp.238.
 72. EURASIAN ECONOMIC UNION (EAEU), 2014. The creation of the Eurasian Economic Union/ Евразийский Экономический Союз (ЕАЭС). Создание Евразийского экономического союза. [online]. Available from: <http://ria.ru/spravka/20140529/1009667833.html> (Accessed 1 January 2015)
 73. EUROPEAN COAL AND STEEL COMMUNITY (ECSC). [online]. Available from: http://en.wikipedia.org/wiki/European_Coal_and_Steel_Community Accessed 5 January 2015)
 74. EUROPEAN COMMISSION (EC), 2010. *Europeans, Agriculture and the Common Agricultural Policy. Full report*. Brussels, Belgium.
 75. EUROPEAN COMMISSION (EC), 2012. Directorate-General (DG) for agriculture and rural development. Why do we need a Common Agricultural Policy? *Discussion paper by DG agriculture and rural development*.
 76. EUROPEAN COMMISSION, AGRICULTURE AND RURAL DEVELOPMENT (EC, A&RD), 2010. The common agricultural policy after 2013. Public debate, *Summary report*. (37 p.)
 77. EUROPEAN COMMISSION (EC), 2007. Europeans, agriculture and the Common Agricultural Policy. [online]. Available from: http://ec.europa.eu/public_opinion/archives/ebs/ebs_276_sum_en.pdf (Accessed 25 November 2014)
 78. EUROPEAN MOVEMENT (EUROMOV). The Common Agricultural Policy, 2008. [online]. Available from: <http://www.euromove.org.uk/index.php?id=6514> (Accessed 24 April 2008)
 79. FAFCHAMPS, M., and MINTEN, B., 2012. *Impact of SMS-Based Agricultural Information on Indian Farmers*. [online]. The World Bank Economic Review, vol.26, no 3, pp.383 –414. Available from: <http://wber.oxfordjournals.org/> (Accessed 23 May 2015)
 80. FARMSUBSIDY ORGANIZATION (FSO). [online]. Available from: <http://farmsubsidy.openspending.org/transparency/> (Accessed 10 February 2011)
 81. Federal Ministry of Food, Agriculture and Consumer Protection (FM of FACP), 2010. German Agriculture Facts and Figures. [online]. Available from: http://www.bmel.de/SharedDocs/Downloads/EN/Publications/GermanAgriculture.pdf?__blob=publicationFile (Accessed 21 December 2014)

82. FEDOSEEV, A., 2014. Prospects for integration in the post-soviet countries / Перспективы интеграции на постсоветском пространстве. Newspaper "Kaliningradskay Pravda / Калининградская правда" №30
83. FENNEL, R., 1997. *The Common Agricultural Policy: Continuity and Change*. Clarendon Press. pp.439.
84. FLICK, U., 2002. *An Introduction to Qualitative Research*. 2nd Edition. London: Sage
85. FOOD AND AGRICULTURE ORGANIZATION (FAO), 1996. The world food summit. Rome, Italy. 13-17 November 1996.
86. FOOD AND AGRICULTURE ORGANIZATION (FAO), 1998. Knowledge and information for food security in Africa: from traditional media to the Internet. *FAO Research, Extension and Training Division. Communication for Development Group, Extension, Education and Communication Service (SDRE)*. [online]. Available form: <http://www.fao.org/waicent/vercon/default.htm> (Accessed 25 January 2013)
87. FOOD AND AGRICULTURE ORGANIZATION (FAO), 2004. A review of FAO's digital information resources for APAARI (Asia-Pacific Association of Agricultural Research Institutions). *Reports FAO Regional Office for Asia and the Pacific*, pp.9
88. FOOD AND AGRICULTURE ORGANIZATION (FAO), 2010. 27th FAO Regional Conference for Europe and Central Asia. Armenia: 13-14 May, 2010.
89. FORUM FOR THE AMERICA'S ON AGRICULTURAL RESEARCH AND TECHNOLOGY DEVELOPMENT (FORAGRO). Dialogue and Articulation for Regional Agricultural Research and Technological Development. [online]. Available from: www.iica.int/foragro (Accessed 15 November 2011)
90. GABITOV, A., 2012. Corruption ruining Kazakhstan. *Kazakh-Zerno.kz Newspaper / Коррупция разоряет Казахстан. Газета "КазакЗерно.kz"* [online]. Available from: <http://kazakh-zerno.kz> (Accessed 25 November 2014)
91. GARFORTH, C., and USHER, R., 1996. *Methodologies for analysing and improving the effectiveness of promotion and uptake pathways for renewable natural resources information and technology: a review paper*. Reading: AERDD, The University of Reading. (Working Paper 96/8.)
92. GATAULIN, A.M., 1997. *Problems of formation of Russian agricultural market. Proceedings of independent agrarian Economic Society of Russia / Проблемы формирования аграрного рынка России*. Труды независимого аграрного-экономического общества России. Moscow: МСХА, pp.584.
93. GAYDAR, E. T., 1992. Logic of reforms / Логика реформ. *Journal "Questions of economics / Voprosy ekonomiki"* #2, p.13.
94. GERSON, K. and HOROWITZ, R., 2002. *Observation and Interviewing: Options and choices* in T.May (ed.), *Qualitative Research in Action*. London: SAGE

95. GIBBS, G.R. and TAYLOR, C., 2005. *How and what to code*. Press: University of Huddersfield. [online]. Available form: http://onlineqda.hud.ac.uk/Intro_QDA/how_what_to_code.php (Accessed 15 October 2012)
96. GILBERT, N., 2001. *Researching social life*. London: SAGE, pp.406. [online]. Available form: [http://www.corwin.com/upm-data/18483_03_Gilbert\(Researching\)_Ch_02_WATERMARKED.pdf](http://www.corwin.com/upm-data/18483_03_Gilbert(Researching)_Ch_02_WATERMARKED.pdf) (Accessed 31 May 2012)
97. GLASER, B.G., 1978. *Theoretical sensitivity*. University of California San Francisco.
98. GLOBAL FORUM FOR AGRICULTURE RESEACRH (GFAR). [online]. Available from: www.egfar.org (Accessed 15 November 2011)
99. GLOSSARY OF COMMOMN AGRICULTURAL POLICY (Glossary of the CAP), 2014. [online]. Available from: http://ec.europa.eu/agriculture/glossary/pdf/index_en.pdf (Accessed 29 December 2014)
100. GRIGORUK, V.V., 2012. Kazakhstan's model of agriculture development / Казахстанская модель сельского развития. Kazagroinnovation/ Казагроинновация. *Journal of Kazakhstan's Agrarians*.2012 (6)
101. GRUBER, H., and KOUTROUMPIS, P., 2011. Mobile telecommunications and their impact on economic development in Economic Policy. [online]. Available from: economicpolicy.oxfordjournals.org/content/economicpolicy/26/67/387/full.pdf (Accessed 8 February 2015)
102. GUMMESSON, E., 1999. *Qualitative Methods in Management Research*. 2nd Edition. Thousand Oaks: Sage
103. HANCOCK, B., 1998. *Trent Focus for Research and Development in Primary Health Care: An Introduction to Qualitative Research*. Trent Focus.
104. HANSIN, D., 1997. Why did Britain join the EEC in 1973, and not before or later? Department of Environment and Rural Affairs (DEFRA). CAP Reform Countdown An introduction to the new Common Agricultural Policy schemes in England. [online]. Available from: www.gov.uk/government/uploads/system/uploads/attachment_data/file/303263/cap-reform-leaflet.pdf (Accessed 21 December 2014)
105. HARDING, J., 2006. *Grounded Theory*. The Sage Dictionary of Social Research Methods. London: Sage publications
106. HARDING, J., 2013. *Qualitative data analysis from start to finish*. London: Sage publications
107. HISTORY OF KAZAKHSTAN, 2012. Independent Kazakhstan / Независимый Казахстан. [online]. Available form: <http://e-history.kz/ru/contents/list/107> (Accessed 12 December 2012)
108. HOLLING, H., 1978. *Adaptive Environmental Assessment and Management*. John Wiley and Sons, New York.
109. INDUSTRIAL STRATEGY: government and industry in partnership. HM Government. [online]. Available from: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/227259/9643-BIS-UK_Agri_Tech_Strategy_Accessible.pdf (Accessed 6 January 2015)

110. INFORMATIONAL AGENCY KAZAKH-ZERNO (IA K-Z)"/ ИНФОРМАЦИОННОЕ АГЕНСТВО “КАЗАХ-ЗЕРНО, 2011. Formation of agriculture for years of independence of the Republic of Kazakhstan / Становление сельского хозяйства за годы Независимости Республики Казахстан. *Journal of Informational Agency in Kazakhstan.No7*
111. INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE (IFPRI), 2008. Improving information, increasing agricultural productivity. [online]. Washington, DC: The international Food. Available from: <http://www.ifpri.org/pressrelease/improving-information-increasing-agricultural-productivity> (Accessed 5 March 2011)
112. INTERNATIONAL INSTITUTE FOR COMMUNICATION AND DEVELOPMENT (IICD), 2006. [online]. Available form: <http://web.idrc.ca/openebooks/302-x/> (Accessed 12 March 2008)
113. IT-PUBLICATIONS. [online]. Available from: <http://iport.kz/> (Accessed 15 November 2010)
114. ISMURATOV, S.B., 2000. *Economic bases of specialization of agricultural production cooperatives in Northern Kazakhstan / Экономические основы специализации сельскохозяйственных производственных кооперативов Северного Казахстана*. Moscow. *Unpublished thesis* (Doctor of economic science), pp.297.
115. JAROLIMEK, J., ULMAN, M., 2014. Accessibility of the Regional Information Based on the Regional Information Structure Framework. *Agris on-line Papers in Economics and Informatics VI (1), Czech University of Life Sciences in Prague*. [online]. Available from: http://online.agris.cz/files/2014/agris_on-line_2014_1_jarolimek_ulman.pdf (Accessed 18 October 2014)
116. JOHN, W.M. and BRUCE, F. J., 1984. The world food equation: interrelations among development, employment and food consumption. *Journal of Economic Literature*, pp. 531-574.
117. KABANOVA, O.V., 2001. *Information support of economic decisions in farm management*. North Caucasus State Technical University. *Unpublished candidate dissertation*.
118. KAIGORODTSEVA, T.F., 2013. *WTO: pros and cons for Kazakhstan / ВТО: за и против для Казахстана*. Russia: G-global.
119. KALIEV, G.A., 2003. Agricultural problems at the turn of the century / Аграрные проблемы на рубеже веков. *Journal of Kazakhstan's Agrarians. Almaty*, pp. 340.
120. KALOXYLOS, A., GROUMAS, A., SARRIS, V., KATSIKAS, K., MAGDALINOS, P., ANTONIOU, E., POLITOPOULOU, Z., WOLFERT, S., BREWSTER, C., EIGENMANN, R., MAESTRE Terol, C., 2014. A cloud-based Farm Management System: Architecture and implementation. *Computers and Electronics in Agriculture Journal*. [online]. 100 (2014) pp.168–179. [online]. Available from: www.elsevier.com/locate/compag (Accessed 16 October 2014)
121. KALOXYLOS, A., WOLFERT, J., VERWAART, T., MAESTRE TEROL, C., BREWSTER, C., ROBBEMOND, R. and SUNDMAKER, H., 2013. The Use of Future Internet Technologies in the Agriculture and Food Sectors: Integrating the Supply Chain. 6th International Conference on Information and Communication Technologies in Agriculture, Food and Environment

- (НАИСТА 2013). *Procedia Technology* [online]. pp. 51 – 60. Available from: www.sciencedirect.com (Accessed 16 October 2014)
122. KARBAYEV, E., 2011. *Land reform in 20 years of Independence of the Republic of Kazakhstan / Земельная реформа за 20 лет Независимости Республики Казахстан*. Press: North Kazakhstan Regional Land Organization / Солтүстік Қазақстан облысының жер қатынастары басқармасы.
123. KAWULICH, B.B., 2004. *Qualitative data analysis techniques*. University of West Georgia.
124. KAZAKHSTAN INSTITUTE FOR STRATEGIC STUDIES (KISS) / КАЗАХСТАНСКИЙ ИНСТИТУТ СТРАТЕГИЧЕСКИХ ИССЛЕДОВАНИЙ (КИСИ), 2008. *Kazakhstan in the world of economic processes / Казахстан в системе мировых экономических процессов*. Almaty.
125. KAZAKHSTAN TODAY / КАЗАХСТАН СЕГОДНЯ, 2010. Newspaper “Kazakhstan Today”
126. KAZHRAKHIMOV, Z.O., 2003. Assessment of the financial condition of the agricultural organizations of the North Kazakhstan region / Оценка финансового состояния сельскохозяйственных организаций Северо-Казахстанской области. *Journal of Agricultural Science of Kazakhstan “Bastau/Bastay”* № 4, pp.14-18.
127. KHASANOV, H., 2003. Reforms in economy / Реформы в экономике. *Journal “The problems of modern economy”*, #6, pp.21- 33.
128. KHASANOV, M.A. and YARULLIN, R.R., 2012. *Features and organization of Russian Federation agrarian policy at the present stage / Особенности и организации аграрной политики РФ на современном этапе*. Russia, Moscow: Academic.
129. KHRAMKOV, A., 2011. Application of scientific advances in agriculture in Kazakhstan - at the 1970s. *Daily Republican political newspaper “Liter”*.
130. KILJUNEN, K., 2004. The European Constitution in the Making. [Centre for European Policy Studies](http://www.cepr.eu).
131. KIRSHKE, D., 2000. The international agricultural economy and agricultural policy. *International agricultural journal / Mezhdunarodnyi Selskokhozyaystvennyii Zhurnal*, No6 pp.5-13.
132. KOESTER, U., 2000. The Role of Germany in the Common Agricultural Policy. [online]. Available from: <http://www.agric-econ.uni-kiel.de/Abteilungen/marktlehre/research/download/The%20role%20of%20Germany.pdf> (Accessed 16 February 2008)
133. KOKATE, K.D., SINGH, A.K., 2012. Use of mobile technologies for empowering small holder farmers in India. *Indian Council of Agricultural Extension, KAB-1, Pusa, New Delhi*. [online]. Available from: <http://www.indabook.org/d/Use-of-Mobile-Technologies-for-Empowering-Small-holder.pdf> (Accessed 19 October 2014)
134. KONDRATEV, N.D., 1989. Problems of economic dynamics. -М .: 66. Economy, pp. 91-102/ Проблемы экономической динамики.

135. KOROTKOE, E.M., 1997. *The concept of management / Концепция менеджмента*. Inzhinirengo & Consulting Company. Russia: Deka. pp.304.
136. KOROTNEV, V.D., 2004. Assurance system of agriculture personnel management: theory, methodology, practice / Система обеспечения сельского хозяйства кадрами управления: Теория, методология, практика. Moscow. *Unpublished thesis (Candidate of economic science)*, pp.249.
137. KOSHELEV, V.M. and KOROLKOV, A.F., 1997. Learning objectives of managers and specialists of information and consultancy services APC. Newsletter Ministry of Agriculture of the Russian Federation. pp.40-45 / Задачи обучения руководителей и специалистов информационно-консультационных служб АПК.
138. KOSHELEV, V.M., 1998. Prospects for the development of staff from training information and consulting centers in agriculture. Newsletter Ministry of Agriculture of the Russian Federation. 1-2, p.38-41 /Перспективы развития системы обучения кадров информационно-консультационной службы АПК.
139. KOSHELEV, V.M., ALEKSANOV, D.S., KOROLKOV, A.F., 1998. About the project of creating an integrated system of knowledge transfer to rural producers. Newsletter Ministry of Agriculture of the Russian Federation. / О проекте создания комплексной системы передачи знаний сельским товаропроизводителям.
140. KOZLOV, V.V., 1998. Results and perspectives of the Nizhny Novgorod agribusiness consulting service. Newsletter Minselhozproda of Russia. pp. 40-42 / Итоги и перспективы деятельности Нижегородской консультационной службы АПК.
141. KUENKEL, N., 2004. Introduction to German agriculture policy. [online]. Available from: http://www.glow-boell.de/media/de/txt_rubrik_5/SuS_Kuenkel_Introd2.pdf (Accessed 13 February 2011)
142. KUMAR, R., 2005. *Research methodology*. London: SAGE Publications.
143. KURMANOVA, G.K., 2010. *Land attitudes in Kazakhstan: the theory, practice and ways of development. / Земельные отношения в Казахстане: теория, практика и пути развития. A manuscript D. of Economy Science thesis*. Economics and national economy, Astana.
144. KUTSENKO, S.P., ZHUCHENKO, V.Y., SMOLIYANIKOV, V.I., 1972. Organization of machining economic information in rural regions / Организация машинной обработки экономической информации в сельском хозяйстве. Moscow: Statistics, 1972, -416p.
145. LAPIN, A.V., 2006. Improvement of the regional system of information and consultation to ensure agricultural producers: the example of АПК Smolensk region. Russia: Bryansk. Unpublished Thesis / Совершенствование региональной системы информационно-консультационного обеспечения сельскохозяйственных товаропроизводителей: на примере АПК Смоленской области (на правах рукописи).
146. LAPINA, L.V., SHUMAKOVA, E.V., 2013. Состояние и перспективы развития сельского хозяйства Тверской области. *Journal Vestnik Tsv.GU/ Журнал Вестник ТвГУ*. Выпуск 22, pp. 126-136.

147. LAW OF THE REPUBLIC OF KAZAKHSTAN on the administrative-territorial structure of the RK (as amended 03.07.2013). [online]. Available from: http://online.zakon.kz/Document/?doc_id=1007265 (Accessed 02 February 2015)
148. LEE, J.W., TAI, S.W., 2008. *Environmental management and sustainable development in the oil and gas industry: A case study from Kazakhstan*. London, UK: Taylor and Francis, 2008: pp. 185-198.
149. LIAO, J., Li, L. and LIU, X., 2013. An integrated, ontology-based agricultural information system. *Information Development* 1(14). [online]. Available from: <http://idv.sagepub.com/content/early/2013/11/06/0266666913510716> (Accessed 18 October 2014)
150. LOWE, A., 1998. Grounded Theory. Lecture at Robert Gordon University, May 1998
151. LUKIANOV, P.B., 2009. Modern information technology in agriculture / Современные информационные технологии в сельском хозяйстве. [online]. Available from: <http://agrarnyisector.ru/rastenevodstvo/kormoproizvodstvo/sovremennye-informacionnye-tekhnologii-v-selskom-khozyajstve.html> (Accessed 15 November 2014)]
152. LUNDBERG, M., 2005. *Agricultural market reforms. Analyzing the Distributional Impact on Reforms: A practitioner's guide to trade, monetary and exchange rate policy, utility provision, agricultural markets, land policy, and education, Volume 1*, Washington, D.C.: The World Bank. (A. Coudouel and S. Paternostro, eds.)
153. MAHMOODI, M., PEZESHKI-RAD, Gh. AND CHIZARU, M., 2011. Identifying training needs of agriculture and natural resources. *Agriculture Science Technology Vol. 13 pp.979-987*
154. MALTSEVA, V.A., 2010. *State agricultural policy of the USA on modern stage / Государственная аграрная политика США на современном этапе*. Russia: Yeakaterinburg / Екатеринбург
155. MALTSEVA, V.A., 2011. *Disintegration of the USSR. Who is to blame for the collapse of the USSR / Распад СССР. Кто виноват в развале СССР*. Russia: Press.
156. MALYSHEVA, N.V., 2013. Factors affecting the development of agriculture, taking into account peculiarities of agricultural activity / Факторы, влияющие на развитие сельского хозяйства с учетом особенностей деятельности сельхозпроизводителей. *State University of Vyatsk / Вятский государственный университет» № 5*.
157. MASALKOV, I. and KIBLITSKAYA, M., 2003. *Methodology and research design in the style of the case studies / Методология и дизайн исследования в стиле кейс студии*. Moscow: International University of Business and Management (UIBM).
158. MASON, J., 2002. *Qualitative Interviewing: Asking, Listening and Interpreting. Qualitative Research in Action*. London: SAGE, pp. 225–41.
159. MASON, M., 2010. Sample Size and Saturation in PhD Studies Using Qualitative Interviews. [63 paragraphs]. *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research, 11(3)*, Art. 8 [online]. Available form: <http://nbn-resolving.de/urn:nbn:de:0114-fqs100387> (Accessed 2 May 2011)

160. MAULENKULOV, Z., 2001. *The ways to improve the efficiency of agricultural production / Пути повышения эффективности сельскохозяйственного производства. Unpublished M. Phil thesis.* Kazakh University of Economy, Almaty.
161. MCNAMARA, K., BELDEN, C., KELLY, T., PEHU, E., DONOVAN, K., 2011. Introduction: ICT in agricultural development. Facebook Users in the World. E-source book. Available from: http://www.ictinagriculture.org/ictinag/sites/ictinagriculture.org/files/final_Module1.pdf [online]. (Accessed 15 September 2012)
162. MEENA, H.R. and SINGH, Y.P., 2013. Importance of information and communication technology tools among livestock farmers: a review. *Scientific Journal of Pure and Applied Sciences*. [online]. 2(2), pp.57-65. Available from: <http://www.sjournals.com/index.php/SJPAS/article/viewFile/466/514> (Accessed 10 October 2014)
163. MIKESHINA, L.A., 2006. Philosophy of Science: epistemology. Methodology / *Философия науки. Эпистемология. Методология. Study Guide 2nd edition, revised and enlarged.* Moscow. Publishing House International University in Moscow.
164. MILES, M. B., and HUBERMAN, A. M., 1994. *Data management and analysis methods.* Handbook of Qualitative Research. Thousand Oaks: SAGE Publications.
165. MILOSERDOV, V.V. and MILOSERDOV K.V., 2002. *Agriculture policy in Russia / Аграрная политика России.* Moscow: Science. XX Century. Russia, Moscow: FGUP, VO Minselkhoz Russia.
166. MILOSERDOV, V.V., 1992. Jump into the market. *AIC: Economics, Management / Прыжок в рынок. АПК: экономика, управление.* №3. pp.20-19
167. MINISTRY OF FOOD, AGRICULTURE, AND CONSUMER PROTECTION (Ministry of DA&CP), 2013. Germany's position on agricultural reform. [online]. Available from: http://jsis.washington.edu/euc/file/2010%20MEU/Germany_Agriculture_Position_Paper.pdf (Accessed 1 November 2014)
168. MOKYR, N., 1990. Path Dependency. [online]. Available from: <http://economics.about.com/od/economicsglossary/g/pathdy.htm> (Accessed 15 January 2015)
169. MOLLETT, J.A., 1988. *Intereconomics Journal, University of Oxford.* The impact of agricultural price policy in developing countries
170. MOZHIN, V.P., 1974. Optimization of planning decisions in the agriculture / *Оптимизация плановых решений в сельском хозяйств* Moscow. Economics 1974,- pp.151
171. MUNYUA, H., 2000 (posted). Information and Communication Technologies for rural development and food security: Lessons from field experiences in developing countries. [online]. Available from: <http://www.fao.org/sd/cddirect/cdre0055b.htm> (Accessed 12 January 2008)
172. MUSINA, R., 2005. Methodical basis of formation and development of multistructure economy in the agriculture / *Методические основы формирования и развития*

- многоукладной экономики в сельском хозяйстве. *POISK Scientific Journal of Ministry of Education and Science of RK*. №4.
173. NAIDENOV, V.I., and DOLGONOSOV, B.M., 2005. *Humanity cannot survive without the production of knowledge / Человечество не выживет без производства знаний*. Russia: Press.
174. NAZARBAYEV, N.A., 1992. Strategy of Establishment and Development of Kazakhstan as a Sovereign State. *The Regulations created by President of the Republic of Kazakhstan*
175. NAZARBAYEV, N.A., 1996. *On the threshold of the XXI century / На пороге XXI века*. Published: Almaty Press.
176. NAZARBAYEV, N.A., 2001. Ten years equal century / Десять лет, равные столетию. *Proceedings of the President of the Republic of Kazakhstan Nursultan Nazarbayev to the funds of the Museum of the First President of the Republic of Kazakhstan*.
177. NAZARBAYEV, N.A., 2003. *The main directions of domestic and foreign policy for the year 2004 / Основные направления внутренней и внешней политики на 2004 год*. Message from the President of the Republic of Kazakhstan Nursultan Nazarbaev of Kazakhstan. April 2003.
178. NAZARENKO, V.I., 2000. *Agricultural Policy (the West, Eastern Europe, Russia) / Аграрная политика (Запад, Восточная Европа, Россия)*. Ch 1, 2: Survey. Moscow: VNIITE and Agroprom.
179. NEVILLE, C., 2007. The Complete guide to referencing and avoiding Plagiarism. Open University Press Educational and Professional Book Publishers. McGraw Hill Education Europe. [online]. Available from: <http://www3.pcad.edu/Library/FAQs/Neville,%20Colin%20The%20Complete%20Guide%20to%20Referencing%20and%20Avoiding%20Plagiarism.pdf> (Accessed 12 September 2013)
180. NEW YORK CITY (NY City). Modern information technology / Современные информационные технологии. [online]. Available from: <http://www.mynyc.ru/soedinennye-shtaty-ameriki/selskoe-hozyaystvo-ssha/perspektivy-azvitiya-selskogo-hozyaystva/sovremennye-informacionnye-tehnologii/> (Accessed 4 November 2013)
181. NIENKE, M.B. and GERT-JAN, S., 2008. Measuring agricultural research investments. A revised global picture. ASTI Background Note. October 2008.
182. NILES, K., and D. ORDEN, 1996. *Macroeconomic Policies and U.S. Agriculture. Southern Agriculture in a World Economy*. SRDE No. 198 International Trade Leaflets 1-10.
183. NOVICHKOV V.I., KALASHNIKOV I.B., NOVICHKOVA V.I., 2001. *Agriculture policy / Аграрная политика*. Moscow, RF: Marketing. pp.288.
184. NUTI, D.M., 2010. The Former Soviet Union after dis- integration and transition. *TIGER Working Paper Series, No 117*, Warsaw.
185. O'FARRELL, C. and TREINEN, S., 2002. FAO, *Gender and ICTs. FAO COAIM Side Event on Gender and Agricultural Information Management*. 24 September 2002.
186. OLESIK, C. Y., 2008. The problems of the formation of high schools students' population of the USSR (1944-1990) / Проблемы формирования студенческого контингента вузов СССР

- (1944-1990 гг.). *Journal of Herald Adygei State University / Журнал “Вестник Адыгейского государственного университета” №2.*
187. OMEKWU, C., 2003. National agricultural information management system in Nigeria: a conceptual framework. [online]. *Library Review*, vol.52, no 9. pp. 444-451. Available from: <http://dx.doi.org/10.1108/00242530310501464> (Accessed 25 May 2015)
188. ORAZGALIEVA, A.K. and URAZALINOV, E.B., 2011. Features of Agrarian Policy of the Republic of Kazakhstan: directions, mechanisms, methods / Особенности аграрной политики Республики Казахстан: направления, механизмы, методы. *Semei: Journal of Kazakh finance-economic academy.*
189. ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD), 1994. *The OECD jobs study: Facts, Analysis, Strategies. OECD Publishing.*
190. ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD), 2004. Farm household income: towards better informed policies, Policy Brief, OECD, Paris. [online]. Available from: <http://www.oecd.org/dataoecd/43/54/33817664.pdf> [Accessed 10 February 2011].
191. ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD), 2013. OECD review of Agricultural policies: Kazakhstan 2013. *Report. OECD Publishing.*
192. ORIENTAL EXPRESS CENTRAL ASIA (OREXCA). [online]. Available from: <http://kazakhstan.orexca.com/> (Accessed 20 December 2012)
193. OSHAKBAYEV, R., 2012. Banks increased lending to agriculture in Kazakhstan after coming into the industry of public funds / Банки увеличили кредитование сельского хозяйства в Казахстане после прихода в отрасль госсредств. *Information agency Novosti-Kazakhstan.*
194. OSPANOV, B.S., 2002. Land reform in Republic of Kazakhstan: methodology, methods, practices / Земельная реформа Республики Казахстан: методология, методы, практика. *A manuscript D. of Economy Science thesis. Russian Scientific Research Institute of Economy, Labour and Management in Agriculture.*
195. OSPANOV, E.S. and KAIGORODTSEV, A.A., 2006. Food security in Kazakhstan: Theory and Practice / Продовольственная безопасность Казахстана: теория и практика. *Vestnik KASU Journal №4* pp.204.
196. OVCHINNIKOV, O.G., 1999. State regulation of the agricultural sector of the USA / Государственное регулирование аграрного сектора США. [online]. Available from: <http://www.iskran.ru/russ/content-ru.html> (Accessed 2 January 2015)
197. OZCATALBAS, O., BRUMFIELD, R.G. and OZKAN, B., 2004. The agricultural information system for farmers in Turkey. SAGE Publications. Vol. 20 (2) pp. 97-105. [online]. Available from: <http://idv.sagepub.com/content/20/2/97> (Accessed 17 November 2014)
198. PAARLBERG, R. and PAARLBERG, D., 2000. The agricultural revolution of the 20th century. Iowa State University Press

199. PALMIERI, V. and RIVAS, L., 2007. *Information Management for Agricultural Technology Innovation*. Comuniica Magazine, May-August, 2007.
200. PANFILOVA, V., 2013. Relations between Russia and Kazakhstan - a good example of non-conflict-cooperation. *Kazakhstan news: Agency of international information* / Отношения между Россией и Казахстаном – хороший пример бесконфликтного сотрудничества. *Казахстан –новости: Агентство международной информации*.
201. PANTELEEVA, O., 2012. Agricultural policy in developed countries / Аграрная политика развитых стран. *Отечественные записки / Journal "Otechestvenniye Zapiski"* №6 (51).
202. PARKER, C., RAMDAS, K., SAVVA, N., 2013. Is IT Access Enough? Evidence from a Natural Experiment in India's Agriculture Markets. [online]. Available from: http://www.researchgate.net/profile/Nicos_Savva/publications (Accessed 23 May 2015)
203. PARSHEV, A.P., 2006. *Why Russia not America? / Почему Россия не Америка?* Moscow press: Astrel.
204. PATTON, M.Q., 2002. *Qualitative research and evaluation methods*. SAGE Publications, pp.598.
205. PETIT, M., 1996. Beliefs and values regarding the role of government in market intervention. *Paper presented at the Seminar on Beliefs and Values Underlying Agricultural Policies*, Lake Balaton, Hungary, September 18-24.
206. POLKINGHORNE, D.E., 1991. Narrative and Self-concept. *Journal of narrative and life history*, 1 (2 & 3), pp.135-153.
207. POMFRET, R., 2007 (a). *Distortion to Agricultural Incentives in Kazakhstan*. World Bank Working Paper, 61p.
208. POMFRET, R., 2007 (b). *Central Asia since the dissolution of the Soviet Union economic reforms and their impact on state- society relations. Perspectives on Global development and Technology*, 6(1-3), pp.313-343
209. POMFRET, R., 2008. Using Energy Resources to Diversify the Economy: Agricultural Price Distortions in Kazakhstan. [online]. Available from: http://siteresources.worldbank.org/INTTRADERESEARHC/Resourcs/544824-1163022714097/Pomfret_Ag_distortions_in_Kaz_0609.pdf (Accessed 05 March 2011)
210. POMFRET, R., 2009. *Using Energy Resources to Diversify the Economy: Agricultural Price Distortions in Kazakhstan*. *Comparative Economic Studies*, 51 (181), pp. 212.
211. RAKHMATULLINA, G.G., 2007. Priorities of industry development of Kazakhstan / Приоритеты промышленного развития Казахстана. *Kazakhstan Specter / Казахстан. Journal "Spectr" / Спектр № 2*, pp.55-66
212. RAMIREZ, R., 1997. *Understanding farmers' communication networks: combining PRA with agricultural knowledge systems analysis*. London: International Institute for Environment and Development. (Gatekeeper Series No. 66).

213. RAMKUMAR, S.N., 1995. The analysis of farmer information systems for feeding of dairy cattle in two villages of Kerala State, India. *Unpublished doctoral dissertation, University of Reading, Reading, UK*
214. REINHARZ, S., 1984. On Becoming a Social Scientist. Brunswick, NJ: Transaction
215. RESEARCH AND ANALYTICAL CENTER OF "KAZAGROMARKETING" JSC (KazAgroMarketing), 2012. Information without borders. Analytical collection. [online]. Available from: www.kam.kzpage.php (Accessed 10 November 2013)
216. REUT, A.L., 2001. Information infrastructure of the market economy. Unpublished thesis (*Candidate of science*) *Unpublished dissertation*.
217. RICE, P.L. and EZZY, D., 2005. *Qualitative Research Methods*. South Melbourne: Oxford University Press.
218. RICHARDSON, D., 1997. *The Internet and Rural and Agricultural Development: Integrated Approach*. FAO, Rome.
219. RITCHIE, J., and LEWIS, J., 2003. *Qualitative Research Practice: A Guide for Social Science Students and Researchers*. London: SAGE Publications Ltd.
220. RITSON, C. and HAPVEY, D., 1997. *Common Agricultural Policy*. CAB International, pp.440
221. ROLLS, M.J., SLAVIK, M. and MILLER, I., 1999. *Information systems in Czech agriculture: sources and transfers of information for small and large scale farmers, new cooperatives and company farms*. Reading: AERDD, University of Reading. (Rural Extension and Education Research Report No.11).
222. RUSSIAN INFORMATION AGENCY (RIA), 2010. The meeting of the Council on Information Society Development, chaired by Medvedev. Российское информационное агенство (РИА новости). Заседание Совета по развитию информационного общества под председательством Медведева. [online]. Available from: [http://ria.ru/trend/Medvedev Russia information technology 12022009](http://ria.ru/trend/Medvedev_Russia_information_technology_12022009) (Accessed 12 November 2014)
223. RYABSEV, A.D., 2004. Small business development in the agricultural sector: on materials of the Republic of Kazakhstan / Развитие малого предпринимательства в аграрном секторе: на материалах Республики Казахстан. Moscow. *Unpublished thesis (Candidate of economic science)*, pp.141.
224. RYZHKOV, N., ABALKIN, L., 1989. *The issue for transition to a market economy with retaining the administrative-command system / Задача перехода к рынку с сохранением административно-командной системы*, М: State Program
225. RYZHKOV, N.I., 1999. *Restructuring: the history of betrayals*. М.: News "Bars" / Перестройка: история предательства. Moscow: Novosti, «Bars» p.240.
226. SABDENOV, O., 1997. *Economic policy of transition period in XXI Century / Ekonomicheskaja politika perekhodnogo perioda na rubezhe XXI veka*. Publisher: Qazaqstan

227. SÆBØ, H., GLOERSEN, SVE, D., 2002. *Electronic data collection in Statistics Norway*. Oslo: Statistical Central Berau. [online]. Available from: http://www.ssb.no/english/subjects/00/90/doc_200217_en.pdf (Accessed 21 January 2014)
228. SAFRONOV, N.A., 1998. *Enterprise economics / Экономика предприятия*. Moscow: Lawyer/ Юрист p. 427.
229. SAGADIEV, K., 2006. *Reforms: analytical overview, scientific approaches / Reformy: analiticheskii obzor (nauchnoie izdanie)*. Almaty: Gauhar.
230. SAGADIEV, K.A., SEITKAZIEVA, A.M., NURMULHANOVA, G.Z., 2006. *Competitiveness of the national economy: organizational and economic mechanism of formation of the Kazakh model / Конкуренетоспособность национальной экономики: организационно-экономический механизм формирования казахстанской модели*. Almaty: UIB, pp.224.
231. SAGIDANOV, R., 2008. The doubt / Сомнение. *Daily Republican political newspaper "Liter"*.
232. SALYKOVA, L. 2012. *An investigation of foreign trade policy and its impact on economic growth: the case of Kazakhstan (1991-2008)*. Unpublished PhD thesis.
233. SANTIAGO, N., 2009. Interview types: structured, semi-structured, and unstructured. [online]. Available from: <http://www.examiner.com/article/interview-types-structured-semi-structured-and-unstructured> (Accessed 09 February 2011)
234. SARSENBIYEVA, N.F., 2013. Formation and development of information and consultancy services agriculture of Kazakhstan / Формирование и развитие информационно-консультационных служб агропромышленного комплекса Республики Казахстан. *Journal of Astana economic forum*.
235. SAUNDERS, M., LEWIS, P. and THORNHILL, 2003. *Research Methods for Business Students*. 3rd Edition. Harlow: FT Prentice Hall
236. SCOTT, P., CARL, G., SJAIFUL, B., 2003. *Applications of the policy analysis matrix in Indonesian agriculture*. 1st Edition, Jakarta: Yayasan Obor Indonesia, pp.114
237. SEROVA, E.V., 1999. *Agricultural policy / Аграрная политика*. Moscow: High School of Economy (ВШЭ).
238. SHANCHENKO, N.I., 2006. *Information Management / Информационный менеджмент*. Study Book. Published: Uliyanovsk.
239. SHCHERBAK, I.N., 2014. *The role of global food security in the EU Common Agricultural Policy*. Moscow State Institute of International Relations (University) of the MFA of Russia / Роль глобальной продовольственной безопасности в единой аграрной политике ЕвроСоюза. Московский государственный институт международных отношений (университет) МИД России. [online]. Available from: <http://www.vestnik.mgimo.ru/sites/default/files/pdf/sherbak.pdf> (Accessed 21 December 2014)

240. SHELOMENTSEVA, V.P., AMIROVA, M.A., 2013. Developing the information infrastructure of agro-industrial complex in the Republic of Kazakhstan. *Middle-East Journal of Scientific Research* 14 (8), pp.1103-1107
241. SHOKAMANOV Y. K, 2003. Dynamics and structural improvements of the Kazakhstan and its' regions Economic development / Динамические и структурные изменения в экономическом развитии Казахстана и его регионов. *Economica&Statistica. Economics and Statistics*, 3, 38-39
242. SKIDAN, O., 2010. Management theory and studies for rural business and infrastructure development. Institutional synergetic model of organizational-economic mechanism of formation of Ukraine' agrarian policy. / Теория управления и исследований для сельского предпринимательства и развития инфраструктуры. Институционно-синергетическая модель организационно-экономического механизма формирования аграрной политики Украины. *Research papers* 21 (2). *Unpublished thesis*.
243. SMAILOV, A., 2000. *Statisticheskii ezhegodnik Kazakhstana [translated]. Statistical Yearbook of Kazakhstan*. The National Statistical Agency of the Republic of Kazakhstan, Astana, pp 45-48 (*Annual report*).
244. SMAILOV, A., 2008. National accounts of the Republic of Kazakhstan / Natsional'nyie scheta Respubliki Kazakhstan./ Национальные счета Республики Казахстан. *The National Statistical Agency of the Republic of Kazakhstan (Annual report)*.
245. SMAILOV, A., 2009. Kazakhstan's statistics since independence / Статистика Казахстана за годы независимости. *The National statistics agency of Kazakhstan. Astana (Annual report)*.
246. SMAILOV, A., 2010. National Statistical Yearbook of Kazakhstan / Национальный статистический ежегодник Казахстана. *The National Statistical Agency of the Republic of Kazakhstan. Astana. 503p (Annual report)*.
247. SNYDER, W., 2013. *Qualitative Research in Education*. Part 12 "Making Meaning from Your Data". A User's Guide Third Edition. SAGE Publications, pp.241-68.
248. SOLOMOU, A., TSOGIA, S., MOUSXOUDI, K., FRAGIA, T., SFOUGARIS, A., TZORTZIOS, S., 2009. Farmers' views and attitudes towards the reformed common agricultural policy in Greece. *International Journal of sustainable development and planning*. №4. [online]. Available from: <http://www.witpress.com/elibrary/sdp-volumes/4/3/392> (Accessed 25 November 2014)
249. SORENSEN, C.G., FOUNTAS, S., NASH, E., PESONEN, L., BOCHTIS, D., PEDERSEN, S.M., BASSO, B., BLACKMORE, S.B., 2010. Conceptual model of a future farm management information system. *Computers and Electronics in Agriculture* (72) pp.37-47. [online]. Available form: www.elsevier.com/locate/compag (Accessed 15 November 2014)
250. SOUTH AFRICAN DEVELOPMENT COMMUNITY (SADC), 2010. *Agricultural Information Management Systems (AIMS)*. Outubro, Maputo, Centro Internacional de Conferencia.

251. STATE REGULATION OF THE ECONOMY, 2012. *State official regulation* No7-2012. Государственное регулирование экономики.
252. STATISTICAL BULLETIN, 2012. Socio-economic development of Republic of Kazakhstan. *National Statistical Agency of the Republic of Kazakhstan, Synopsis, January-July, 2012.*
253. STEMLER, S., 2001. An overview of content analysis. *Practical assessment, research & evaluation*, 7(17). [online]. Available from: <http://PAREonline.net/getvn.asp?v=7&n=17> (Accessed 11 March 2013)
254. STEPANOV, G.A., 2001. Agricultural Policy of the European Union: theory, structure, functioning analysis / Аграрная политика Европейского Союза: Теория, структура, анализ функционирования. *Unpublished thesis. Russia.*
255. STRAUSS, A.L. and CORBIN, J.M., 1990. *Basics of qualitative research: Grounded theory procedures and techniques*. London: Newbury Park, CA: SAGE.
256. STRAUSS, A.L. and CORBIN, J.M., 1998. *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory*. Thousand Oaks, CA: Sage. Sage Publications, Inc.
257. STRAUSS, A., 1987. *Qualitative analysis for social scientists*. Cambridge, UK: Cambridge University Press.
258. STRICKER, S., EMMEL, M., PAPE, J., 2003. Situation of agricultural information and communication technology (ICT) in Germany. EFITA Conference Debrecen, 2003, July 5-9.
259. STUKOVA, I.V., 2013. Integration of information systems in economic relations in agriculture / Интеграция информационных систем в экономические отношения в сельском хозяйстве. *Fundamental Research*, №8–5, pp.1155-1157. Available from: www.rae.ru/fs/?section=content&op=show_article&article_id=10001311 Accessed 24 February 2015)
260. SULTANBEKOVA, G., 2001. Economic growth in the Republic of Kazakhstan and factors of its components / Экономический рост в Республике Казахстан и факторы, его составляющие. *Journal of Herald of Kazakh State University, Journal: Economic series*. 24(4), pp.3-5
261. SUPREM, A., MAHALIK, N., KIM, K., 2013. A review on application of technology systems, standards and interfaces for agriculture and food sector. *Computer Standards & Interfaces* (No 35) pp.355-364. [online]. Available from: www.elsevier.com/locate/csi (Accessed 15 November 2014)
262. TAIT, E.J., 2010. An analysis of eParticipation in Scottish local authorities. Unpublished PhD thesis.
263. TASBULATOV, R., 2013. Global trends in agriculture. Global trends in agriculture. Prospects for Kazakhstan in the agricultural competition in the Customs Union and the WTO / Мировые тенденции развития сельского хозяйства. Перспективы Казахстана в агроконкуренции в условиях Таможенного союза и ВТО. *Journal of Kazakhstan's agrarians*. May, 2013.

264. TEMPUS IN KAZAKHSTAN (1995-2010) Information has been produced by National Tempus Office in Kazakhstan within the framework of the European Union Tempus programme supported by Education, Audiovisual and Culture Executive Agency (EACEA). International European project TEMPUS. [online]. http://tempuskaz.kz/files/tempus_inK.pdf (Accessed 13 February 2014)
265. TERMEER, C.J.A.M., and SIBOUT, G.N., 2012. *Complexity leadership for sustainable regional innovations. Regional studies association*. The international forum for regional development policy and research. Paperwork. New York, USA.
266. THE LAND-GRANT TRADITION (L-G Tradition), 2012. Association of Public and Land-grant universities, Washington DC. [online]. Available from: <http://www.aplu.org/document.doc?id=780> (Accessed 5 January 2015)
267. THE NATIONAL STATISTICS AGENCY OF KAZAKHSTAN (NSAOK), Statistics reports and comments. [online]. Available from: <http://zonakz.net/articles/36833> (Accessed 15 November 2010)
268. THE TREATY OF ROME, 1957. [online]. Available from: <http://www.gleichstellung.uni-freiburg.de/dokumente/treaty-of-rome> (Accessed 5 January 2015)
269. THE WORLD BANK. Working for a world of poverty. Kazakhstan overview. [online]. Available from: <http://data.worldbank.org/> (Accessed 08 January 2013; 10 November 2011)
270. THORNE, S., 2000. *Data analysis in qualitative research*. University of British Columbia Vancouver, British Columbia, Canada. [online]. Available form: <http://ebn.bmj.com/content/3/3/68.full> (Accessed 13 February 2012)
271. TROITSKYI, M., 2013. European Union in the world policy / Европейский союз в мировой политике. *Journal International processes / Международные процессы*. №1(32)
272. TUIMEBAYEV, E., 2007. Key factors and conditions to ensure food security / Основные факторы и условия обеспечения продовольственной безопасности. [online]. Available from: <http://articlekz.com/article/5968> (Accessed 1 January 2015)
273. TWEETEN, L., 1998. Overview of U.S. agricultural policy. *Paper presented to "Cross Country Agricultural Policy Symposium: An International comparison"*, June, 1998. Taiwan.
274. UK AGRICULTURE [online]. Available from: http://www.ukagriculture.com/uk_agriculture.cfm (Accessed 16 February 2011; 27 October 2011)
275. ULAKOV, S.N., 2008. Food security as an economic category and its role in national security / Продовольственная безопасность как экономическая категория и её роль в обеспечении национальной безопасности. [online]. Available from: <http://articlekz.com/article/5263> (Accessed 2 January 2015)
276. ULANOVSKYI, A.M., 2009. Qualitative research: approaches, strategies, methods / Качественные исследования: подходы, стратегии, методы. *Psychological Journal*, №2, pp.18-28.

277. UNESCO, 1981. UNISIST: Unesco Documents and Publications in the Field of Information: A Summary Guide. Guidelines on Studies of Information Users (Pilot's version). Paris, p.3.
278. UNITED NATIONAL DEVELOPMENT PROGRAM (UNDP), 2002. *Human Development Report (HDR): Kazakhstan*
279. UNITED STATES DEPARTMENT OF AGRICULTURE (USDA). Kazakhstan Agricultural Overview. Available from: <http://www.pecad.fas.usda.gov/highlights/2010/01> (Accessed 21 October 2011)
280. USHACHEVA, I.G., 1988. The Radical restructuring of agricultural management: experience and ways of improvement / Коренная перестройка управления АПК: опыт и пути совершенствования. Moscow.
281. USHACHEVA, I.G., OGLOBLINA, E.S., SANDU, I.S., TRUBILINA, A.I., 2007. *Innovation activities in the agricultural sector of Russia / Инновационная деятельность в аграрном секторе экономики России*. Moscow: "Koloss".
282. VASILESCU, L.G., 2008. *Agricultural development in EU: drivers, challenges and perspectives*. University of Craiova, Romania.
283. WAPAKALA, W.W., 1982. *The role of libraries in agriculture, SCECSAL Proceedings on Libraries and Their Impact on Education, Economics and Culture in Developing Countries*. Tanzania Library Association, Dar-es-Salaam
284. WARREN, M.F., 2002. Adoption of ICT in agricultural management in the United Kingdom: the intra-rural digital divide. *Agriculture economy No48, 2003 (1):1-8*
285. WILLIAMS, B.K., 2010. Adaptive management of natural resources - framework and issues. *Journal of Environmental Management*. U.S. Geological Survey Cooperative Research Units. [online]. Available from: <http://www.webpages.uidaho.edu/fish510/PDF/Williams%202011%20adaptive%20mgt.pdf> (Accessed 1 November 2014)
286. WILSON, V.A., 1998. Qualitative research: an introduction, purposes, methodology, criteria for judgment, and a rationale for mixed methodology. [online]. Available from: [ERIC Document Retrieval Service \(EDRS\), ED423285](http://eric.edrs.org/?id=ED423285) (Accessed 5 January 2015)
287. WITZKE, H., NOPELLA, S., KENNEDY, L., 2007. Effects of the EU Common Agricultural Policy and U.S. Farm Policy on Agricultural Land Markets. The German Marshall Funds of the United States, Report [online]. Available from: http://www.agrar.hu-berlin.de/de/institut/departments/dao/ihe/Veroeff/GMFUS_Report_land_market.pdf (Accessed 4 November 2013)
288. WORLD GEOGRAPHY: Germany. Economic development / Всемирная география: Германия. Экономическое развитие. [online] Available from: <http://bibliotekar.ru/rGeo/15.htm> (Accessed 5 January 2015)
289. YANOVSKI, O.Y. and POZNYAK, S.V., 2005. The history of the twentieth century Russia: Textbook / История России XX век: Учебное пособие. РИВИ, 2005. - 704 p.

290. YIN, R., 1994. Case Study Research Design and Methods. 2nd Edition. Thousand Oaks, CA: Sage. [online]. Available from: <http://www.madeira-edu.pt/LinkClick.aspx?fileticket=Fgm4GJWVTRs%3D&tabid=3004>. Accessed 15 November 2014
291. YUSUF M., ISYAKA M. S., AINA O. K., 2014. International Journal of Humanities Social Sciences and Education (IJHSSE). The impact of Management Information System (MIS) on the performance of business organization in Nigeria. Volume 1, Issue 2, February 2014, PP 76-86.
292. ZAGAITKANOV, I. and KOLESNIKOVA, L., 2008. Economic laws and modern management agroeconomy / Экономические законы и современное управление агроэкономикой. APC: *Economy, management. Journal* №6, p.98.
293. ZHOGOLEVA, E.E., 1996. *Methodology development of Russia' agrarian policy priorities / Методология разработки приоритетов аграрной политики России*. Moscow: Informatic. pp.228.
294. ZIYABEKOV, B., 2007. Agricultural policy in Kazakhstan: Myths and Realities. Rescue Village in government hands / Аграрная политика в Казахстане: мифы и реальность. Спасение села в руках правительства. *Newspaper Kanumal.kz* № 45 (132). 22.11.2007
295. ZOBBE, H., 2001. *The Economic and Historical Foundation of the Common Agricultural Policy in Europe. Working Paper*, Fourth European Historical Economics Society Conference. Merton College, Oxford, U.K.
296. ZOBBE, H., 2002. On the foundation of agricultural policy research in the United States. Staff Paper 02-08. Agricultural Economics Purdue University

BIBLIOGRAPHY

1. BANKS, M., 2007. Using visual data in qualitative research. London: SAGE.
2. BARANOVSKI, N.T., and VASKIN, F.I., 1991. Automated processing of economic information / Автоматизированная обработка экономической информации. Moscow: Finance and Statistics, pp.304.
3. BASHMACHKOVA, O., 2014. Does the farmer feed the country? / *Journal Agricultural Review*, №5. Накормит ли фермер страну? Журнал «Аграрное обозрение», №5. [online]. Available from: <http://agroobzor.ru/econ/a-171.html> (Accessed 15 November 2014)
4. CRESWELL, J.W., 1994. Research Design: Qualitative and Quantitative Approaches. Thousand Oaks; London: Sage.
5. CROUCH, M. and MCKENZIE, H., 2006. The logic of small samples in interview based qualitative research. *Social Science Information*, 45(4), pp. 483-499.
6. DENZIN, N.K., and LINCOLN, Y. S., 2000. *Handbook of qualitative research*. Thousand Oaks, CA: SAGE. (2nd Ed)
7. DEY, I., 1999. *Grounding grounded theory: Guidelines for qualitative inquiry*. San Diego, CA: Academic Press
8. DMITRIYEV, M.V., 2005. *Development of devices and data transmission systems based on optoelectronic atmospheric channel / Разработка устройств и систем передачи информации на основе оптоэлектронных атмосферных каналов*. Moscow. Unpublished thesis (Candidate of technical science).
9. EASTERBY-SMITH, M., THORPE, R., and LOWE, A., 2002. Management Research: an Introduction. 2nd Edition. London: Sage
10. ERIC, A.M. and SCOTT, R.P., 1989. *The policy analysis matrix for agricultural development. Outreach Program*. Stanford University pp.201.
11. ENCYCLOPEDIA OF NATIONS. France – agriculture.
12. EUROPEAN COMMISSION (EC), 2014. CAP post-2013: Key graphs & figures. CAP expenditure and CAP reform path. [online]. Available from: http://ec.europa.eu/agriculture/cap-post-2013/graphs/graph2_en.pdf [Accessed 23 April 2014].
13. FOX, K.A., 1987. *Agricultural Economics*. The New Palgrave: A Dictionary of Economics. Volume 1, p. 55-62.
14. GARDNER, B.L. and RAUSSER, G.C., 2011. *Handbook of Agricultural Economics*, Volume 1A, Agricultural Production. Imprint: North Holland.
15. GARFORD, C., 2001. *Agricultural knowledge and information systems in Hagaz, Eritrea*. SD Dimensions.
16. GLASER, B.G. and STRAUSS, A.L., 1967. *The discovery of grounded theory: strategies for qualitative research*. Chicago, Aldine Publishing Company.

17. GLESNE, C., and PESHKIN, 1992. *Becoming qualitative researchers: An introduction*. White Plains, NY: Longman
18. HAIR, J.F. Jr., MONEY, A.H., SAMOUEL, P., PAGE, M., 2003. *Research Methods for Business*. Chichester: John Wiley and Sons, Ltd.
19. HANNAN, P., 2006. *Observation techniques*. Press: University of Plymouth
20. HARTL, C., 2003. *Expatriate women managers: gender, culture and career*. Published: Rainer Hampp Verlag.
21. HSIEH, H. and SHANNON, S.E., 2005. *Three Approaches to Qualitative Content Analysis*. *Qualitative Health Research*, vol. 15 no. 9.
22. HUGHES, G., SILVER, C., 2011. Summary of strengths and weaknesses of each package in the context of analysis open-ended questions. [online]. Available form: http://www.surrey.ac.uk/sociology/research/researchcentres/caqdas/support/analysingsurvey/summary_of_strengths_and_weaknesses_of_each_package_in_the_context_of_analysing_op_enended_questions.htm (Accessed 31May 2012).
23. INTERNATIONAL MONETARY FUND (IMF), 2011. *World Economic and Financial Surveys. World Economic Outlook Database*.
24. JOHN, M., 1986. *Agriculture on the road to industrialization, in development strategies reconsideration*. Transaction books.
25. JOHNSON, B.F., and MELLOR, J.W., 1984. The role of agriculture in economic development. [online]. Available from: https://books.google.kz/books?id=Qv9VvmwfULAC&pg=PA33&lpg=PA33&dq=to+determining+the+appropriate+E2%80%98balance+E2%80%99+between+agriculture+and+other+sectors&source=bl&ots=iuDNV7wA0F&sig=XHoD3e5wYFKZkLy3cx0XGwBXTQ0&hl=en&sa=X&ei=NWsiVcHpF4OhsAGKu4OoAw&redir_esc=y#v=onepage&q=to%20determining%20the%20appropriate%20E2%80%98balance+E2%80%99%20between%20agriculture%20and%20other%20sectors&f=false (Accessed 21 September 2014)
26. KENISTON, K., 2002. Grassroots ICT projects in India: Some preliminary hypotheses. *ASCI Journal of Management*, 31 (1and2).
27. KENISTON, K., 2003. Grassroots ICT projects in India: Some preliminary hypotheses. *ASCI Journal of Management*, 31 (1and2).
28. KNYAZEV, V.M., 2013. Methodical development to practical training on the subject "*History and Philosophy of Science (thesis)*" / Методическая разработка к практическим занятиям по дисциплине «История и философия науки». Yekaterenbyrg: postgraduate UGMU.
29. KRIPPENDORFF, K., 1980. *Content analysis: An introduction to its methodology*. Newbury Park, CA: SAGE
30. KRUGER, R. A., 1994. *Focus groups: A practical guide for applied research* (2nd ed.). Thousand Oaks, CA: SAGE Publications.

31. KURISHBAYEV, A., 2013. Following the global trend / Следуя общемировой тенденции. *Newspaper "Kazakhstan's Pravda"*, 2013, #4 September (№ 265).
32. LAWRENCE, D., 1999. *The Economic Value of Information*. Springer-Verlag, New York
33. LEWIS, A., and SILVER, C., 2007. *Using Software in Qualitative Research: A Step-by-Step Guide*. Los Angeles: SAGE, pp.283
34. LINCOLN, Y.S. and GUBA, E.G., 1985. *Naturalistic Inquiry*. Newbury Park, CA: SAGE Publications.
35. MARSH, D. and RHODES, R.A.W., 1992. *Policy networks in British government*. Oxford: Clarendon Press.
36. MCKINNEY, S., 2008. *CSU Learning Skills: your link to success Academic writing: writing a literature review*. Charles Sturt University. [online]. Available from: http://www.csu.edu.au/data/assets/pdf_file/0005/82796/LitReview.pdf (Accessed 15 May 2011)
37. MEESTER, G., 2000. EU institutions and the decision-making process for agricultural policy. *Agricultural policy and the enlargement of the European Union: Wageningen University Press*, Paper for the 23rd Annual Meeting of the Public Administration Theory Network
38. MILLER, D.C., SALKIND, N.J., 2002. *Handbook of research design and social measurement* / ed. by. Thousand Oaks ; London ; New Delhi : Sage
39. MULLA, D.J., 2013. Twenty five years of remote sensing in precision agriculture: key advances and remaining knowledge gaps. *Biosystems engineering 114*, pp.358-371. *Special Issue: Sensing in Agriculture Review*. USA. [online]. Available from: www.elsevier.com/locate/issn/15375110 (Accessed 18 October 2014)
40. NASH, E., 2009. System Analysis and Definition of System Boundaries. FutureFarm, Report No.3.1. [online]. Available from: www.futurefarm.eu (Accessed 12 November 2013)
41. NAZARBAYEV, N.A., 1990. *Without the right and left / Без правых и левых*. Moscow: Young Guard / Молодая гвардия.
42. NAZARBAYEV, N.A., 2011. *Speech of the President of the Republic of Kazakhstan Nursultan Nazarbayev at the republican forum of agriculture workers / Выступление Президента Республики Казахстан Н.А. Назарбаева на Республиканском форуме работников агропромышленного комплекса*. Kazakhstan: Akorda.
43. NEUMAN, G.A., 1991. Autonomously Work Group Selection. *Journal of business and psychology*, 6, pp.283-91.
44. NORGARD, R.T., 2013. *Endeavors to represent the non-representational: researching corporeal-locomotive media*. Aarhus University, Denmark. Center for teaching development and digital media. pp.23
45. O'BRIEN, J., 1999. *Management information systems – managing information technology in the internet worked enterprise*. Boston: Irwin McGraw-Hill.

46. ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD), 2005. *Agricultural policies in OECD countries: monitoring and evaluation*. France. Paris.
47. OMAMO, S. and NASEEM, A., 2005. *Agricultural science and technology policy for growth and poverty reduction*. International Food Policy Research Institute (IFPRI). Washington, D.C. pp. 40.
48. OSPANOV, B.S., 2006. Land reform in 15 years of independence of Kazakhstan / Земельная реформа за 15 лет независимости Казахстана. *Land of Kazakhstan Journal*. №6 pp.2-5.
49. PALLADIN, A., *Connected Agriculture / Подключенное сельское хозяйство*. [online]. Available from: <http://www.cisco.com/web/RU/news/releases/txt/2009/081309.html> [Accessed 20 November 2014]
50. PONOMOREVA, K.V., and KUZMIN, L.G., 1991. *Information support of automated system of management / Информационное обеспечение АСУ*. Moscow: High School / Высшая школа.
51. RICHARDS, L., 2005. *Handling qualitative data: a practical guide*. Great Britain by MPG Books Group, Bodmin, Cornwall
52. SALAMONE, F., 1977. *The methodological significance of the lying informant*. *Anthropological Quarterly*, pp.117-124
53. SALMEN, B., Nolan, J., 2005. *Rural development and ICT. Collaboration & Work*. European Communities, Luxembourg
54. САМАНА, Е.К., 1983. *Information management in agricultural research (Arabic, English); Technical Consultation on Agricultural Research Cooperation in the Near East and North Africa*, Nicosia (Cyprus).
55. SILVERMAN, D., 1993. *Interpreting qualitative data: methods for analyzing talk, text and interaction*. London: SAGE.
56. SPEDDING, C.R.W., 1988. *An introduction to agricultural systems* (2nd. ed). London: Elsevier Applied Science.
57. TESCH, R., 1990. *Qualitative Research: Analysis Types and Software Tools*. Bristol, PA: Falmer Press
58. ТЕМІРБЕКОВА, А.В., ТАСТАНДИЙЕВА, Н.В., 2012. *Innovations in agricultural policy as a factor of economic growth in the agro-industrial complexes in Kazakhstan / Инновационная направленность аграрной политики как фактор экономического роста в отраслях АПК в Казахстане*. KZ:Almaty pp.411
59. THE COLD WAR MUSEUM. *Fall of the Soviet Union*. [online]. Available from: http://www.coldwar.org/articles/90s/fall_of_the_soviet_union.asp (Accessed 25 December 2014)
60. TONGIA, R., SUBRAHMANIAN, E., ARUNACHALAM, V. S., 2005. *Information and Communications Technology for Sustainable Development. Defining a Global Research Agenda*. Allied Publishers, Bangalore.

61. TWEETEN, L., 1989. *Agricultural policy analysis tools for economic development*. Westview Press: Boulder and San Francisco, IT Publications London.
62. UNITED NATIONS ENVIRONMENT PROGRAMME (UNEP). Environment for development. [online]. Available from: www.unep.org/geo/geo4/report/ (Accessed 12 April 2009)
63. VESNIN, V.R., 1996. *Fundamentals of Management / Основы менеджмента*. Moscow: Institute of International Law and Economics "Triada.Ltd": pp.384.
64. VITURK, M., 2011. Integration theory of sustainable regional development, *Politicaka Ekonomie*, 2011, Vol. 59, Iss. 6 p.794-809.
65. WALTERS, C., 1986. *Adaptive Management of Renewable Resource*. MacMillan, New York.
66. WHITTAKER, An. and WILLIAMSON, G.R., 2011. Succeeding in research plans and literature reviews for nursing students. Transforming nursing practice meeting. Learning matters Ltd.
67. WILLIAM, G., 1995. Measurement of Productivity and Growth in U.S. Manufacturing. *Monthly Labor Review*, published by the Bureau of Labor Statistics, July 1995.
68. WISKERKE, J.S.C., BOCK, B.B., STUIVER, M. and RENTING, H., 2003. Environmental cooperatives as a new mode of rural governance, *NJAS – Wageningen Journal of Life Sciences*, p.9-26
69. WU, X., LIU, Z. and FENG, G., 2010. The service modes of agriculture communication system in Inner Mongolia. *Agriculture Economics* (2) pp.58–59

Appendices I and II on Kazakh history

APPENDIX I: OVERVIEW OF KAZAKHSTAN

1. History of Kazakhstan

For understanding the role of agricultural policy in Kazakhstan's agricultural development, this Appendix sets out to consider the recent history of the Republic of Kazakhstan – “*the ninth largest country in the world by land area*” (Lee and Tai, 2008 p.185). Geographically Kazakhstan is situated in the north of Central Asia, deep in the Eurasian continent with an area of 27,249 square kilometers. The total length of the republic's borders is 13,394 km. Kazakhstan is bounded by the Russian Federation in the north, China in the east, Uzbekistan, Turkmenistan, Kyrgyzstan in the south and the border with Caspian Sea. The country geographically divides into 5 different regions: north, south, east, west and center (NSAOK, Available from: <http://zonakz.net/articles/36833> (Accessed 15 November 2010)).

Kazakhstan is famous for deposits of petroleum, natural gas, coal, iron ore, manganese, chrome ore, nickel, cobalt, copper, molybdenum, lead, zinc, bauxite, gold and uranium. The second largest of the former Soviet Union republics in territory, it possesses enormous fossil fuel reserves and plentiful supplies of other minerals and metals (Lee and Tai, 2008 p.185). Of all the one hundred and five elements in the periodic table, at least ninety-nine can be found in abundance in Kazakhstan. Large-scale commercial exploitation began in the 1960s and 1970s (Kazakhstan today, 2010).

The country's population on March 1, 2012 was 16 718.1 thousand people, including urban population - 9141.1 thousand (54.7%), rural - 7577.0 thousand people (45.3%). All belong to more than a hundred different ethnic groups (Statistical bulletin, 2012).

According to these statistics, about 45 percent of the total population live in rural areas and are directly or indirectly engaged in a wide range of agriculture activities. Kazakhstan has 48 lakes and 8502 rivers with their tributaries; another 26% of the territory is covered by steppe. About 44% (172 million hectares) is desert and 14% is semi-desert. 21 million hectares are forests. Agriculture contributes about 31 percent to Kazakhstan's GDP, about 22% of which is contributed by the crop sector. Approximately 61 percent of labour forces are employed in agriculture sector with 52 percent employed in the crop sector (Statistical bulletin, 2012).

2. Kazakhstan's agriculture during the transition period to market economy

Kazakhstan has a promising resource base, from its sizable hydrocarbon reserves. At independence in 1991, Kazakhstan's leadership embarked on a new course of development with the planned transition from a socialist economy to one which was market based. In 1992, work on the reformation of the economy to a market basis began, and the process of formation of a multi-structural economy geared up. For instance, 91300 economic enterprises, of which 73400 represented the non-state sector, operated in Kazakhstan at the end of 1995. Considering the portion of industrial production produced

in 1995 by enterprises in the non-state sector of the economy was 30.4%, their share of the volume of gross production in agriculture was 38.9%. Furthermore, with the serious shortcomings in agriculture production and also to be taken into account the large and annual deviations of the products' volumes in accordance with weather conditions. For example, the record harvest of corn in 1992 followed a 60% slump of corn production in 1991 (OREXCA, Available from: <http://kazakhstan.orexca.com> /Accessed 20 December 2012).

The decline and destruction of agriculture production as a strategic and critical industry have led to a crisis of many other industries and destabilized the economy as a whole. For example, in Kazakhstan agriculture for the period 1991-1997 the areas under crops decreased by 13.2 million hectares (38%). Especially in the agriculture sphere, problems with the changes in the approach to development sharply arose. On one hand this was because of the position of the interests and possibilities of the independent state, and on the other because of the necessity of rapid assimilation of the new methods of management and wide introduction of progressive technology to increase the productivity of fields and farms, together with extension of the volumes and improvement of the methods of processing, storage and transportation of the raw materials, and creation of a developed social infrastructure in the villages. That urgent global problem is still being solved very slowly, and during recent years, the agriculture of Kazakhstan has been involved in a production and environmental crisis. 36300 different agriculture enterprises and 30800 farms are now combined into the agriculture and industrial complex of Kazakhstan. According to the conclusions of many authoritative scientists, the lands of Kazakhstan can feed more than one billion people if reasonably used (OREXCA, 2012).

Thus, the steady recovery of the Kazakhstan economy has taken place since 1999, a result mainly achieved through the agriculture sector of economy and the increase of agriculture productivity by 28.9% (Smailov, 2009 p.45). In view of the fact that in Kazakhstan's agriculture about a third of the population is involved in the agrarian sphere, agriculture is a major part of Kazakhstan's economy (Pomfret, 2009).

By 2007, Kazakhstan had become one of the most successful countries in Central Asia and the CIS. However, according to Ospanov (2002 p.47) economic growth is largely due to continued dependence on primary commodities in Kazakhstan as well as growth in the world energy prices. According to Kaliev (2003), in 2009, the volume of agriculture production in Kazakhstan exceeded 1.6 trillion tonnes and increased in comparison with 2000 by almost 4 times. But, unfortunately, there is still a high import dependence on certain types of agriculture products and foodstuffs. Although the resources of the republic allow food production to 3 times more than its entire population consumes (which for the past 100 years has increased from 4.9 to 17.0 million people) currently produced volumes do not allow for consumption.

Agriculture is one of the key sectors of the economy of Kazakhstan. Taking into account this fact, the President of the Republic of Kazakhstan, Nazarbayev in his traditional annual address to the nation highlighted the problems which still take place in agriculture and commented:

“The transition to a market economy in the country is completed, now the country has all the necessary features to work and live in a democracy and the market needed only effective action in this area. But has not yet overcome all difficulties; such as a greater difficulty in the privatization process to this day is the village and villagers. Crises in the agriculture sector continued and the State keep this sector under scrutiny” (Nazarbayev, 2001)

The transition from the models of raw materials development to a model of innovative development of Kazakhstan's economy is a major landmark in the realized strategy of industrial-innovative development of Kazakhstan to 2015. Through the diversification and modernization of the economy, and with creation of the conditions for production of competitive products, export growth is expected to achieve the main goal – sustainable development for Kazakhstan.

In the following sections the researcher will examine in detail the development of Kazakh agriculture, beginning from the initial reforms under the former USSR and continuing with the transfer to a market economy.

3. The initial stage of the reforms in the former USSR

The proclamation of sovereignty on December 16, 1991 by the Constitutional Law “On the State Independence of the Republic of Kazakhstan” laid the foundation for the development of Kazakhstan as a “free and democratic” state. Kazakhstan was proclaimed an independent and democratic state by law (Osmanov, 2002). The authorities announced a time of transfer to a market economy. The problems in the economy of Kazakhstan had begun in the mid 1980’s when the Union of Soviet Socialist Republics (USSR) was in a deep economic, political and social crisis. The attempts to solve the problems in the development of economic reforms were made in two areas: expanding the independence of state enterprises and the expansion of the scope of the private sector. These attempts introduced various mechanisms that were implemented according to the principle of “*one step forward and two steps back*” (History of Kazakhstan. Available form: <http://e-history.kz/ru/contents/list/107> Accessed 12 December 2012). The reforms which took place during that period were described as ‘perestroika’. The term ‘perestroika’, coined by Gorbachev in the late 1980s, means restructuring, and was used to describe a series of reforms that abolished state reformation and planning in the Soviet Union. Perestroika caused chaos and stagnation for the national economy, but at the same time, it “*began the transition from the Soviet-type political and economic model towards pluralist democracy, private ownership and enterprise, and participation in international and national markets*” (Nuti, 2010 p.5).

The failure of several economic reforms was caused by the lack of success of the Government of the USSR in moving to privatization of the means of production, and attempting to reconcile the market and socialism. In spring 1990, the Government of the Council of Ministers gave the program of transition to the market, which included the increase in prices of some commodities. In contrast to the program of the Council of Ministers, in the summer of 1990 the plan of “500 days” was announced,

which provided for the period to create the conditions for the transition to a market economy. Bogomolov (2005 p.3) noted that *“The program provided economic union of all former Soviet Republics with the single currency, a single legislation, and defense. At the same time, the Council of Ministers was liquidated, and the economy is controlled by the Council of Heads of Governments of each country with expanding their autonomy. It was the main reason for torpedoing the program. Gorbachev went on about the Soviet military-industrial complex and refused to support this program.”*

Thus, finally, in the fall of 1990, President Gorbachev offered a compromise; the program went to the market, which was also ineffective (Bogomolov, 2005 p.3). Besides, all economic operations in the Soviet Union system were subordinated to the central-planned economy and were executed by the corresponding branch Ministries’ setting mandatory requirements and tasks to achieve production goals and delivery from each nation and regions (Asadov, 2007). As the result of the implementation of different reforms, former Soviet Union societies could not keep a centrally planned economic system and the whole USSR economy was transformed towards the transition to a market-based economy. The Soviet government has now admitted many mistakes during these emergency economic transformations which led political and financial crises in all Soviet countries. However, the collapse of the USSR, at the beginning of 1992, and the price liberalization led to the destabilization of the financial and monetary system and rampant inflation.

Hopes for a solution to the crisis were placed on massive help from the West. Getting Western loans led to rapidly rising debt of the former Soviet Union, which by the end of 1991 exceeded, by some estimates, 70 billion USD and had a clear tendency to increase. The worsening economic situation accelerated the elimination of the Soviet Union. The Republics tired of indecision at the centre and chose to get out of the crisis alone (Khasanov, 2003). A key event in the political history of modern Kazakhstan which determined its place and dynamics of development was the adoption of the Declaration of Independence of the Kazakh Soviet Socialist Republic, on October 25, 1990. This event and the proclamation of sovereignty on December 16, 1991 by the Constitutional Law “On the State Independence of the Republic of Kazakhstan” laid the foundation for the development of Kazakhstan as a “free and democratic” state. This meant Kazakhstan was proclaimed an independent and democratic state by law (Osmanov, 2002), but an independent state in economic disaster (Khasanov, 2003). Kazakhstan gained its sovereignty in 1991 and this led to the emergence of the Republican concept of transition. The President of the Republic of Kazakhstan, Nazarbayev, established the Supreme Economic Council, which includes a peer group of well-known foreign and domestic economists; Committee for State Property; Antimonopoly Committee, amongst others.

In the first half of 1992 the republic's leadership developed key strategic directions for the development of Kazakhstan which President Nazarbayev outlined in the “Strategy for the formation and development of Kazakhstan as a sovereign state.” In the economic sphere it aimed to achieve the

following objectives: the formation of a social market economy; establishment of legal and other conditions for the implementation of the principle of economic self-determination rights; introduction of the national currency and ensuring its internal and then external convertibility; conquest of its own or sharing with other countries specific positions on world commodity markets; saturation of the consumer market; involvement and active use of foreign investment for the development of Kazakhstan” (History of Kazakhstan. Available form: <http://e-history.kz/ru/contents/list/107>, Accessed 12 December 2012). The privatization of social services and the transfer of all the companies under the jurisdiction of the Republic, a more equitable distribution of income of enterprises, increasing the share of processing technologies, foreign investment – were all actors in the development of the new market oriented economic system.

Considering the main direction of economic reforms for the period 1990-2000, Rakhmatullina (2007), and Ashimbayev et al. (2007) note that the economy of Kazakhstan up to independence had a raw materials orientation, being oriented to the needs of the national economy of the USSR, which was located externally. Thus, the impact of economic reforms in Kazakhstan has greatly affected its economy. On 16 May 1992 the main strategy covered the concepts of democracy, the rules of law and the market oriented economy. The strategy of socio-economic reforms, based on development of the young sovereign state and creation of a competitive market economy and state social development was formulated by President of Kazakhstan Nursultan Nazarbayev and named “Strategy of Establishment and Development of Kazakhstan as a Sovereign State”. It was published in all official national newspapers for all Kazakhstan citizens to see. The strategy of socio-economic reforms focused on the following spheres:

- Domestic and foreign policy: development of a young sovereign state moving toward a strong presidential republic; creation of a multiparty system; provision of stability as the main political objective and condition for successful implementation of economic reforms.
- Economy: creation of a competitive market economy based on both private and state ownership; creation of legal and other conditions for implementation of the principle of economic self-determination of a person; achievement of strong positions in the world commodity markets for the natural resources of Kazakhstan.
- Social development: creation of a society, which provides wealth to all its people and guarantees entrepreneurship freedom and opportunity to apply personal abilities in any other sphere of activity (Nazarbayev, 1992).

With regard to the role of agriculture in the state’s economic development, it was evident that agriculture was the most problematic sector both at the factory-farm complex level, and at the whole national economy. It was conditioned first of all by the impact at production of soil and climate conditions. Their negative impact may be to some extent ameliorated by biological, technical, technological and economic factors: raising and high zoning of high-yield and stable sorts of crop, high production species of animals, strengthening of material and technical base of agriculture, using

progressive technologies, forms of labor organization and production, and using economical ways of sector management. However, agriculture zones of Kazakhstan have very low bioclimatic potential and this sector had an out of date material and technical base. The general level of the economy was not allowed to use economical instruments for development of agriculture production. Due to this, and despite the influence of agriculture policy on agriculture development, at the beginning of the 1990's Kazakhstan's agriculture was behind developed countries and still needed to be improved.

APPENDIX II: AN EXAMINATION AND ANALYSIS OF THE REFORMS AND AGRICULTURAL POLICY OF KAZAKHSTAN SINCE INDEPENDENCE IN 1991

1. Introduction

This Appendix examines the role of agriculture in Kazakhstan's economic development since independence in 1991. Considering agriculture as an industry that provides the country with food and industrial raw materials, the important role of this sphere of the economy in the whole country's development is evident. During the Soviet regime, Kazakhstan was transformed into a great industrial and agricultural region. Huge centres of energy, metallurgy, fuel, chemical and machine-building industry were built in the republic. The years of the Soviet regime were the most favorable for the development of Kazakhstan's economy with regard to the production of these heavy industries (OREXCA, 2012).

At the same time, serious violations of the existing laws of economic complexity, associated with rupture of economic relations between the socialist countries of the former Soviet Union in the 1990's, immediately influenced the stability of the economy in all initially independent countries including Kazakhstan. The pre-existing principles of the socialist economy were completely destroyed, and the new principles had not yet been built. The period of new reforms with transition from state ownership to private, from a socialistic economy to a market-based economy began spontaneously. As the previous Appendix suggested, it was a period of deep recession with structural problems in all spheres of the economy, including the agricultural sphere of Kazakhstan. But on the other hand, Kazakhstan had a promising resource base, from its sizable hydrocarbon reserves. At independence in December, 1991, Kazakhstan's leadership embarked on a new course of development. In 1992, work on the reformation of the economy to a market basis began. During these years especially, the process of the formation of a multi-structural economy was geared up (OREXCA, 2012).

This Appendix examines the evolution of various policy regimes in Kazakhstan since independence, and their contribution to its economic performance. It will also consider the following major issues necessary for the subsequent analysis: general information; socio-economic conditions and historical background of Kazakhstan's agriculture development; structural changes in the agrarian sector of the Republic of Kazakhstan, the reforms of agriculture policy and associated outcomes, and effect on gross domestic products. Additionally, the integration processes of the Commonwealth of Independence States (CIS) have played a significant role when Kazakhstan became a sovereign state.

2. Agricultural reforms within the frame of the agricultural policy (AP) of Kazakhstan

During the Soviet era, agriculture in Kazakhstan and other former Soviet countries was characterized by two salient features: absolute state ownership of all agricultural land and concentration of production in large-scale collective farms.

So, after independence, Kazakhstan, like other post-Soviet countries, began to modernize and reform all sectors of its economy. This period was the start of a new stage in agricultural development, characterized by the development of new forms of property and business units in the agricultural sector. The most important result was the formation of the reforms leading to the diversified economy of agriculture as one of the strategic directions of AP. However, any drastic transformations were not passed down to the state's economy painlessly. As a result, the violation of economic ties at the beginning of 1990's led to a crisis in agriculture and in the whole country's economy. To escape the economic crisis in the country, it was important to take urgent and decisive steps with the implementation of new reforms and regulations in the conditions of the new market-oriented economy. Analysis of the reforms in the agricultural sector shows two stages of formation and development of multi-structural economy in Kazakhstan: the first stage – the period of formation (1991-1999) and the second stage, since 2000, the period of growth (IA Kazakh-Zerno, 2011).

The first stage was characterized by restructuring agriculture. Prior to 1991, state ownership had been a brake on the market, as a prerequisite of market relations is the diversity of ownership of the means of production. For this purpose, in 1991, land reform was initiated with a change of land ownership relations, the monopoly of state ownership was eliminated, and collective and state farms were transformed into different forms of business. The privatization of state ownership of land took place which had been owned by the collective farms and state farms, and agricultural land was redistributed in favour of the peasant (small farmer) farms, family farms, and horticultural cooperatives. As a result, the reforms practically stopped the inflow of capital into the rural economy, and production volumes dropped sharply, as did the standard of living of the rural population, which increased social tensions in the countryside (IA Kazakh-Zerno, 2011).

Land reform is central to economic transformation, one which affects the interests of every citizen and society as a whole (Karbayev, 2011). Investigating land reform as a major policy influencing Kazakhstan's agricultural economic development, Kurmanova (2010 p.3) claims: *the land reform was started without any proper preparation of legal basis and methodology which caused certain problems.....The land reform is compounded by the reduced the role of land use which subsequently led to the loss of the main functions of the Government in the field of land management, which consists in the organization and implementation of State control over the use and protection of land, planning and forecasting their use, information management data for the land cadastral and land monitoring.*

Thus, as a result of a number of factors: disruption and discontinuity developed over many decades of economic relations between enterprises of the CIS, the crisis in the economy, the complexity of economy transfer to a market economy, and the sharp drop in discipline and responsibility among officials, the volume of industrial and agriculture production with other sectors of the economy in Kazakhstan (as in other Republics of the former USSR) for the period for 1992-1995 dramatically decreased. According to the assessment of individual experts, the decline in production in 1992, from its relatively stable level in 1990 was 14.6%, in 1993 - 28%, in 1994 – 48% and in 1995 – 57%

(OREXCA, 2012). History clearly demonstrates that as a purely market-based state the economy proved to be ineffective. Therefore, when constructing the system of state regulation of the agricultural sector, one of the main objectives was to find the optimal combination of market and state, to begin to achieve the main goal of social development. This process is not simple and the developers and policymakers of many government programmes faced intractable issues (Smailov, 2000).

During the period of economic reforms in 1992, the strategy of industrial development was also spontaneously implemented. The export of oil, gas, metals and other raw-materials was the main aim of this strategy. The state requirements to improve the technologies for production of quality agriculture products influenced the increase of the investments into this branch. Agriculture policy reoriented to market conditions. The legal instruments and mechanisms of State regulation of agriculture were also created. Moreover, for the further stable development of Kazakhstan's agriculture, on the basis of medium-term plans for socio-economic development of the country, reforms of agriculture policy were developed and approved.

With the basic state programs, the laws on regulation of various directions of agriculture were passed. For instance, the law on "Governmental regulation of agro-industrial and farm territories development" was approved by the authorities in 2005 and defined the legal, organizational, economic and social fundamentals to realize the governmental regulation of agro-industrial and farm territories development in Kazakhstan.

Discussing the situation in Kazakhstan agriculture for the period since 1991 Sagadiev (2006 p.215) claims: *due to the insolvency large agriculture enterprises collapsed into the small-scale cooperatives and individual farms, which could use only primitive technology. There has been a decrease in the number of livestock, arable land, reducing crop yields and livestock productivity, decrease in soil conservation measures, increasing the risk of diseases of plants and animals, the collapse of social services in rural areas.*

Considering the situation and statistical reports for that period, Rakhmatullina (2007), and Sagadiev et al. (2006) suggest that in 1992, at the beginning of the reforms, 2120 state collective farms and 480 collective farms worked in Kazakhstan. During the period of reforms (1992-1996) most of them were privatized and on this basis, on July 1, 1996 there were created 39,980 peasant farms, 2354 production cooperatives, 3060 small private enterprises (associations), 373 joint stock companies have been created. There were another 595 state farms (farms) and 219 farms. Under the circumstances, reforms in agriculture policy were proposed by policymakers in the following directions:

- To seriously tackle recession and ensure its stabilization
- To increase agriculture production

Farms in Kazakhstan are divided into three categories: agricultural enterprises, private (or peasant) farms, and subsidiary household plots:

- *“Agricultural enterprises tend to be large-scale operations (similar to the State and collective farms of the Soviet era) and are involved strictly in commercial production of commodities. Agricultural enterprises account for about 65 percent of Kazakhstan grain production.*
- *Peasant farms are typically family farms and are substantially smaller than agriculture enterprises. Nearly 200,000 peasant farms produce grain, and they account for about 35 percent of the country's output. According to the 2006 census, 95 percent of the farms are smaller than 1,000 hectares. Peasant farms, like agriculture enterprises, produce commodities mainly for sale rather than for private consumption.*
- *Household farms are small personal subsidiary plots (average size 0.15 hectares, or about one half of one acre) that are used to produce crops or livestock chiefly for personal consumption. Kazakhstan's 3 million household farms produce less than 1 percent of Kazakhstan grain but account for 50 percent of the country's poultry inventory and 85 percent of the cattle” (USDA, Available from: www.pecad.fas.usda.gov/highlights/2010/01, Accessed 21 October 2011)*

It is known that agro-holding companies usually play a significant role in Kazakhstan agriculture development. They typically operate as “an umbrella company’ for numerous individual agricultural enterprises providing operating capital and marketing channels for commodities produced on the farms (USDA, 2011). At the same time, considering the gradual implementation of reforms in agriculture sector since independence, it is evident that these regulations secured the necessary conditions for the agriculture sector to escape from the crisis with creating the conditions for its development. Revisions of the concept of land and economic reforms in the Kazakhstani agriculture sector with the further development of agriculture were also recognized as important measures to overcome the crisis (Sagadiev, 2006).

Thus, in the course of economic reforms in agriculture, there have been major costs, such as: crop area decreased by 18.6% including on irrigated land by 7.5%. In 1995, the gross grain yield was 33.3 to 1990. Thus, the crop yields in agriculture sharply decreased. At the end of 1995 the number of livestock and its productivity dramatically reduced. As a result, up to 78.5% of the agriculture enterprises were now unprofitable (Sagadiev, 2006 p.219).

During the examination of agricultural reforms within the frame of agriculture policy of Kazakhstan, it is understandable that all these reforms secured “the necessary conditions for agriculture sector to output from the crisis with creating the conditions for its development” and were “important measures to overcome the crisis” (Sagadiev, 2006 p.219). In the following section the features of the agricultural policy of Kazakhstan will be examined by the researcher, in order to understand the main directions, mechanisms and methods of agricultural policy development.

3. Features of the agricultural policy of the Republic of Kazakhstan: directions, mechanisms, methods

In modern Western economies an agriculture sector is actively supported by the government. Government establishes and annually reviews by minimum prices for major agriculture products. Thus, producers are protected from the sharp fall in prices. Abdrakhmanova, 2007 p.117).

Regulation of development of the agriculture sector affects many aspects of the market economy: it operates public procurement of agriculture products, regulates the export and import of food, set quotas for the production of basic agriculture products, uses guaranteed prices to ensure stabilization of the food market, subsidizes activities for the reconstruction of the processing and marketing of products and gives assistance in building infrastructure, equipping rural areas (Abdrakhmanova, 2007 p.117). With regard to the State regulation of the economy in Kazakhstan, Abdrakhmanova (2007) notes that the regulatory functions of the state are carried out in the following areas:

- Creation of legal framework, legal security regulation.
- Creation of competitive environment for all agriculture markets.

- Support of sustainable agriculture development, enabling manufacturers to adapt to market conditions. An important function of government regulation in this regard is to maintain a strong demand for food and agriculture raw materials. The state contributes to the formation of effective demand, affecting the income generation of key populations through the regulation of the prices of agriculture products, public procurement, food purchased for regional funds.

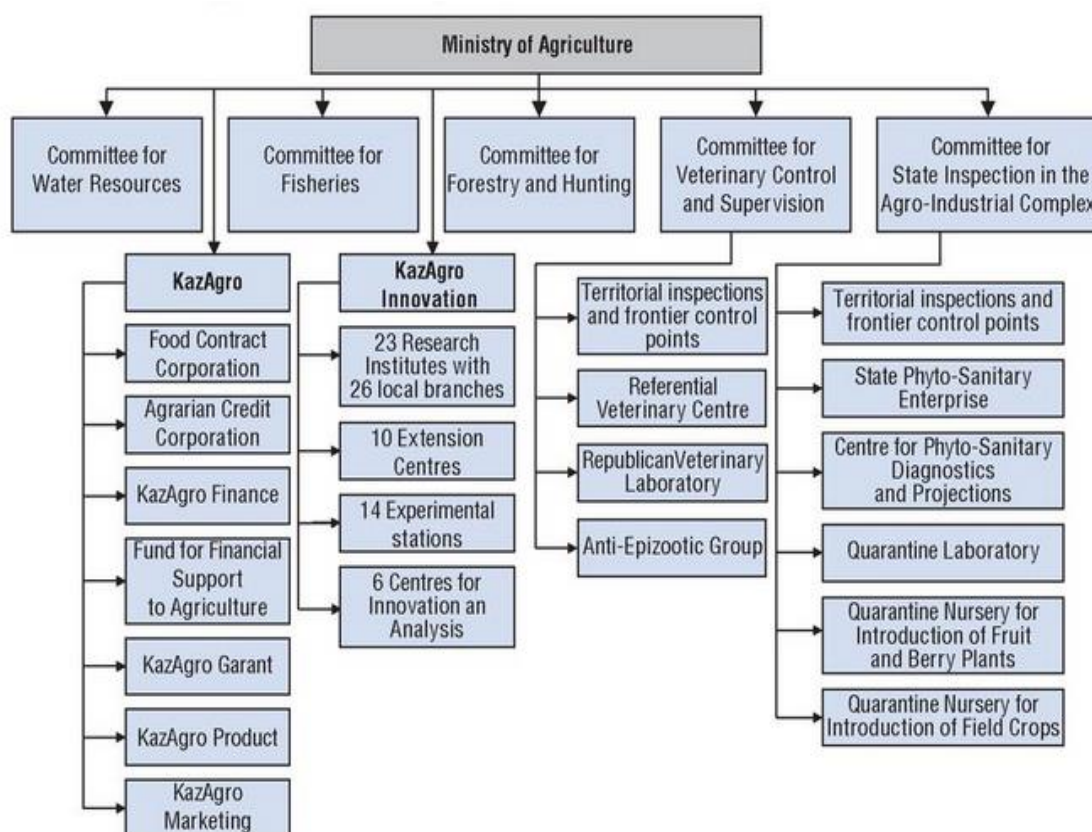
- Policy provision of reasonable protectionism, food security through the efficient system of tariffs, taxes on imported food.

- Favorable climate for foreign investors, formation of joint ventures in agriculture, government guarantees to foreign creditors while importing advanced technologies and equipment.

- Development of key areas of agriculture science, investment projects to develop new technologies that meet international standards. (Abdrakhmanova 2007 p. 119)

The Ministry of Agriculture of RK is the organization for administration of agricultural policy on national level. The structure of Ministry with five subordinate committees to control and manage whole agriculture system in Kazakhstan is presented in Figure 12.

Figure 12. Structure of Ministry of Agriculture of the Republic of Kazakhstan (2012).



Source: Ministry of Agriculture, KazAgro, KazAgroInnovatio 2012

At the same time, considering the fiscal adjustment as one of the main directions in countries' agricultural policies, there are two different approaches on this issue for developed and developing countries. For instance, in countries of the European system, for the implementation of targeted programmes and any support of agriculture, the state provides about 30 percent of the state budget. On the other hand, in a developing country like Kazakhstan, the agricultural budget support contains only 1 percent of the state budget (Orazgalieva and Urazalinov, 2011). On the basis of comparisons it can be argued that the state provides insufficient support of the agriculture sector in Kazakhstan.

According to Abdrakhmanova (2007) the main methods used in Kazakhstan to justify forecast indicators of agribusiness development are:

- *target-oriented* (in the targeted program planning agriculture development annually allocated to support the agrarian sector of tens of billions of dollars and provided to subsidize purchase prices and asset financing);
- *balance* (provides accounting equation in food production with material and technical equipment of agriculture, agro-processing volumes with a total capacity of processing industry, capital investment in the development of agriculture);
- *normative* (using recommended rates of consumption of food and non-food items per capita) (Abdrakhmanova, 2007 p.119)

To justify the overall production volumes agribusiness uses the following forecast data:

- Population, its demographic structure;
 - The real structure of the consumption fund, science-based intake of food;
 - Changing consumption patterns, depending on changes in income and consumer prices;
 - Export and import of agriculture and industrial production based forecast of world prices.
- (Abdrakhmanova, 2007 p.119)

Thus, compared with agricultural policies of developed countries, the differences between these and Kazakhstan, and in some cases the weaknesses of Kazakhstan's policies have been identified.

4. The structure of Kazakhstan's GDP and dynamics of its volume indices since the 1990's

During the first decade of independence and economic reforms Kazakhstan had to go through a series of crises: of economic growth, of investment, inflation, and a payments crisis. Thus, analyzing the situation in Kazakhstan's economy during the first decade since independence in 1991, Sultanbekova (2001 p.3) states: *the deep crisis of economic growth that took place before 1996, hit the entire economic system. Imbalances which are hidden in the planned economy, and new imbalances that emerged in the first half of the 90s, have had a devastating impact on all sectors of the economy and social development. In 1996-1997 there were insignificant "bursts" of economic growth, which, unfortunately, have not been sustained. Since 1999, the economy has embarked on a new path of transformation, there has been steady growth, indicating that the crisis is gradually being overcome.*

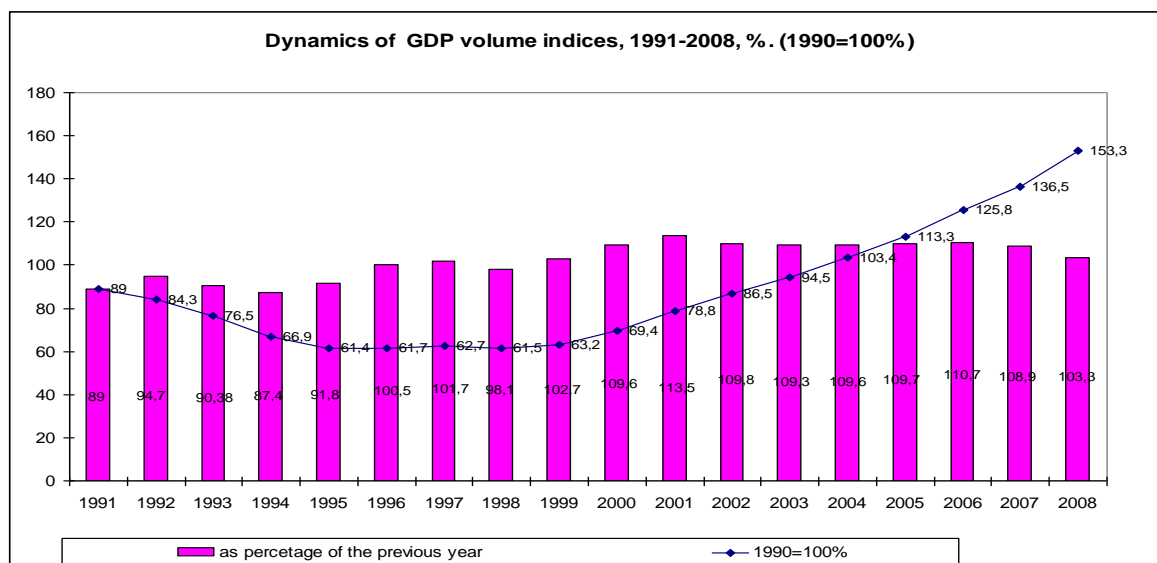
OECD experts also examined agricultural policy in Kazakhstan since independence, noting that:

"Agriculture output hit its lowest point in 1990. Policy support to the agricultural system continued to be limited, although a number of activities were emerging to later become the principal components of agricultural support in Kazakhstan. Emphasis was placed on improving the technical base of agriculture through preferential leasing of machinery and equipment. The decline in production was reversed in 1999" (OECD, 2013 p.89)

The dynamics of GDP volume indices for the period 1991-2008 as the result of implemented policies and reforms were presented in Figure 12. Thus, economic reforms in Kazakhstan during 1991-2008 to achieve transition to a new market based economy influenced the economic crisis existing since independence for the following 5 years. As a result, in 1995 the lowest level of GDP index in comparison with 1990 was registered as 61.4 percent. The decrease of the real GDP's dynamic was justified by a serious crisis in Kazakhstan's economy and was accompanied with a drop in production. In 1995, anti-crisis measures were introduced and as a result the macroeconomic situation in the Kazakhstan significantly improved. The period 1996-1997 indicated noticeable signs of economic stabilization, but it was hard-hit by the Russian crisis in 1998 (Pomfret, 2007(b) p.326). Nevertheless, this process was seen to fail due to the influence of the financial crisis in 1998-1999 in the world. With this in mind, for the subsequent fourteen years the main focus was formulated as recovering the

process of the pre-reformation potential of the economy. According to Akimov and Dollery (2008), in 2000 the Kazakhstan national economy demonstrated a ‘positive dynamic of growth’ (Figure 13).

Figure 13. Dynamics of GDP volume indices for the period 1991-2008, in percentage



Source: Republic of Kazakhstan, National Statistics Agency (2009)

During the reforms in Kazakhstan, Shokamanov (2003) highlights that significant changes occurred in the structure of GDP of Kazakhstan. Thus, the pre-reformation period in Kazakhstan was defined as an agrarian country while the share of agriculture was 34% and industry 20.5%. So, the changes in GDP structure occur not only due to the changes in the indices of the physical volumes, but are also impacted by different dynamics of prices in other spheres of national economy (Shokamanov, 2003).

After proclaiming independence, the agriculture sector had a rapid decline. The annual growth rate of agriculture value added during the period 1990-2001 was 3.22 per cent. On this note, Pomfret claims:

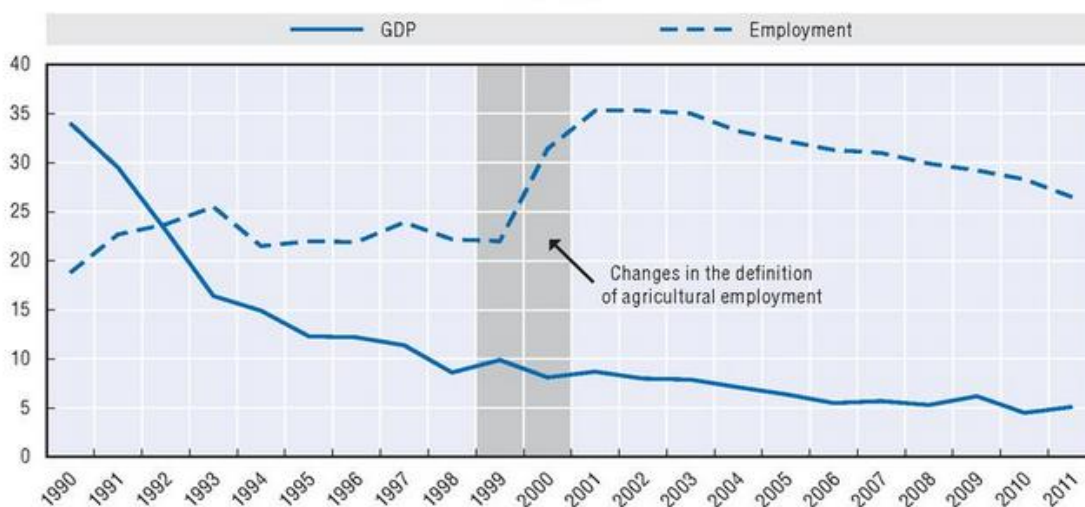
“One reason for the decline was a policy vacuum, which saw the rapid switch in the early 1990s from support for farmers to a market situation. This was reversed in the early 2000s as the government responded to the oil boom by promoting economic diversification, which included generous support for agriculture” (Pomfret, 2008 p.1)

Kazakhstan’s economic structure has a peculiarity. It was mentioned earlier, that in 1991 the agriculture share of output comprised of 34 percent and in 2008 - 5.3 percent. In 2011, the share of the agriculture sector in the total GDP of the country was only 5% compared with 34% in 1990, and this was associated with the “oil boom” in Kazakhstan. Figure 13 presents the trends in agriculture’s share of output and of employment. Additionally, OECD experts state:

“With the rapid growth of oil output, agriculture’s share of GDP declined from 34% in 1990 to 5% in 2011” (OECD, 2013 p.69)

Thus, the decrease of GDP indices in agriculture is evident. Furthermore, such correlation of the economy and employment structures cannot be considered as a dynamic progressive change.

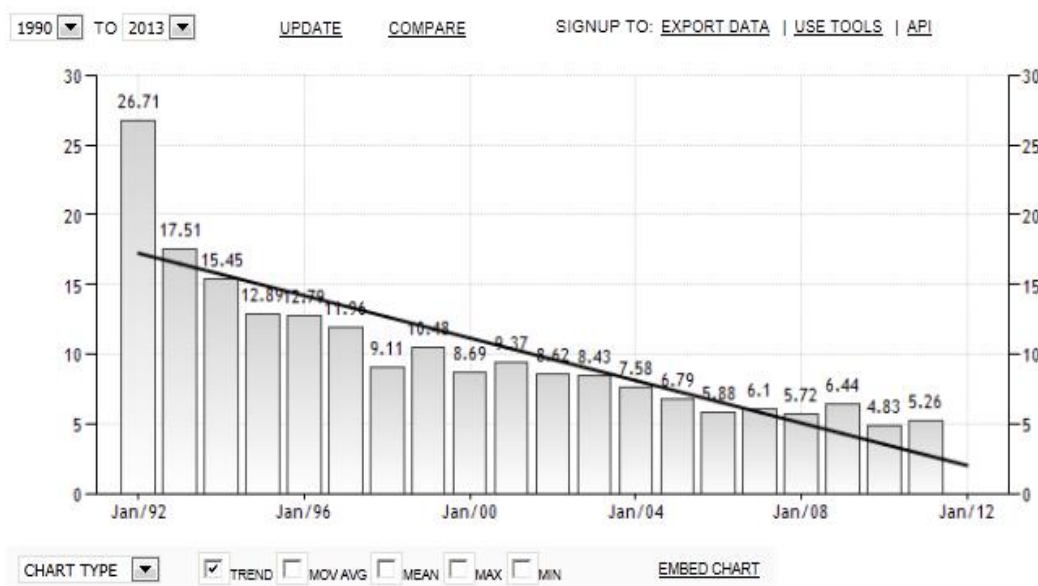
Figure 14. Agriculture's share in GDP and total employment during the period of 1990-2011, (per cent).



Source: Statistics Agency of the Republic of Kazakhstan.

Kazakhstan joined the World Bank in 1992, and according to a World Bank report published in 2012, agriculture accounts for only 5.26% of GDP and is reflected in Figure 15, “but the sector continues to employ almost one third (28.3%) of the working population and is critical to addressing poverty and food security, as well as providing an important avenue for diversification of the economy” (The World Bank, Available from: <http://data.worldbank.org/> Accessed 08 January 2013).

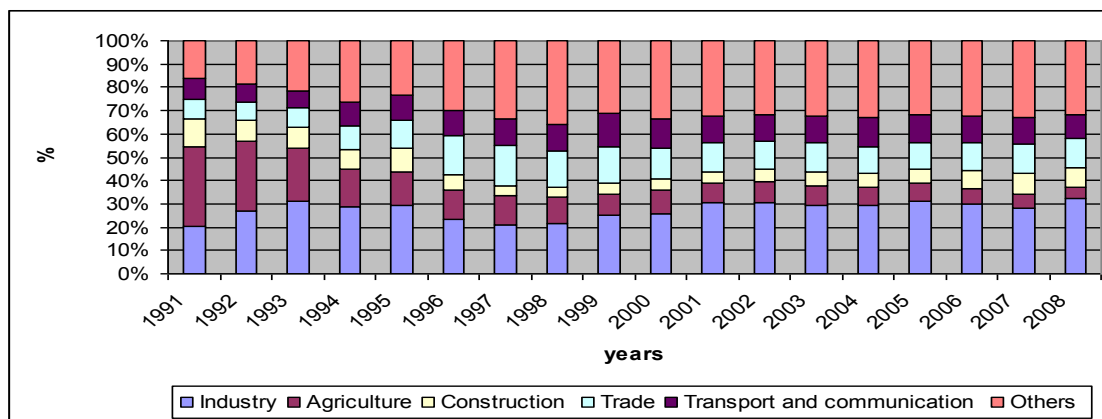
Figure 15. Percentage ratio of GDP in Kazakhstan since 1990s.



Source: Republic of Kazakhstan, National Statistics Agency (2009)

In addition, Figure 16 reflects the price factor with the reasons for this decline. The following factors apply: the destruction of pre-existing trade relations with the countries of the former Soviet Union, disruptions in the supply of equipment, lack of fuel, fertilizer, seed, bad loans; together with the lack of systematic state support, weak economic operations, the lack of manpower associated with the outflow of villagers in the city and other countries, and the deficit in the professional staff and managers for the agricultural sector. All these influenced the stagnation in the agricultural sector of Kazakhstan. Thus, the current price of agriculture's GDP was still decreasing and did not achieve the level it had at the beginning of the 1990s.

Figure 16. Structure of GDP in current prices, in % to the result



Source: Compilers Abutalinova. 2005; Smailov. 2010

Thus, the level of agriculture development has always been and continues to be a determining factor in the economic and socio-political stability of Kazakhstani society. It is evident that agriculture with its enormous potential and large reserves takes a priority place in the development of the Kazakhstani economy.

5. The theory and practice of agricultural policies during the independence period

The theory and practice of Kazakh agricultural policies in the academic literature have been given very little attention, especially at the time of independence in 1991. This is evidenced by the limited number of publications and research articles in the literature review. Writers Ospanov (2002), Sagadiev et al. (2006) characterized that period of time as a period of urgent decisions without proper study and investigation of implemented policies, even more without practical tests.

The agrarian crisis has become a part of the general economic crisis with deep roots and a long-term character, caused by specific agrarian reforms and the agricultural policy of the state for decades. Later, experts discussing the problems of implemented agrarian reforms and policies since 1991, tried to find the problematic points and mistakes in previous experience. Kurmanova (2010 p.8) states: *to overcome the negative trends in agriculture we needed to study the theory and practice of existing policies and the creation of the new agrarian reforms, which defines a system of measures for a*

radical transformation of economic relations in the countryside, in order to ensure food security of the population and the growth of its standard of living. In this context, Maulenkulov (2001 p.15) claims that: the lack of investigation of the previous experiences of the theory and practice of implemented regulations and reforms in agriculture influenced for the implementation of the following new policies, and as a result the same mistakes and problems in certain reforms were repeated again. Nonetheless, at the beginning of 2000 experts initiated several disputes and discussions about the theory and practice of current policies on the analysis and comparison with previous implemented regulations and reforms since independence. Grigoruk (2012 p.13) states: in the countries of the Commonwealth of Independent States (CIS), a logical interest in complex rural development emerged only in the early 21st century. First State Rural Development Programme was developed in Kazakhstan in 2003 and designed for 7-years period. Now it is implemented and we can make a critical evaluation of the program's results. Grigoruk highlights three main weaknesses of the Programme: first, we should say that it was developed without sufficient theoretical basis and excluding foreign experience. Although the development of the Programme was preceded project in the form of technical assistance from the Asian Development Bank, its executors and consultants have insufficient understanding of the world-established models of rural development and their ability to adapt to the reality of rural Kazakhstan. Second, the main goal behind the program - create normal living conditions for villagers on the basis of optimization of rural settlement. Third, the program is considered rural areas as a habitat of the rural population; organize rural settlements with engineering and social arrangement. Agricultural component was absent. Thus, the fundamental role of agriculture in rural development programme was not considered (Grigoruk, 2012 p.15). Additionally, Grigoruk suggests: For the sustainable development of rural areas needs to create the corresponding legal, economic and organizational framework that is the prerogative of the state bodies and local self-government. And it is necessary to adopt a law on the development of rural areas, to develop a strategy for rural development by 2020 and to build a common rural investment budget (Grigoruk, 2012 p.15)

It is noticeable that the theory and practice of Land Reform and Food Security policies take a special place among other programmes and regulations. So, the following Sections review the theory and practice of several main policies implemented in Kazakhstan since independence in 1991.

6. Theory and practice of land reforms in Kazakhstan

Theoretical and methodological bases for regulating land relations have always been a subject of disputes and discussions among the scientists and agriculture experts especially in the last decade for the years of land reform. A significant contribution to the study of this problem has been made by prominent Kazakhstani scholars, economists and farmers: Kaliev (2003), Bergenov (2004), Ospanov et al. (2006), Sagadiev (2006), Dodabayev (2007).

Regarding the stages of the country's development, the collapse of the Soviet Union at the beginning of the 1990's allowed Kazakhstan to choose its direction of self-development. Ospanov (2002 p.19)

claims: *the old system of land relations has been deprived of its legal framework, many of the issues of land management could and should have been addressed and resolved with the solution of fundamental political and economic structure of Kazakhstan as a sovereign state. And additionally, notes: life has demanded urgent decisions that had to be made without proper study and even more - the practical test. The latter circumstance gave (and will) be felt in subsequent years change.*

Thus, land reform in Kazakhstan was launched after gaining independence and the declaration of the transition to a market economy. Ospanov (2002 p.21) claims: *at the initial stage of land reforms carried out, the focus was on the Russian version of land reform. As a result, accumulated scientific knowledge, gained experience, including the negative, caused correction in practice of the implemented initial models and options for land reform.*

The experience of land reform in other countries suggests that land is a fundamental issue in agricultural policy, as well as in the economic policy of the state. However, in Kazakhstan there is a lack of clear and justified vision and program of land policy implementation.

To address these shortcomings, a new approach for development of land relations, is to improve the scientific researches and guidelines for the reform of land relations by improving their economic and legal framework (Kurmanova, 2010 p.21)

Land policy clearly takes an especially important place in the agriculture economy development of Kazakhstan. Suggesting that steps of land reform implementation have had a negative impact, Kurmanova (2010 p.3) highlights the main reason for this problem in the following statement: *the past 20 years of economic reform have shown that lack of knowledge and often ignoring proven in the worldwide economic methods of regulation of land relations was reflected in the legal framework of land reform. The practical steps for its implementation had a negative impact on its results. As a result the economic reforms in Kazakhstan were completely destroyed by the old system of management of rural economy, based on the close connection of large farms with objects corresponding to the production and social infrastructure, the components of a single agricultural sector, aimed at solving the general problem for all.*

Furthermore, the crisis in agriculture can be characterized as follows: *huge areas of agricultural land taken out of agricultural use has led to a sharp increase in the proportion of reserve land and fallow land. As a result, land reform in the agricultural sector was carried out without due regard to the specific agricultural conditions and in isolation from the reform of industrial and economic relations. Add to this the problem of imperfect system of payments for the land, adds Kurmanova (2010 p.3).*

Due to the fact that the land is an important national resource, scientists such as Maulenkulov (2001) and Sagadiev (2006) have noted the need for a better developed concept of land management of the country. Ospanov (2002 p.19) highlights: *for the development of land reforms it is necessary to deepen the research on the legal, economic, organizational and technical aspects of this problem, and the place and role of land relations in the system of social relations. A more thorough justification of the*

issue of land management, land cadastral (records showing the extent, value and ownership of land) and land monitoring; an efficient system of land use for specific conditions in the Republic of Kazakhstan.

The experience of land reform in other developed countries suggests that land is a fundamental issue in agricultural policy as well as in the economic policy of the Government in general. However, in Kazakhstan there is no strategic development concept and program of implementation of the land policy. With this in mind, Kurmanova (2010 p.3-4) claims: *to address these shortcomings a new approach to development of land relations is to develop the scientific and guidelines for the reform of land relations by improving their economic and legal framework.*

The impact of land reform in Kazakhstan has still not been fully investigated and there is a list of unresolved issues in the agricultural sector for research, such as: management and protection of land, requiring better regulation of land relations, and ecologically safe land use (Kurmanova, 2010).

Another no less important policy for any states is Food Security policy, and Kazakhstan is no exception. Thus, the following section presents the theory and practice of Food Security policy with its evolution during independence since 1991.

7. Food Security policy since independence

Ospanov and Kaigorodtsev (2006) identified the challenges of sustainable development of agro-industrial complexes, suggesting that state activities should be aimed at ensuring the food security of the Kazakhstani population: *Food security should be an opportunity to ensure the country's population of basic foodstuffs through domestic production with the necessary priority to the most vulnerable, the poor and provide physical and economic access to food in a quantity and quality which are necessary for the preservation and maintenance of life and the strength of the person. Moreover, this should be complete or the maximum possible independence of the state from external sources of food* (Ospanov and Kaigorodtsev, 2006 p.204)

It was thus evident that the achievement of full food security will provide independence of the state from external food sources. At the same time, the European CAP indicates a similar strategy for developed EU countries. Scientists argued that food security is ensured in the event that the country produces about 80 % of the food consumed. And more than that, they claim: *food security is considered secured in case if the volume of products makes up the safety stock in the developed countries (additional products for 60 days, or 17 % of annual consumption)* (Ospanov and Kaigorodtsev, 2006 p.204)

With regard to procurement of certain products which are not produced in the country, the researchers determined the importance of preventing dependence of food from other countries. Furthermore, they reasonably claim that food security in Kazakhstan may not be achieved without positive government influence and the government's support of the agricultural sector. On this note, they believe: *Food*

safety should be under government regulation in accordance with the legislative, administrative and economic impact of the state on the production, processing and marketing of products and food (Ospanov and Kaigorodtsev, 2006 p.204).

Thus, examining the role of food security policy in Kazakhstan with its development it was evident that this topic has not been investigated widely in Kazakhstan, though the importance of this policy in agricultural development was highlighted by researchers.

8. The result of the agricultural policy's influence on agriculture of Kazakhstan since 1991

Thus examining the theory and practice of agricultural policy in literature since independence, it may be seen that this period of time was one of urgent decisions without proper study and investigation of implemented policies, even more without practical tests. During the economic reforms the agricultural policy of Kazakhstan was reoriented towards a market based economy. The role of significant reforms for that period of time has been discussed, for understanding the weaknesses of those reforms with their influence on agriculture development. Hence, legal and organizational conditions were created for the functioning of agricultural units and organizations which were established with the various forms of ownership. Taking into account the huge territories and historical state orientation to agriculture development of Kazakhstan, it was clear that the agriculture sphere has to be considered as a high priority sector for Kazakhstan's economic development. Ziyabekov (2007 p.3) states: *agriculture policy is a part of the economic policy and is the sequencing of the state and authorized by public law institutions on the formation of cultural, social, legal and economic conditions of the rural population.*

Examining the influence of agriculture policy on economic development during the 90's, Ziyabekov (2007) claims that this sector of economy, and the agro-food system in Kazakhstan generally, are experiencing one of the most difficult periods in their development. The crisis has affected both economic and social areas of the economy's development. Moreover, writers such as Sagadiev (2006) and Ziyabekov (2007) state that the most negative consequences of the market in agriculture policy during 1991-2004 was a significant reduction in the production capacity of agriculture, and which, as a result, was reducing the quality of life in rural areas.

On the basis of analysis, OECD experts found weak points in agricultural processes. For example, with regard to the functioning of the food chain in Kazakhstan, experts identified the procedures for transaction costs to the agriculture producers and others involved in the chain as very complex. OECD researchers investigated the chain of the three largest sectors in Kazakhstan: cereal, milk and meat. On the basis of their review, the functioning of the food chain was determined as inefficient, and one which significantly restricted the development of agriculture. Moreover, the experts highlighted the need to improve the "hard infrastructure", such as roads, ports and grain elevators. On the other hand, the need to develop the "soft infrastructure" - market information, knowledge systems and specialized training, contractual relationships, reviewing complex bureaucratic procedures, the regulatory

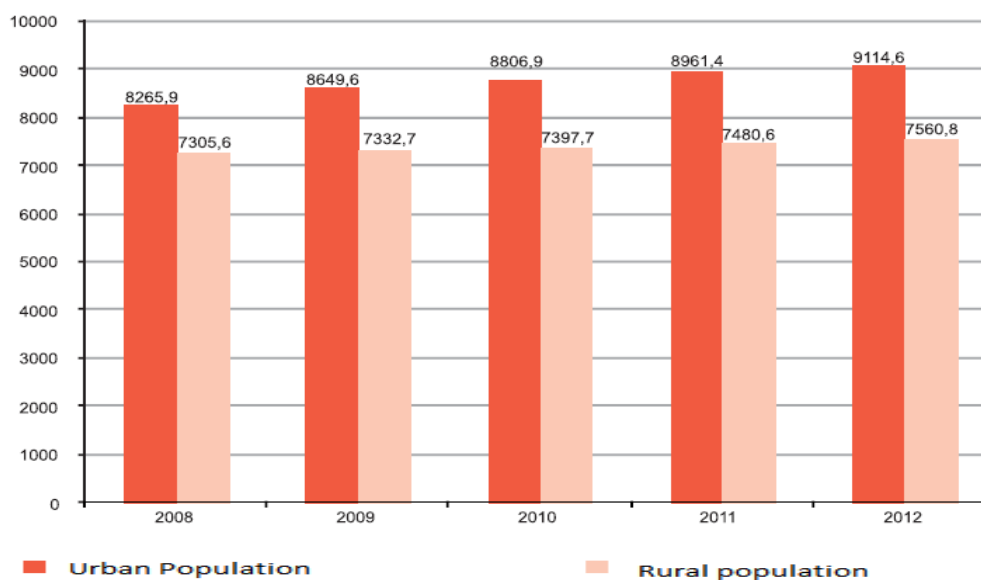
framework for collective action and competition - was also proposed by OECD advisors (OECD, 2013).

To substantiate the above findings, this study demonstrates some figures of productive capacity of agriculture to date, compared with the pre-reform period. Thus, the share of agriculture in GDP declined from 34% in 1990 to 6.5% in 2005, the area of agricultural land decreased from 197.6 million hectares to 78.3 million hectares, including arable land from 35.5 to 22.1 million hectares. Land out of agriculture output, followed by the decline of reclamation is ultimately the deterioration of land quality and thus complicates the prospects for recovery of the large scale agriculture production. As a result of voluntary and forced privatizations in agriculture and limited resources, there was a drastic reduction in the number of livestock. Thus, at the end of 2005 the number of cattle was 55.9%, and of pigs 39.7%, based on 1990 levels. Of the 35 million sheep in 1990, at the end of 2005 in the country, there were only 14.3 million head. The reasons are the same: the artificial destruction of the economic infrastructure, and the denial of economic rights. And as Ziyabekov noticed, these statistics were the result of privatization (Ziyabekov 2007 p.3). At the same time, examining the situation in agriculture Ziyabekov paid more attention to understanding and analyzing the changes in agriculture economy and rural regions after implementation of several important policies and regulations since independence with the transfer to the new market economy system. He highlighted the following:

- The poor condition of the agricultural machinery industry and the production of mineral fertilizers affect the material and technical equipment of the rural producers. On this note, the deterioration of agricultural machinery is 80%, and 2 times higher than the normative life.
- A production of mineral fertilizers decreased by about 16 times.
- Agriculture products: meat production decreased in 2 times in comparison with 1990's; the same catastrophic situation took place in all major types of food.
- The result has been a significant change in consumption patterns - increasing the share of imported food products. For food products sold in retail trade, the import share of 20%, and in the major cities - 60%.
- The share of consumption of imported food products significantly increased (Ziyabekov 2007 p.3, translated).

Currently, the average size of the rural population is 7 560.8 thousand people or 45% of total population in Kazakhstan. The ratio between urban and rural population for the period of 2008-2012 was presented in the reports of the National Statistical Agency of the Republic of Kazakhstan in Figure 17.

Figure 17. Urban and Rural Population in Kazakhstan



Source: Statistical Report 2012. The National Statistical Agency of the Republic of Kazakhstan.

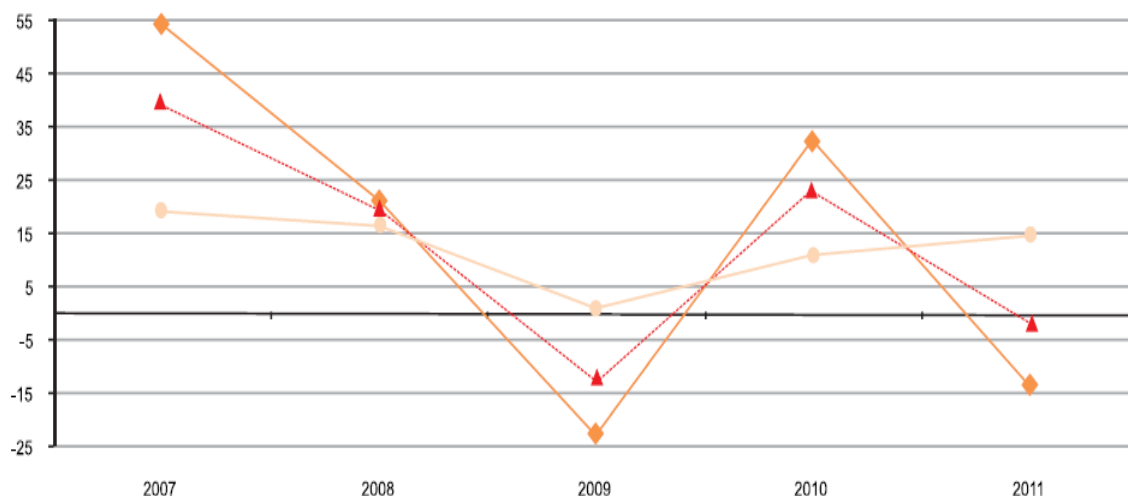
On the other hand, the life quality in rural regions during the independence period significantly reduced (Ziyabekov 2007). Examining the causes of this problem, the decrease of wages in rural regions was identified as one of the main reasons which significantly influenced the life quality of rural citizens. The average monthly wages of agriculture workers were published in national statistical reports:

- 2005, in rural regions the wage was 14,976 tenge (120 USD) and in the economy - 34,060 tenge (273 USD);
- 2012, the wage was 31,471 tenge (approx. 210 USD) and in the economy - 66,884 tenge (approx. 446 USD), which is more than double higher in comparison with the villagers (NSAOK, 2010)

So, these and other economic strains have led to today's results in agriculture, that is, the irresistible rise of the prices of agriculture products, and as a result, the poor quality of life of the main sector of the population. The main causes of what is happening seem to be the lack of an effective agriculture policy and agrarian reforms. The lack of a solid theoretical framework of agrarian policy of the transition period has led to a systemic crisis in agriculture. The changes in sale prices of agriculture products in Kazakhstan for the period of 2007-2011 are presented in Figure 18.

Figure 18. The change in sale prices for agriculture products in Kazakhstan

(in percentage to previous year December; “+” gain and “-“reduction)



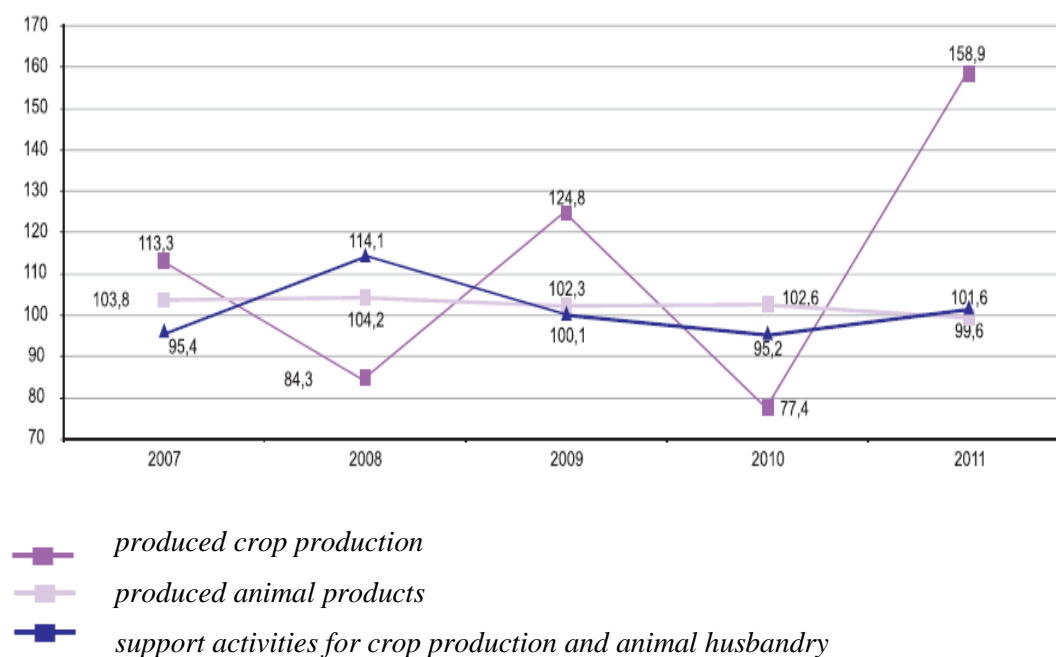
Source: Statistical Report 2012. The National Statistical Agency of the Republic of Kazakhstan.

Thus, the leading role in the whole system of state regulation of the economy is to maintain an appropriate level of prices and price equilibrium, as imbalance in the price mechanism leads to cumulative damage. The system of state regulation of prices in countries with a developed market economy involves: setting upper and lower limits of price fluctuations, indicative and conditional price, which the state seeks to maintain. Regulatory tools are buying and selling of agriculture products to commodity intervention and maintaining the desired level of prices (Ziyabekov 2007).

The active participation of the state in the reproduction process of the food complex is characteristic of any country with a market system. Despite the apparent independence of the farmers, traders and producers of agriculture products, all of them follow the directions of the agrarian and food policy. Moreover, the measures taken by the State to maintain a balance between demand and supply, the protection of domestic producers and structural changes in rural areas, are not only economic but also cover non-economic, administrative issues (Sagadiev et al., 2006).

Examining the current situation in the agriculture of Kazakhstan for the last 5 years (Figure 19), the situation in this sphere has slightly changed, but still needs definite improvement and development.

Figure 19. The volume indices of gross production (services) agriculture (in % to previous years)



Source: Statistical Report 2012. The National Statistical Agency of the Republic of Kazakhstan.

The following section considers the obstacles and unrealized provisions in Kazakh agricultural policy.

9. Obstacles and unrealized provisions in agricultural policy

Examining the evolution of agricultural policy development and its influence on the agricultural economy development it is helpful to consider the obstacles and unrealized provisions in agriculture policy during the period of independence. Since the 1990's the agricultural sector in Kazakhstan rapidly declined and the annual growth rate of agricultural value added for the period of ten years after independence in 1991 and was 3.22% (Pomfret, 2009).

“One reason for the decline was a policy vacuum, which saw the rapid switch in the early 1990s from support for farmers to a market situation reserved in the early 2000s as the government responded to the oil boom by promoting economic diversification, which included generous support for agriculture” (Pomfret 2009 p.182)

Thus, it was clear that agricultural policy in Kazakhstan was directed to supporting the large rural business accounts, for example, about 86% of all funds allocated to finance large rural agricultural businesses. This decision was regarded as one of the obstacles in agriculture policy realization during independence. On this note, the President of the “Union of Farmers of Kazakhstan” on the basis of several meetings with farm leaders in Kazakhstan shared his disagreements with government decisions: *in their view, the Ministry of Agriculture’s review of agriculture policy does not fully take into account the interests of small and medium-sized rural businesses, does not meet the expectations*

of the rural population, and most importantly - does not contribute to the dynamic development of the agriculture sector (Darinov, 2011 p.5).

Thus, on the basis of Darinov's opinion, representing the interests of farmers in Kazakhstan, the main mistake in the formulation of agriculture policy in the country was the bid which was made on the full support of large-scale production, while the peasant economy in Kazakhstan, by its nature a system of medium and small-scale farms, was ignored.

In addition, small and medium agribusiness accounts for the predominant share of the production of feed, cotton, tobacco, wool and hides. This is confirmed by the statistics of Kazakhstan's National Statistics Agency, and it is necessary also to consider the design and implementation of agriculture policy (Darinov 2011). In particular, it is confirmed by the fact that the small and medium rural businesses account only for 14% of all funds allocated to the financing of agriculture from different sources. Thus, as Darinov sums up farmers' opinion: *and this time almost all sectors of the industry, with the exception of grain production, where significant proportion of large farms, is dominated by small and medium-sized farms. Exactly, they and family farms are needed to ensure food security of the population of the country with vegetables and melons, fruit, oil, meat and dairy products (Darinov, 2011 p.6).*

Regarding the last three years, it was evident that the farmers were in a precarious financial position. Despite the fact that 2009 was a high-yield year, it failed to bring peasant farmers anticipated dividends because of low grain prices and the problems associated with their storage and sale. Poor harvests in 2010 only worsened the situation. The total loss of profit amounted to over 233,333 million USD. With this in mind, Darinov (2011 p.6) suggests: *if the state will turn its face to small and medium agro-business and will create normal conditions for them to gain access to credit and support measures, the farmers of our country, to equip with modern technology and equipment, have been able to show his true potential, increasing several times the performance of labor productivity fields and farms.*

Discussing the factors hindering the development of agriculture in the country, Darinov (2011) claims that one of the factors is the excessive bureaucratization of processes for registration and issuance of lending. As a rule, review and approval of applications of potential borrowers are stretched out over many months, and sometimes years. Agriculture producers argue that the inability to obtain registration of credits in the region, or remotely via communications and the effective technology, complicate the situation of getting subsidies and loans. The same opinion about conditions and mechanisms of subsidies' distribution and their inefficiency differentiation in agriculture was reflected by Bergenov (2004 p.29). He notes that it remains a major problem for small and medium businesses: *today's state agriculture subsidies as such are not transparent and do not reflect the effective assistance agro-formations by the state. They are ineffective, not of a programmatic nature, for agriculture producers are able to reach only a small portion of funds. Therefore, all government*

subsidies should be transparent, i.e. financial statements of agro-formations annually should reflect these issues, and national statistical authorities should provide all the necessary information.

The regulation of agriculture “On state regulation of agriculture and rural areas” may be seen as another essential regulation in agriculture development. Commenting on the role of the law introduced in 2005, Ziyabekov (2007) highlights that the main provisions of the law for various reasons were not implemented. Most of the articles of the law did not achieve development regulations. This law is not one of direct action: articles define the direction of government support and do not contain specific mechanisms for management of agriculture. Based on international practice, for example the experience of Germany, UK, the U.S. and other developed countries, the sequence is: first, determine the state agriculture policy and then proceed to implement it. In this context, Ziyabekov (2007 p.3) claims: *first, it is necessary to determine the state agricultural policy, and then proceed to its implementation. That” why we need a new basic law “On the development of agriculture.” And this law should determine the state agrarian policy for a certain period: 5, 7, 10 years. The aim of public policy in this law, it is desirable to encompass as follows:*

- *Competitiveness and sustainable agriculture products;*
- *Formation of the developed markets of agriculture products, raw materials and food;*
- *Creation for agriculture producers equal to business entities other economic conditions generate revenue, improve the financial sustainability of agriculture producers;*
- *Increase income of people working in agriculture, improving the quality of life of rural population;*
- *Environmental protection, conservation and restoration of natural resources used in agriculture.” (Ziyabekov, 2007 p.3)*

One of the most controversial and frequently raised questions in the economic literature was the need for and extent of state intervention in the manufacturing sector of the agriculture sector. Of some help in this matter may be the study of the experience of countries with highly developed agriculture.

To rely on the self-organization of farmers and self-mobilization of the resources necessary to meet the challenges of food security of the country, in the present conditions is impossible. The real economic position of agriculture producers is not considered and does not allow them to be considered creditworthy. The degree of risk of long-term and short-term investments remains high. On the contrary, the ability of government agencies to take risks and give potential investors the necessary guarantees is very low. In Kazakhstan, the total budget support of agriculture is 1 percent of the state budget. All this makes the agribusiness area closed to foreign investment, commercial investment, domestic banks and other financial institutions (Ziyabekov, 2007).

Thus, the main source of funds and the organizing principle for the work in these areas may be only the state, through a detailed and comprehensive system of protectionist support for the agriculture

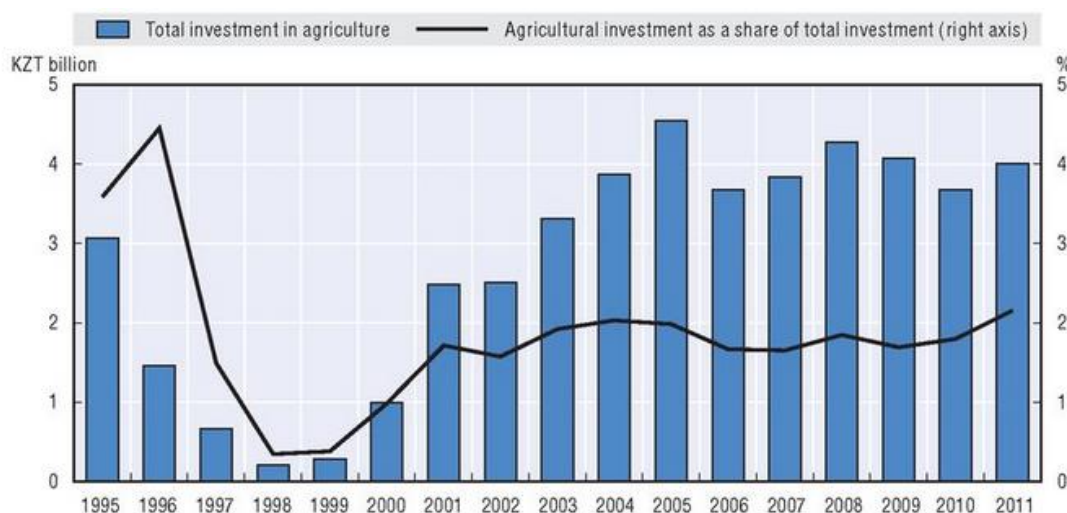
sector. Meanwhile, scientists say, the modern financial policy has been and remains the policy of “patching up” the rapidly deteriorating rural economy. Lack of funds allocated for the maintenance of the agriculture sector, only allows for the measures that are essential for seasonal work and keep afloat the most crisis ridden sectors of agriculture.

In some developed countries, government support programs designed are for 5-10 years and are implemented without any changes. They are usually not tied to requirements and regulations that infringe upon the legitimate rights and interests of small business. There are no requirements to the technology and the quality of seed, crop area size and number of livestock. The main conditions of grants are not to violate the requirements of environmental protection and environmental legislation, not to impair fertility. Consequently, the rules and mechanisms of funding should be as close to international standards and should not be changed from year to year, depending on the whim of individual officials (Darinov 2012 p.6), representing the interests of farmers of small and medium business. *Agriculture policy is focused only on big agribusiness*, adds Darinov (2011 p.6).

Taking into account unsolved problems in current agriculture with the question: “what should be done to improve the current situation in agriculture of Kazakhstan?” Kazhrakhimov (2003) claims that the modern agriculture policy must be comprehensive with transparency of financial statements, investors and government agencies that implement the state support of the village.

At the same time examining the issue of agriculture’s investments for the period of 1995-2011, OECD experts in revision of Kazakhstan’s agriculture put forward the following statistics based on calculation by Statistics Agency of the Republic of Kazakhstan (Figure 20)

Figure 20. Investments in agriculture of Kazakhstan, 1995-2011 (OECD 2013 p.73).



1. In constant 1994 prices based on GDP deflator.

Source: Calculation based on Statistics Agency of the Republic of Kazakhstan data.

Furthermore, the Union of Farmers of Kazakhstan suggest the need to reconsider the priorities of agriculture policy by bringing it in line with global practice, where the overriding principle is to provide equal competitive conditions for all agriculture entities with equity and fairness of state support. It suggests Kazakhstan should also rethink the role of the peasant farm and create conditions

for the establishment and ongoing development state of the Union of Kazakhstani farmers (Darinov, 2011).

In 2008, speaking in New York, at a meeting of the Economic and Social Council (ECOSOC), Deputy Foreign Minister of Kazakhstan Danenov said that Kazakhstan is also experiencing the negative effects of the food crisis. Discussing the growth rate of investment in agriculture in Kazakhstan compared with the World Bank estimates, he states that investment was increased more than 2 times for the last five years. On this note, Danenov (2008) states: *the agriculture sector has become attractive for business and this is an additional incentive for the creation of a modern and competitive agriculture industry, to expand its export capacity and increase the standard of living and well-being of the rural population.*

10. The factors of agricultural policy's negative impact on agriculture

The implementation of any policy can play a significant positive or negative influence on agriculture economy. The analysis of factors with a negative impact is an important issue for understanding the weaknesses of the implemented policies and finding efficient solutions to improve the situation. Thus, taking into account the importance of this view, this section will consider the factors of Kazakh agricultural policy's negative influence on agriculture development during the period since gaining independence in 1990's.

As is known, the development of agriculture is one of the main strategies in a country's economic development. Sagadiev et al. (2006) claim that the implementation of the policies as a whole system in Kazakhstan under the existing economic, social and legal environment in agriculture is partially ineffective, but nevertheless represents a promising alternative adaptation of Kazakhstan in the world economy, but is one which requires a very large investment. The strategy also required major constitutional reforms in the agriculture sector of Kazakhstan.

In fact, the literature suggests it was evident that since 1991 that agriculture in Kazakhstan has been a backward sector with a low technological level. Moreover, the deplorable state of agriculture made investment in it seem unrealistic and, as a result, in the era of economic reforms, Kazakhstan has reduced crop yields and agriculture production (Sagadiev, 2006; Ospanov, 2002). At the same time, in the process of introduction of the new policies and reforms in agriculture it is important to understand the elements of policy with monitoring and evaluation of the results. Thus, describing the procedures of agriculture reforms Lundberg (2005 p.145) suggests:

“Agriculture reform contains an element of evaluation, it is intended to give policymakers an idea of the potential impacts of reforms. However, successful reforms must include some core capacity for monitoring and evaluation that is built into the program at its inception. This would enable policymakers to see whether the policies were implemented as planned, whether the

results correspond to expectations, what must be changed during implementation, and what might be learned from experience.”

Further, Sagadiev (2006 p.214) indicates: *The deficiencies and shortcomings in the implementation of agrarian reforms have led to the serious consequences. As the result, the majority of farms (52%) due to violation of parity prices, distortions in the financial and credit system and taxation, became unprofitable.* At the same time, Sagadiev highlights the following reasons for the negative impacts of the introduced reforms: *The main reasons for such large losses were hasty market reforms, and lack of forethought organizationally and methodically. 59% of farmers have no education in the field of agriculture, as well as no possessing additional skills and knowledge in management, finance, accounting, agriculture and livestock, which are necessary to manage the farms (peasant)* (Sagadiev, 2006 p.215).

As a consequence, at the time agriculture dangerously increased the number of loss-making enterprises. Due to lack of funds, farmers had not purchased and implemented new techniques, technologies, constrained development consulting and other services. As a result, due to errors and miscalculations, economic reforms in the countryside for 5 years did not lead to the expected results (Maulenkulov, 2001).

Discussing the situation in agriculture of Kazakhstan for the period of economic reforms, particularly during the privatization process at the beginning of the 1990's, Maulenkulov (2001) notes that there has been a distortion of the main goals of privatization. Under 'privatization' it is necessary to understand the formation of effective economic ownership (Sagadiev, 2006 p.215). Thus, instead of forming an effective economic ownership, in reality privatization has benefited the owners. Moreover, the system of agriculture management needs further decentralization. The influence of the state on agriculture (direct, administrative) is still high. Many economic adjustments do not work, so the administrative interference in the economic affairs of the villagers from the state's authorities at all levels and agriculture administration continues.

Thus, examining the situation in Kazakhstan's agriculture sphere after several economic reforms during the independence period, the impacts of agriculture policy and reforms in agrarian branch, the researcher formulated the following conclusions. As is known, the decisions which impact on the efficiency of the state programs on development of the agriculture of Kazakhstan are targeted to the achievement of pre-defined tasks. However, as Smailov (2000), Sagadiev et al. (2006) discussed in their surveys, from the current activity analysis of this sector, the tasks were not completed for the full range. For instance, the condition of the agro-industrial complex is defined by its material support, and the latter in its term depends on scope of agriculture equipment and machinery, energy and other resources as well as implementation of new technologies and informational support for this sector. At the same time, the factors of negative impact of agrarian reforms and policy on agricultural economic development were noted by Maulenkulov (2001 p.4), among which are: lack of evidence-based and well-defined agriculture policy; haste in the transition to a market economy; no forecast the

consequences of decisions on land reform, deregulation and privatization; price liberalization; use of foreign business models without considering the peculiarities of socio-economic and natural conditions in Kazakhstan; rural poor adaptation to a market economy. The lack of structural IMS and reliable information in agrarian spheres has not been addressed by researchers since the 1990's.

The department of agriculture should be substantially changed and should be formed into operational units of local analytical and consulting centers, in the marketing department of service - development and consultancy division, having in its composition experimental stations and actively influencing the scientific and technical progress in agriculture.

Instruments of mutual linkage of long-term and short-term tasks of agriculture sectors, as it is known, must be created and offered by the government (Musina, 2005 p.6).

To improve the situation in agriculture of Kazakhstan for the development of agriculture the following new important documents were initiated and approved by governance and policy makers: "State-run Program of Rural Territories Development for 2004-2010", "Concept of sustainable development of agro industry complex of the Republic of Kazakhstan for 2006-2010" and "Government agro-food program of the Republic of Kazakhstan".

These reforms are aimed at providing food security, balance of agro-industrial product markets, and formation of effective system of enterprises and entrepreneurship, development of rural territories and support of competitive advantages of the national production. As is known, numbers of subjective factors, such as seasonal character of production, high funds, immobility of agrarian resources, high climate conditions dependence, the presence of constant risk in attaining stable incomes were considered in this document with the necessities of intervening and support from the government.

11. Agricultural policy development for effective integration to World Trade Organization

In recent years, almost all the CIS countries, including Kazakhstan, have defined a major role for the development of agriculture. Kazakhstani agricultural development was formed on the basis of a market infrastructure that aims in part improve the material and technical base, to provide working capital, stabilize production; and resolve issues for agriculture produce (Bergenov, 2004). *The government should implement the agricultural policies in a comprehensive, systematic way, in relationship and interdependence, which should ensure the effectiveness and efficiency of the economic mechanism of agricultural formations' management with the various legal forms of management. Lack of such practices in agricultural sector of Kazakhstan and other CIS countries, unfortunately today does not create real conditions for the effective development of the sector,* adds Bergenov (2004 p.27).

Development of the Commonwealth requires the effective integration relations between all the countries of the CIS, as is intended by the EU countries. To date, all CIS countries do not exist in

isolation from each other, but the development of these economies and the rural economy as a whole depends on the effective mechanism of agrarian policy of all countries in the Eurasian space.

According to Bergenov (2004) *the ongoing agricultural policy, on the contrary, creates the necessary conditions for misappropriation of public funds, as a result of lack of system, lack of control and lack of effective mechanisms for implementation that many into the hands of officials at various levels. Therefore, the economic mechanism of Agrarian Policy of Kazakhstan and other CIS countries should reflect the functions such as planning, forecasting, organization, coordination, regulation, incentives and control in health management principles such as the unity of politics and economics, scientific, comprehensiveness, consistency, effectiveness, independence and interdependence, dynamism and efficiency.*

Additionally, discussing the main and sensitive issue in modern agricultural policy, Berdenov (2004 p.28-29) on this issue claims: *it must be comprehensive, with all the transparency of financial statements investors and government agencies that implement the state support of the agriculture sphere.* But according to researchers: *the ongoing agriculture policy, on the contrary, creates the necessary conditions for misappropriation of public funds, as a result of unsystematic character, lack of control and lack of effective implementation mechanisms.* During the investigation of agriculture policy development for effective integration to WTO, another problem was highlighted by researchers. Bergenov (2004 p.30) states: *today one of the urgent problems of agriculture is the lack of proper management. In particular it concerns of financial management in agricultural enterprises.*

Currently, the competitive environment in Kazakhstan is missing, claims Kaygorodtseva (2013). Analyzing the current role of Kazakh entrepreneurs, Kaygorodtseva observes that if entrepreneurs will continue their business under the existing path, a competitive environment will not develop. At the same time, WTO membership, or membership in the Customs Union is seen as the only a way to a real transformation of the national economy and improve its competitiveness. Scholars argue about a vicious circle: the lack of a competitive environment does not encourage the development of innovative entrepreneurship, and the low level of innovative entrepreneurship is a brake to increase the competitiveness of domestic producers. “Thus, WTO accession will be accompanied by both positive and negative effects on the economic development of Kazakhstan.”

“Definitely, in terms of Kazakhstan's accession to the WTO it is necessary to improve the competitiveness of agricultural products on the basis of the effectiveness of elements and tools of economic management mechanism and state regulation of the agricultural sector.” (Bergenov, 2004 p.31).

Thus, taking into account the political decision on Kazakhstan's accession to the WTO which is unlikely to be reversed, the experts suggest concentrating the attention on the beginning of preparation for life in a liberal market with new rules in strong competitive conditions.

12. Summary

Kazakhstan's agriculture sphere in this section was examined and analyzed together with the reforms and agriculture policy evolution during the period since independence since 1990's. It was evident that the agriculture of *"Kazakhstan still suffers from a number of problems which bar from productivity and profitability. According to the World Bank, currently Kazakhstan's labor efficiency in agriculture five times lowers than in the Eastern Europe, even lower than in Russia. In order to reach the European level it is also necessary to enhance production and competitive ability of the national producers. It is also necessary to implement international quality standards; including switching to modern technologies, thus the Kazakh producers will be ready for accession to the WTO"* (The World Bank, Available from: <http://data.worldbank.org/> (Accessed 10 November 2011).

Agricultural production of the country today is frequently one of small-scale production, which is the main reason for its weak competitiveness. Insufficient production of agriculture products and low productivity has led to the high dependence of the republic from the import of many agriculture commodities. With this in mind, the agricultural sector of Kazakhstan for its role in the structure and overall reproductive process of the economy is a key area. In accordance with the Kazakhstan Development Strategy to 2020 the agriculture sector belongs to seven priority sectors and should fully realize the benefits of the industry and large-scale potential. Taking into consideration this situation, the exploration of the problems in agriculture is an important issue on which economists and researchers in CIS countries should focus their vision.

Agriculture should be viewed as an industry that provides the country with food and industrial raw materials; and agriculture takes an important strategic role as a key customer and consumer of industrial products, forming, ultimately, profits in various sectors of the national economy.

From this perspective, this part of the study has explored the following issues: observation of the current situation in agriculture branch with the influence of different integration processes in economy, socio-economic conditions and historical background of country, structure of Kazakhstan's GDP and dynamics of its volume indices, the evolution of agriculture policy and associated outcomes and their effects on gross domestic products. Obstacles and unrealized provisions in agriculture policy and the factors of negative impact of agriculture policy's reforms on agriculture branch were explored for understanding the existing gap in agriculture sphere.

The observation of literature in agriculture related to the main study aim shows that there is insufficient information and literature related to the role of AIM. Official statistical publications and information resources of Kazakhstan, Department of Agriculture areas of RK, periodicals, data from scientific publications on the research problem, the information on the Internet, and the results of empirical research dissertation based on the information recorded in the information system of statistical reporting agency of Kazakhstan – all these confirmed the lack of studies about the role of information and AIMS in agriculture development – and this is the distinct gap in the existing research.

APPENDIX III: DESCRIPTION OF ORGANIZATIONS WHICH PROVIDED RESPONDENTS WHO PARTICIPATED IN THE INTERVIEWS

1) The Ministry of Agriculture of the Republic of Kazakhstan (MA of RK)

2) JSC National Holding “KazAgro”

The respondents from MA RK and JSC National Holding “KazAgro” were identified as key informants for interviewing in this study because their job was linked with the decision making processes in the agriculture sphere of Kazakhstan. Furthermore, most of them participated in the process of the creation of a wide range of policies and reforms introduced in the agricultural sphere since independence. On the basis of their authorities and duties, it was evident that these people could influence the further development of Kazakhstani agriculture. Many of these respondents had had experience in the agriculture sector of Kazakhstan for more than two or three decades at different levels of management and positions, before independence and after.

Taking into account the fact that the most of the Research Participants preferred to keep their name and position anonymous, and in accordance with ethical standards, the positions of the respondents have been slightly changed, and for each of them were assigned specific identification numbers instead of their names. The details of the RPs’ codes (identification numbers) and other details are available in Appendix VI. Hence, Appendix VI ‘*A summary of interviewed research participants*’ includes the position/level of respondents with their role in this study, oblast/region in which these organizations are located, description of location and the specific role of research participants, with regard to AP in Kazakhstan.

The Head Officer of the Ministry of Agriculture of the Republic of Kazakhstan, Policy Advisor and earlier the former Executive Secretary of the Ministry of Agriculture (RP01) was one of the key interview respondents. This respondent had worked in different positions, and so could share his view on the research objectives from different points of view. His significant experience in agriculture was very important for this study. According to Lee, Woo and Mackenzie (cited in Mason 2010) “*studies that use more than one method require fewer participants, for example, the multiple interviews (very in-depth) with the same participants, among them e.g. longitudinal or panel studies*”. In this study it was considered reasonable to arrange two interviews with the respondent RP01 from strategic agricultural management. The first interview was arranged in March, 2011 when he was working in top positions in Ministry of Agriculture and the second interview was conducted in September, 2012 when the respondent RP01 was transferred to the position of Chief Managing Director, JSC National Holding “KazAgro” (RP03). Both interviews were organized in Astana, where the Ministry of Agriculture and JSC National Holding “KazAgro” is located. It was essential to discuss the research questions with the same respondents who were transferred from one position to another and from one system of management (Ministry of Agriculture) to another (JSC National Holding “KazAgro”). Furthermore, after the first interview the respondent RP01 revealed his interest in study issues and the

second interview was initiated by him eighteen months later. Taking into account the long period between the first and second interviews, and the case of the person's different positions in agricultural structural management the researcher decided to code this person with two different codes RP01 and RP03.

The Head of Strategic Planning Department (RP02) was identified as a key candidate for interviewing and discussing the agriculture policies since 1990's. Advantages and disadvantages of policies in the process of their creation, development and implementation in agriculture sphere were an important topic for understanding the influence of agriculture policy in Kazakhstan's agriculture development. The respondent RP02 played a very significant role in the process of discussion of agricultural policy development in Kazakhstan.

3) *National Holding "KazAgroMarketing"*

The reasons for selection of KazAgroMarketing National Holding included the fact that two employees from National Holding "KazAgroMarketing" had been working for the agrarian sector of the economy for many years and were in charge of two separate departments. They were able to offer informed comment about how the AP in Kazakhstan had affected the further development of agriculture and share their opinion about the barriers and opportunities in supporting agriculture development. Deputy Chairman, the Management Board of "KazAgroMarketing" (RP04) was recommended by RP01 for interviewing, and the Chief of Center of Information Maintenance and Study (IM&S Center), RP05, was another respondent. Both of them were recommended by one of the Vice-Ministers of Ministry of Agriculture as suitable informants for participation in discussion of the research issues and study objectives. These managers had knowledge and experience not only in agricultural sphere but also the IM sphere to support this sector of economy. Moreover, the Chief of IM&S Center's duties were associated with the introduction of new innovative IT in agriculture. Respondents had a fixed full-time working schedule and so were available for discussion for 1-2 hours that day. The researcher organized two semi-structured face-to-face interviews with respondents in September, 2012, in Astana city.

4) *Kazakh Research Institute of Agriculture and Plant (KazRI of A&P)*

The reasons for selection of the interviewee from this Institute included the fact that the interviewee is currently working as a Consultant (part-time) for KazRI of A&P, where the respondent has worked since 1965 (more than 40 years). This person is a consultant and has a scientific degree in agriculture science, as Associated Professor. The respondent is an expert in agriculture of Kazakhstan who made a great contribution to the agriculture development of Kazakhstan. The scientist's opinion and ideas about the problems in current AP and about the role of information in agriculture; how the agricultural sector was managed before independence during the socialistic system and after, vision on policy influence in agriculture were discussed on occasion by telephone, and on occasion in verbal conversations.

5) Regional/oblast and district agricultural departments

The reasons for selection of the regional/oblast and district agricultural departments were based on the fact that all these respondents had agricultural experience and were working in the agricultural sector of Kazakhstan at different levels of agricultural management, the tactical and operational. So, for the period of September, 2012 and February, 2013 the researcher arranged face-to-face semi-structured interviews with 12 people from 5 different regions of Kazakhstan, among them: Akmola (1 respondent), Almaty (2 respondents), Kostanay (2 respondents), Kyzylorda (4 respondents) and South-Kazakhstan Oblasts (3 respondents). All these interviews took time, and the gap between the start and the end of the interviews can be explained by the following reasons: the scattered nature of the regional centers and districts, financial costs associated with flights and accommodation, and also the researcher had to adhere to the schedule that was provided by the respondents.

APPENDIX IV. RESEARCH PARTICIPANTS' VISIONS IN RELATION TO AGRICULTURE DEVELOPMENT OF KAZAKHSTAN

| Agriculture of Kazakhstan | Respondents | Quotations |
|--|--------------------|--|
| Role of agriculture in Kazakhstan's economy | RP03 | <i>“Obviously, agriculture is one of the key sectors of the economy of Kazakhstan..... through diversification and modernization of the economy, state pays great attention to the development of agriculture and rural regions, so we have our national plan on this issue...”</i> |
| Weak sector | RP06 | <i>“Considering the current situation in agriculture in comparison with others spheres of economy it is less developed sector in Kazakhstan....”</i> |
| Decline in agricultural production | RP02 | <i>“Destruction in 1990's followed the decline in agricultural production. Agriculture is one of strategic and critical industries, so the decline led to a crisis and destabilization in the economy of country as a whole”</i> |
| | RP14 | <i>“The experience of recent years indicates that the introduction of agricultural policy and reforms in agricultural sector of Kazakhstan subjected the people of rural areas to heavy casualties. Why the victims should have to be significant, so far no one has explained”</i> |
| The role of agriculture policy in Kazakhstan's economy | RP01 | <i>“Fields of action in agricultural policy: structural policy, social policy, the price policy and food security policy of country”</i> |
| | RP06 | <i>“Most of the reforms at the beginning of the 1990s were taken spontaneously and rashly...were realized through different foreign methods and models which were untested and un-adapted to local climatic and socio-economic conditions in rural regions. As the result, all weaknesses of policy practice influenced for the slow development of agriculture in the following more than 15 years since independence...”</i> |
| | RP18 | <i>“Definitely, all reforms and policies in agriculture have led agriculture to a complete collapse, the development of which is still far behind the others. Thus, the strategy adopted in the 90's led to the stagnation of the rural economy over the next 15 years, as the result, the problems which have accumulated over a long period are still not fully resolved.”</i> |
| Evolution of agriculture policy in Kazakhstan | RP02 | <i>“Since independence the different strategies of agriculture policies with its weaknesses and advantages affected for rural regions and agriculture development in different ways for different periods of time.”</i> |

| | | |
|---|------|--|
| | | <i>“Absence of a strong theoretical base in agricultural policy in transition period lead to a systemic crisis till the end of year 2004.”</i> |
| Reasons of slow development of agriculture in comparison with developed countries | RP03 | <i>“....not a very efficient use of land and other resources is the result of slow development of agricultural sector in Kazakhstan in comparison with other developed countries”</i> |
| | RP07 | <i>“.....for unknown reasons, agriculture has been relegated to a secondary plan in economy development of country in 1990, although Kazakhstan is not only a supplier of raw materials, this is a country with a good potential in agriculture”</i> |
| Low productivity sphere of economy | RP13 | <i>“Agriculture in Kazakhstan shares of output comprised of 34% at the beginning of 90’s and in 2008 it was 5,3%. Thus, the decrease of GDP indices is evident, of course, such situation cannot be considered as a progressive change”</i> |
| The results of reforms and agriculture policy influence after several years | RP06 | <i>“The main cause of what is happening - inadequate measures taken by national and regional agricultural authorities, the scope and nature of the problems in agricultural industry of Kazakhstan still leads to losses in agriculture.”</i> |
| | RP01 | <i>“....the steady recovery and growth of economy in Kazakhstan was significantly grown up since 2000 after reforms; it was mainly achieved through agriculture sector of economy and as the result the agriculture production rate was increased approximately in 30%”</i> |
| Failure to provide food security | RP12 | <i>“Food security of country it means availability of food supplies at reasonable prices.....I can say about ours failure to provide food security”</i> |
| Government keeps this sector under control and support to develop | RP01 | <i>“A greater difficulty faced the village and villagers during the last 20 years since independence.... Crises in agricultural sector still continued, so the government keeps this sector under control and support any innovations to develop this sector and increase the agricultural productivity”</i> |
| The role and management of information | RP03 | <i>“At the beginning of the 90’s during the chaos in agriculture the information and some data were not gathered, thus, the absence of information for that period makes some difficulties in the process of statistical analysis and scientific researches.”</i> |

| | | |
|---|------|---|
| in agriculture of Kazakhstan | RP05 | <i>“.....the role and impact of information and information management can be compared with other spheres of economy where IM play a significant role”</i> |
| Information management to support agriculture policy | RP09 | <i>“...for the effective functioning of agriculture in Kazakhstan, it is necessary to improve the current IM on the basis of introduction new technologies to expand its internal resources and potential”</i> |
| | PR04 | <i>“Monitoring, controlling, managing and cooperation on the basis of unified database system through the access to detailed and timely information and data, should provide scientists, experts, policymakers, agrarians, farmers, etc. the opportunity to use information, to update, to cooperate, etc.”</i> |
| To improve the current IM to support agriculture policy | RP15 | <i>“Discussing the role of IM in agriculture, I can say it needs to be improved. In comparison with other sectors of economy, IM in agriculture was not developed”</i> |
| | RP11 | <i>“The idea of implementation of a network connection and unified integral information system to support agriculture policy in Kazakhstan is a good idea, but I guess it is difficult to realize now...possible it is ambitious plans”</i> |

APPENDIX V: INTERVIEW ARRANGMENT

1. Introduction Letter

Dear _____

I kindly ask you to participate in the process of interviewing to discuss the main topics of my doctoral research which focuses on the role and management of information with its influence to support agricultural policy development in Kazakhstan since independence in 1991.

I am very interested in your and your team participation in this project. I would be very pleased if you would agree to be interviewed. Your participation and cooperation will be very important for me and will be greatly appreciated. The discussion should last an hour. Furthermore, the process of interviewing with your answers will be confidential. I would like to inform you that following this letter, I will call you by phone to arrange an appointment for participation an interview at a time appropriate for you.

If you have other suggestions or you are not willing to participate in this investigation, please e-mail me: rabdrasilova@mail.ru

Best regards,

2. Follow-up Letter

Dear _____

In continuation of our recent conversation, I would like to confirm that I am conducting a research project in agriculture sphere, examining the current situation of the role and management of information with its influence to agricultural policy development. The development of agriculture policy in Kazakhstan since independence is very important issue for this study.

My particular interest is finding the ways to improve the existing agricultural information management (AIM) of Kazakhstan at all levels of agriculture management including all regions/oblasts of Kazakhstan.

I am thankful to you for allowing me to conduct an interview to facilitate my data collection. On this note, I address a note of the topics which I hope to discuss with you during the interview in order to develop my understanding of the situation in your region/oblast.

Additionally, I would be obliged if you would complete the enclosed list of questions to introduce yourself.

I have to appreciate your participation in this study process, and I assure that all data and information gained during the discussion with you will be kept in utmost confidence.

Thank you and I am looking forward to meet you for interviewing.

Best regards,

3. A Two-section Questionnaire

Interviewee surname: _____

Section 1: General Information

1. Indicate your age:

Under 30 31 – 40 41 – 50 50 -60 60+

2. Your gender:

Male

Female

3. Education:

Secondary school

First degree

Degree of High Education

Other, please specify _____

4. How long have you been working for agriculture?

Less than 5 years

6 – 10 years

10 – 20 years

More than 20 years

5. Region/Oblast _____

6. How many Rayons/Districts and Agriculture Farms, units reporting you?

More than 5 Between 6-10 Between 11-20 More than 20

Section 2. Topics for Conversation (Interviewing)

- Discussions about the role of Agricultural policy and reforms in Kazakhstan since independence in the 1990's and their influence to agriculture economy development
- The role and management of information in current situation in comparison with the previous periods
- The use of Information and Communication Technologies (ITC) to improve agriculture information management system at all levels of agriculture management with covering all regions and districts of Kazakhstan to support agriculture policy development

APPENDIX VI: A SUMMARY OF INTERVIEWED RESEARCH PARTICIPANTS

| Research participants (RP) | Position of RP in Study | Name of Organization, Position name (a little changed) | Type of Organization Location (Region/ Oblast, City, District/ Rayon) | Role of Research Participant in Agriculture | Description of Region and Organization | Type of Interview | Date of Interview |
|-----------------------------------|--|--|--|--|---|--------------------------|--------------------------|
| RP01 (SM) | Strategic Management Civil Servant, Policy Advisor | Head Officer of the Ministry of Agriculture of RK. Policy Advisor. | Governmental Astana city | Decision-maker | Main objectives - development and implementation of agricultural and regional policy, strategic planning, government and other programs and projects in | Face-to-face | March 2011 |
| RP02 (SM) | Strategic Management Civil Servant, Policy Adv. | Ministry of Agriculture, RK, Head of Strategic Planning Department | Governmental Astana city | Decision-maker | the regulation sphere, namely in the field of agriculture, fisheries and water resources, protection of reproduction | Face-to-face | October 2012 |
| RP03 (SM) | Strategic Management | Joint Stock Company National Holding | Regulatory Astana city | Decision-maker | “The mission of the Holding is implementation of the state | Face-to-face | September 2012 |

| | | | | | | | |
|--------------|---------------------------------------|--|---------------------------|----------|---|------------------|-------------------|
| | Executive, Managerial | "KazAgro". KazAgro Managing Director | | | policy on stimulating industrial development of agro-industrial complex on principles of effectiveness, transparency and effective corporate management of the Holding's structures" (www.kazagro.kz) | | |
| RP04 (SM) | Strategic Management Managerial | National Holding "KazAgroMarketing", Deputy Chairman, the Management Board | Regulatory Astana city | Advisory | "The main goal of the Company is an increase of agrarian business effectiveness by a supplying a | Face-to- face | September 2012 |
| RP05 (SM) | Strategic Management Managerial | National Holding "KazAgroMarketing", Chief of Center of Information Maintenance and Study (IM&S Center) | Regulatory Astana city | Advisory | wide access to informational- consultation and consulting services for agriculture manufacturers. Today "KazAgroMarketing" - is a multifaceted company which has widely branched network in all Kazakhstan territory". | Face-to- face | September 2012 |
| RP06 | Scientist, Advisor. | Kazakh Research Institute of Agriculture | Research Institute | Advisory | The Institute is a major research Center of the country | Face-to- face | February 2013 |

| | | | | | | | |
|-----------|--|---|--|--------------------------------------|--|--------------|----------------|
| | Expert in Agriculture Industry | and Plant (KazRI of A&P), Scientist-Consultant. Associated Professor. | Almaty city | | in the field of agriculture and crop production. Founded in 1934 as the Kazakh Research Institute. Since 2002 the Institute reported to Ministry of Agriculture. Since 2007 – the Lead Research Institute of JSC "KazAgroInnovation" | | |
| RP07 (TM) | Tactical Management Executive, Manager on Regional level | Akmola oblast's regional department of agriculture | Regulatory and Executive Akmola region | Delivery/ Advisory on Regional level | Agriculture is one of the main sectors of Akmola regional economy, one of the largest regions in the country for the production of spring wheat, strong wheat. Gross grain annual average of about 4 million tonnes, including export capacity - up to 1.5 million tons of high-quality grain. In the total gross production of agriculture about 1/3 of livestock products. | Face-to-face | September 2012 |

| | | | | | | | |
|--------------|--|--|--|---|---|------------------|------------------|
| RP08 (TM) | Tactical Management Executive, Manager on Regional level | Aktobe oblast's regional department of agriculture | Regulatory and Executive Aktobe region | Delivery/ Advisory on Regional level | Production of crops, wheat is about - 92.7% from all agriculture production. Vegetables, melons, potatoes. Cattle, pigs, sheep, goats, horses and poultry | Telephone | October 2012 |
| RP09 (TM) | Tactical Management Executive, Managerial on Regional level | Almaty oblast's regional department of agriculture | Regulatory and Executive Almaty region | Delivery/ Advisory on Regional level | The main sectors of agriculture are the production of cereals, sugar beet, potatoes, melons, wine and tobacco leaf through, rice production, rice is the second, | Face-to- face | February 2013 |
| RP10 (TM) | Tactical Management Executive, Manager on Regional lev | Almaty oblast's regional department of agriculture | Regulatory and Executive Almaty region | Delivery/ Advisory on Regional level | after cereals, food in Kazakhstan, so the demand is always high. | Face-to- face | February 2013 |
| RP11 (TM) | Tactical Management Executive, Manager on Regional Lev | Kostanay oblast's regional department of agriculture | Regulatory and Executive Kostanay | Delivery/ Advisory on Regional level | On the production of agriculture in the region belongs to the zone of developed wheat and grain production, to which a huge | Face-to- face | November 2012 |

| | | | | | | | |
|--------------|---|--|--|---|--|------------------|-------------------|
| RP12 (OM) | Operational Level. Executive | Large agricultural enterprise in Kostanay | Regulatory and Executive Kostanay region | Delivery/ Enterprise manager | influence of climatic. The main producers of agricultural products in the country. Its share in the gross output of agriculture of the republic than 14%. Production of grain, meat, milk and eggs provide not only domestic needs, but also provides the ability to export surplus grain and livestock products from the republic. | Face-to- face | November 2012 |
| RP13 (TM) | Tactical Management Executive, Manager on Regional level | Kyzylorda oblast's department of agriculture. Head of Kyzylorda oblast's agriculture department | Regulatory and Executive Kyzylorda region | Delivery/ Advisory on Regional level | The region is agricultural, a developed agriculture - mainly melon field. The main focus of the regional agriculture is the cultivation and processing of different varieties of rice. | Face-to- face | September 2012 |
| RP14 (OM) | Operational Management Executive, Manager | Zhalagash district's department of agriculture | Executive Kyzylorda (Zhalagash rayon) | Delivery | One rayon cultivated crops | Face-to- face | September 2012 |

| | | | | | | | |
|--------------|--|--|--|--------------------------------------|--|--------------|----------------|
| RP15 (OM) | Operational Management Executive, Manager on Operational level | Terenozek district's department of agriculture | Executive Kyzylorda region (Terenozek rayon) | Delivery | The region is agricultural, a developed agriculture - mainly melon field. The main focus of the regional agriculture is the cultivation and processing | Face-to-face | September 2012 |
| RP16 (OM) | Operational Management . Executive, Manager on Operational level | Syrdarya district's department of agriculture | Executive Kyzylorda region (Syrdarya rayon) | Delivery | of different varieties of rice. One rayon cultivated crops | Face-to-face | September 2012 |
| RP17 (TM) | Tactical Management Executive, Manager on regional level | North-Kazakhstan oblast's agriculture department | Regulatory and Executive North-Kazakhstan region | Delivery/ Advisory on Regional level | The development of agriculture, including durum wheat as well as industrial crops such as sunflower, cotton, flax. This also includes sheep wool and meat, beef and dairy cattle. Bred as wild asses, camels and horses. Economic stability of the region determines the | Telephone | January 2013 |

| | | | | | | | |
|--------------|--|--|--|--------------------------------------|--|--------------|--------------|
| | | | | | production of grain, which is the main export commodity of the region | | |
| RP18 (TM) | Tactical Management Executive, Manager on regional level | South-Kazakhstan oblast's agriculture department | Regulatory and Executive South-Kazakhstan region | Delivery/ Advisory on Regional level | The region has a favorable climate for the development of agriculture. The share of livestock production accounts for 100% of the gross agricultural output. Production | Face-to-face | October 2012 |
| RP19 (OM) | Operational Management Executive, Manager on operational level | Suzak district's agriculture department | Executive South-Kazakhstan region (Suzak' rayon) | Delivery | of meat, milk, eggs and other products occupies a huge place in livestock production. In the fields of cultivated cotton, cereals, vegetables, fruits, melons. The main branch of livestock - sheep, | Face-to-face | October 2012 |
| RP20 (OM) | Operational Management Executive, Manager on operational level | Saryagash rayon's agriculture department | Executive South-Kazakhstan region (Saryagash) | Delivery | karakul develops. The leading sectors of the agricultural production of the Suzak' region are the production of meat and milk. Cotton, production of meat, milk, eggs | Face-to-face | October 2012 |

| | | | | | | | |
|--------------|--|--|--|-----------------------|---|-----------|-----------------|
| RP21 (TM) | Tactical Management Executive, Managerial on Regional level | Zhambyl oblast's agriculture department | Regulatory and Executive Zhambyl region | Delivery/ Advisory | Production of winter wheat, forage crops, grain legumes, safflower. In the field of animal husbandry - breeding cattle, sheep and goats, camels, pigs and poultry. | Telephone | October 2012 |
|--------------|--|--|--|-----------------------|---|-----------|-----------------|

APPENDIX VII: TABLES OF CODE SHEET AND AXIAL CODE SHEET

1. CODE SHEET

- 1.1. Goal, scope of agriculture development
- 1.2. Agriculture in stages of development since independent in the 1990's
- 1.3. Reforms in agriculture sector of Kazakhstan since 1990's
- 1.4. Governance support of agriculture sector in Kazakhstan
- 1.5. Principal directions of agricultural development
- 1.6. Agricultural policy and legislation powers in Kazakhstan
- 1.7. Regional delivery/influence in agriculture policy
- 1.8. Overall assessment of agriculture policy and reforms
- 1.9. Strengths of Kazakhstan's agriculture policy and reforms
- 1.10. Weaknesses of Kazakhstan's agriculture policy and reforms
- 1.11. Future prospects for development of agriculture policy
- 1.12. Recommendations for improvement of agriculture policy
- 1.13. Theoretical foundations of the information and informational resources in agriculture
- 1.14. Principles of information and data collection and storage
- 1.15. Main objectives of AIM
- 1.16. Strengths of current AIM
- 1.17. Weaknesses of current AIM
- 1.18. The role of current IM in agriculture at each levels of agriculture management
- 1.19. Management of information and information flow in agriculture on the basis of technologies
- 1.20. The nature and principles of AIM based on ICT
- 1.21. Comparison of AIM's role with IM systems in other spheres of economy in Kazakhstan
- 1.22. Key stakeholders' opinion about the role of information in agriculture management
- 1.23. Key stakeholders' opinions about knowledge transferring in agriculture on the basis of new technologies implementation
- 1.24. The role of AIM for market research in agriculture sphere
- 1.25. Types of information in agriculture
- 1.26. The lack of network connection between all levels of agriculture for cooperation
- 1.27. AIM system for exchange experience between agrarians and global agricultural business
- 1.28. Suggestions about the types of information and data required for new AIM system
- 1.29. The necessities to improve the current AIM
- 1.30. The ways to improve the existing model of AIM
- 1.31. Recommendations and approaches to improve AIM
- 1.32. AIM to prevent illegal business
- 1.33. AIM - knowledge gathering program
- 1.34. Future prospects for AIM development

- 1.35. Future prospects of agriculture policy development on the base of improved AIMS
- 1.36. The role of computers and new technologies at all levels of agriculture management
- 1.37. The differences between operational, tactical and strategic levels of agriculture on the issue of the use new technologies and computers
- 1.38. Other important themes

2. AXIAL CODE SHEET

| No | Category | Codes |
|----|--|--|
| 1. | Background of agriculture in Kazakhstan | <ol style="list-style-type: none"> 1. Agriculture in stages of development since independent in 1990 2. Reforms in agriculture since 1990 3. Governance support of agriculture sector 4. Principal directions of agricultural development 5. Others |
| 2. | Agricultural policies and reforms since 1991/ key objectives | <ol style="list-style-type: none"> 1. Agriculture policy and legislation powers in Kazakhstan 2. Substantial shift in agriculture policy development since 1990-s 3. Driving force behind the shift 4. Regional delivery/influence of agriculture policy 5. Overall assessment of agriculture policy and reforms 6. Strengths of Kazakhstan's agriculture policy and reforms 7. Weaknesses of Kazakhstan's agriculture policy and reforms 8. Barriers to agriculture policy activities 9. Future prospects for development of agriculture policy 10. Recommendations for improvement of agriculture policy 11. Others |
| 3. | The role and management of information in agriculture | <ol style="list-style-type: none"> 1. Theoretical foundations of the information and information resources in agriculture economy 2. Principles of information and data collection and storage 3. Main objectives of AIM 4. Strengths of current principles of AIM 5. Weaknesses of current principles of AIM 6. The current AIM at each levels of agriculture 7. Consistency of AIM objectives with agriculture policy objectives 8. Management of information and information flow in agriculture on the basis of technologies 9. The nature and principles of AIM based on ICT 10. Comparison the AIM role IM systems in other spheres of economy in Kazakhstan |

| | | |
|----|--|---|
| | | <ol style="list-style-type: none"> 11. Substantial shift in AIM development since 1990 12. The role of AIM to support agriculture policy 13. Strengths of current AIM in agriculture 14. Weaknesses of current AIM in agriculture 15. Others |
| 4. | AIM improvement to support agriculture in Kazakhstan | <ol style="list-style-type: none"> 1. Barriers/ obstacles of implementation of AIM at each levels of agriculture 2. Role of AIM for market researches in agriculture economy 3. Types of information for AIM 4. AIM for exchange experience between agrarians and global agricultural business 5. Suggestions about the types of information and data required for improved IM system 6. The necessities to improve the current AIM 7. The program for conducting honest business 8. The ways to improve the existing model of AIM 9. Recommendations and approaches to improve AIM 10. AIM to prevent illegal business 11. AIM - knowledge gathered program 12. Future prospects for AIM development 13. The role of computers and new technologies at all levels of agricultural management 14. The differences between operational, tactical and strategic levels of agriculture on the issue of the use of new technologies and computers 15. Others |
| 5. | Prospects and expectations | <ol style="list-style-type: none"> 1. Future prospects to improve the current AIM 2. Recommendations to improve the current AIM to support agriculture policy in Kazakhstan 3. Other |