The Application of Participatory Extension through Agricultural Innovation Systems in the Middle East

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Table of Contents

List of Figures

List of Tables

Acronyms

AERDRI	Agricultural Extension and Rural Development Research Institute
AERI	Agricultural Engineering Research Institute
AIS	Agricultural Innovation Systems
AKIS	Agricultural Knowledge and Information Systems
AKIS/RD	Agricultural Knowledge and Information Systems Research and Development
ARC	Agricultural Research Centre
ARDC	Agricultural Research and Development Council
ATMA	Agricultural Technology Management Agency
AusAID	Australian Agency for International Development
CAAES	Central Administration for Agricultural Extension Services
CLAC	Central Laboratory for Agricultural Climate
DRC	Desert Research Centre
FAO	Food and Agricultural Organisations of the United Nations
FTI	Food Technology Institute
IDB	Inter-American Development Bank
IFAD	International Fund for Agricultural Development
IGOs	Inter-Government Organisations
IAER	Iraq Agricultural Extension Revitalisation
MALR	Ministry of Agriculture and Land Reclamation
MENA	Middle East and North Africa
MOA	Ministry of Agriculture
MOWR	Ministry of Water Resources
NGOs	Non-Government Organisations
OTG	On The Ground (Project)
PIRSA	Primary Industries and Resources South Australia
RADCON	Rural Agricultural Development Communication Network
RSSA	Rural Solutions South Australia
SSM	Soft Systems Methodology
SWERI	Soil, Water and Environment Research Institute
T&V	Training and Visit
UAR	United Arab Republic (of Egypt and Syria)
UN / U.N.	United Nations
USAID	United States Agency for International Development
USD	United States Dollars
USDA	United States Department of Agriculture
VEW	Village Extension Worker
WNRDP	West Nubaria Rural Development Project

Abstract

This thesis examines whether participatory extension approaches can be achieved in Middle Eastern countries within a supporting framework of Agricultural Innovation Systems (AIS), to enhance agricultural development and improve the living standards of rural communities.

Middle Eastern agriculture is dominated by poor, small scale peasant farmers and government controlled agricultural advisory services, based on delivering top-down, predetermined messages through technology transfer demonstration models. Participatory extension approaches, however, involve farmers being consulted about their needs and engaging in the development of new technologies in ways that could best serve their rural communities. They empower people for change and give them ownership of sustained, practical outcomes. AIS recognise that modern extension needs to broaden its focus to support interactions between all stakeholders, creating an enabling context for innovation. Governments take pluralistic approach in facilitating sound opportunities within the marketing chain to achieve innovation and prosperity. AIS helps small farmers in poorer nations to collectively produce and market their goods.

This qualitative research identified the key barriers for two Middle Eastern countries to engage in participatory extension and AIS using content analysis with a combination of data collection methods. This involved 96 researchers, extension workers, farmers and government officials directly involved in AusAID funded training and development projects in which the author was involved. Data from interviews, surveys and participant observation was analysed against existing literature.

While many of the agricultural workers spoke about and supported the principles of participatory extension, it was inherently difficult for them to implement within these countries. This was mainly due to the hierarchal control with government systems, diminishing resources, and a lack of trusting and engaging relationships with farmers. There are many cultural leadership and management attributes identified that presented significant challenges to achieving participatory extension and AIS which is based on more Western thinking. However, there are also core beliefs and traditions within Middle Eastern culture that are supportive of participatory approaches for developing agriculture and enhancing rural societies. Examples of successful participatory approaches were evident in both countries and opportunities identified where taking an AIS approach could greatly assist agricultural development.

This research concludes that participatory extension through AIS will not naturally occur with Middle Eastern government agricultural advisory services, but can be achieved where key leaders and outside influences are involved. It provides important recommendations for organisations undertaking agricultural development projects across this region. Modifications are needed to the way these models are approached within a “top-down”

authoritarian structure, which can still achieve an inclusive engagement that builds the capacity of all stakeholders from below.

By identifying the many challenges and barriers for organisations to successfully apply participatory extension within AIS frameworks into Middle Eastern Islamic cultures, it is hoped that new, more effective approaches can be developed in the future that will provide a better return on the investment of international Aid, and most importantly, increase the living standards of the rural poor across this region.

Thesis Declaration

I certify that this work contains no material which has been accepted for the award of any other degree or diploma in my name, in any university or other tertiary institution and, to the best of my belief, contains no material previously published or written by another person, except where due reference has been made in the text. In addition, I certify that no part of this work will, in the future, be used in a submission in my name, for any other degree or diploma in any university or other tertiary institution without the prior approval of the University of Adelaide and where applicable, any partner institution responsible for the joint-award of this degree.

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Christopher Peter McDonough on 27th January, 2019

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I thank all of the research participants from both Iraq and Egypt, along with the Arabic interpreters, who willingly gave of their time for interviews, surveys, discussions and observations, giving many insightful and honest reflections of the agricultural and cultural environments they found themselves in, and were hoping to impact.

Most importantly, I express my deep appreciation for my family, especially my wife Jayne, as well as my children Luke, Joel and Rachael, for their incredible support and patience throughout the years of this thesis compilation. This has included managing things at home during overseas and other training trips, putting up with many, many late nights and periods of intense study, and allowing me to pursue this passion I have for participatory agricultural extension and rural development.

Finally, I thank God for making this all possible and guiding me through every step of the way.

Preface: My personal history in participatory extension leading to this thesis completion

This preface is offered as an explanation of the context in which this thesis emerged.

My background in agricultural extension

I am an extension practitioner rather than an academician, with a 30 year commitment to the practice of participatory extension. I believe a good agricultural extension officer has the ability to relate to the people within the rural environments, to understand their thinking, gain their trust and work with them to develop innovations and build their capacity to change.

I completed a Bachelor of Applied Science in Natural Resource Management at Roseworthy Agricultural College, followed by a Graduate Diploma in Agriculture. In 1989 I became a LandCare Officer at the Kadina Department of Agriculture Office on the Yorke Peninsula of South Australia, supporting three Soil Conservation Boards, while also forming, working with and facilitating the activities of many agricultural and environmental rural community groups. This was at the very beginning of the LandCare movement which marked a significant change in agricultural extension in Australia, moving from a more research driven technology transfer model where field workers were viewed as agricultural experts passing on information, to a participatory approach where the motivation for change was more driven from the grass-roots farmers and extension staff became more facilitators of change.

I continued in project work and district agronomy with Primary Industries and Resources South Australia (PIRSA) in the 1990s at numerous locations involving various agricultural groups, and playing a key role in the development of numerous State-wide and nationally used group extension programs such as *Right Rotations* and *TopCrop*. Through this time participatory extension approaches expanded through the department, coupled with excellent extension officer training in the social aspects of adult learning, active listening, understanding personality types, how to facilitate participatory group meetings, build peoples capacity and empower people to work together to achieve shared outcomes.

In 1998 I was directly involved in the extension support for the Mallee Sustainable Farming project which was firmly based in participatory principles for rural development. This project spans the low rainfall farming districts (250-350mm annual average rainfall) across three Australian states and has been instrumental in dramatically changing traditional farming systems (with high erosion and low production), to innovative and sustainable No-Till farming businesses over the past 21 years (Mallee Sustainable Farming 2018).

From 2005 I became involved in PIRSA's numerous international agricultural projects and training programs which included three visits to Eritrea, two to Egypt, one to Niger and one to Jordan to work with our project team from Iraq, all which has given me a keen understanding and awareness of the many issues facing agricultural development in these

countries. This has also been enhanced by participating in the training of many visiting agricultural delegations from many Middle Eastern and North African countries, including Iraq, Egypt, Tunisia, Morocco and Afghanistan.

In 2015 I left PIRSA to continue my group and project work with Mallee farmers and international clients as a private consultant. Participatory extension has continued as my framework for helping farmers to change and building their capacity to take on new challenges, through building strong, trusting relationships, encouraging innovation with new technologies and helping farmers to put these into practice using their local experience and knowledge to become more profitable and sustainable.

My thesis instigation and progression.

The initial opportunity to complete a thesis based on international agricultural development came in 2010, when working for PIRSA as an agricultural extension officer I began project work in Niger. Unfortunately, political unrest in that country meant that project came to an abrupt halt in early 2011. However, in that year, which also saw the Arab Spring developments across the Middle East, PIRSA commenced agricultural training and development projects within both Iraq and Egypt, and well as training many workers from these countries within Australia. This lead to a change in the direction of my initial research proposal to focus on achieving participatory extension within the Middle East. I received a scholarship for this thesis while continuing to work part time for PIRSA during this period. My candidature began as a Masters student in 2011, and was upgraded to a PhD in 2012.

The main data collection, participant interviews and observation occurred between 2011 and 2015. This was all prior to the ISIS invasion and destructive activities across Iraq and taking control over much of the northern regions. Chapter 6 of this thesis “Barriers to Participatory Extension in Egypt: Agricultural Workers' Perspectives” (McDonough, Nuberg et al. 2014) was published in the Journal of Agricultural Education and Extension in 2014. However, during this period and following I experienced some personal issues that lead to break in the writing up of the research for approximately 18 months. This also culminated with leaving PIRSA in July 2015 to begin my work as a private agricultural consultant. While working full time in the South Australian mallee region and still participating in a number of international agricultural programs, I have come to the completion of this study.

1 Introduction

The Middle East and North African region has population of 380 million people, with approximately 10 million people (2.7%) living on less than $1.90 (USD) per day (World Bank 2018). The average real growth of public spending on agricultural research and development in this region from 2000 to 2009 was estimated at 3%, slightly lower than the world average of 3.1%. Levels of agricultural investment and production have between 1990-2015 have been poor compared to regions across the world and must greatly increase its agricultural production if it is to keep up with its growing demand for food, looking towards 2050 (FAO 2017). The World Bank currently has commitments of $8.1 billion (USD) into the Middle East and North African region (World Bank 2018) with much of this being directed towards the agricultural sector to build the wealth of rural communities and to help feed their own populations as well as to bring in foreign currency through building exports.

To meet the huge challenges facing this region of feeding more people with limited amounts of land, water and natural resources, the FAO (2014) state that they must transform the agricultural sector. To achieve this they must pay attention to the communities whose livelihoods depend on agriculture, forestry and fisheries, building the capacity of smallholder farmers in particular. The more oil rich Arab countries are estimated to be only 34% self-sufficient for cereals and between 60-85% self-sufficient for meat and other livestock products (United Nations and FAO 2017).

Many of these Islamic Middle Eastern countries have systems of agricultural development and extension that are based on research driven, top-down information based approaches that were developed in the 1960s. These approaches are characterised by government centrally controlled agricultural advisory services, with limited levels of ground level farmer participation in needs analysis and program development. These technology transfer models focus on the demonstration of new technologies, with the expectation that this will lead to the adoption by the farming population over time. However, these top-down research based models have been shown to have many deficiencies in achieving agricultural development (Röling 1988), particularly as the challenges of farming increase in complexity.

Participatory extension practices gained in popularity and effectiveness throughout much of the world in the 1980-2000 period, with farmers being engaged in process of needs analysis and technology development with researchers and extension agents, with a greater focus on building peoples capacity to change and increasing farmers ownership of the processes involved (FAO and World Bank 2000). This ensured that research and development was more relevant and applicable to real farmers needs and greatly increased the adoption of these new technologies.

Since 2000, the concept of Agricultural Innovation Systems (AIS) has emerged, taking a more market driven approach within an increasingly complex global setting, and encouraging multi-stakeholder collaboration, pluralism and decentralisation of central government controls. The

role of government becomes one of providing a supporting environment for innovation to succeed, rather than being the primary source of technical information and direction (Rivera 2011).

Most Middle Eastern countries have not modernised their approaches to agricultural extension and development, resulting in poor engagement with their rural communities to improve the capacity of their smallholder farmers in particular, to innovate, increase sustainable agricultural production and improve their living standards.

Therefore, the aim of this thesis is to determine whether participatory extension approaches within AIS can be effective in the Middle East. This aim is elaborated in the following list of **research questions**:

1. What institutional elements have been necessary to promote the emergence of participatory extension and AIS in other regions of the world? *(Chapter 2).*
2. What are the key characteristics of the Middle Eastern culture that impact on this region's ability to embrace participatory extension approaches and AIS? *(Chapters 3, 7 & 8).*
3. What is the nature of extension and the extent to which participatory methods and AIS are understood and implemented in two case study Middle Eastern Countries of Egypt and Iraq? *(Chapters 5 & 6).*
4. What are the barriers to achieving participatory extension and AIS within Middle Eastern countries, and how can they be overcome? *(Chapters 7 & 8),* and
5. How do governments and NGOs need to change their expectations or modify their approaches to achieve appropriate and successful agricultural development outcomes in ways that better suit Middle Eastern cultures? *(Chapter 8)*.

The structure of this thesis to answer these research questions and achieve the research aim is as follows. The preface to this thesis explains the qualifications and experience of the author as an agricultural extension officer with the South Australian government for 26 years as a specialist in participatory extension and 4 years as a private consultant. This background is important as the nature of the social research conducted meant that the author was a participant in the training and project work involving the majority of the agricultural workers, government officials and farmers that were both interviewed and observed within this study. The author's practical expertise in the field of enquiry allowed for a greater depth of questioning, discussion and analysis in seeking to answer the key research questions. The author also outlines the circumstances and timings of this research over the length of data collection, analysis and presentation.

Chapter 2 provides a literature review of the emergence of Participatory Extension and AIS. It begins by defining agricultural extension, followed by a description of the main historic phases of the key agricultural extension approached that governments and INGOs have

utilised to achieve agricultural development since the 1950s. This includes the advance of *Technology Transfer, Diffusion of Innovations* models and *Training and Visit* schemes (1950s-1980s), *Participatory Extension* and *Agricultural Knowledge and Information Systems Research and Development* (1980s-2000s), through to the application of *Agricultural Innovation Systems* (2000s+). This chapter establishes the core attributes of each extension method which is key to understanding whether these Middle Eastern countries can apply modern extension methods which have been successfully in other regions of the world.

The research methodology is established in Chapter 3, which describes the mixed method of social enquiry, along with a review of existing literature to answer the research questions. This includes an explanation of the theoretical framework used for analysing agricultural advisory services, the use of content analysis, semi-structured interviews and surveys, soft systems methodology, the use of computer assisted quality data analysis, interpretive data collection and participant observations. This chapter also gives examples of other published research that has applied similar methodologies and the same conceptual framework to evaluate agricultural advisory services around the world.

Chapter 4 provides a literature review of the context of the Middle East, in terms of its identity and cultural issues that have relevance to achieving agricultural innovations and participation. This outlines how the term *Middle East* came into existence historically, as well as the key influences that has helped to fashion its culture, particularly since the spread of Islam and the Ottoman Empire, as well as the Arab Spring uprisings from 2011. This chapter also provides a brief description of the agricultural development context of the two case study countries of Egypt and Iraq.

Chapters 5 and 6 discuss the key finding of the research conducted through training programs for the both Iraq and Egypt respectively, and describes the current extension methods being used, their governmental organisation and operational structures, and the many barriers that were experienced in applying participatory extension approaches and AIS, from the perspectives of agricultural workers operating within countries. Chapter 5 discusses the research results from Iraq. Chapter 6, entitled "*Barriers to Participatory Extension in Egypt: Agricultural Workers' Perspectives"* was published in the international *Journal for Agricultural Education and Extension*, and has since been cited by various authors, including a major CGIAR report entitled *An agricultural policy review of Egypt: First steps towards a new strategy* (Kassim, Mahmoud et al. 2018).

Chapter 7 examines how easily organisational management strategies that have been developed in Western cultures, such as participatory extension practices, can be transferred and adopted within Islamic Middle Eastern governmental and cultural settings. It draws from the literature review findings of Chapters 2 and 4 and further literature relating specifically to this question, and verifies this in light of the author's direct qualitative research from Chapters 5 and 6's assessment of the case study countries of Egypt and Iraq. It highlights the key characteristics that present barriers to achieving participatory extension approaches and AIS

within the Middle Eastern region, suggesting that different culturally sensitive strategies should be developed to improve agricultural innovation and development.

The final integrative discussion in Chapter 8 continues the analysis of Islamic leadership and management culture focussing on areas appearing supportive of participatory practices, as well as key features of participatory and AIS practices that were observed within the case study countries of this research. This leads to final recommendations as to how agricultural development programs should be approached and modified to obtain be best outcomes within these Middle Eastern Islamic cultures.

The concluding Chapter 9 provides a concise summary of the findings of this research against the research questions stated, as well as recommendations for further research and development that is required within this field.

Appendix 1 provides examples of the documents used within the participant Interview and Survey processes, while Appendix 2 is the monitoring and evaluation report of the "On the Ground" AusAID project that the author completed in conjunction with this thesis.

All references used within this thesis appear within the final Reference section at the end of the document.

While it may be noted that there is a male gender language dominance within much of the discussion and analysis of this research, this is in keeping with the cultural literary sources used. There were 6 women interviewed or surveyed and a total of 11 women involved within the participant observation conducted by the author. There are clear references in Chapter 8 as to the importance of engaging with women in community and advisory services to achieve the changes required for successful agricultural development across the Middle East.

2 The Emergence of Participatory Extension and Agricultural Innovation Systems

2.1 Introduction

To best assess the critical elements of this research topic, it is important to firstly have a clear understanding of agricultural extension, and how it has developed into the modern approaches of this time, particularly in relation to facilitating change in developing countries. The chapter provides a review of existing literature that both defines and summarises the key elements of Technology Transfer models, Participatory Extension approaches through to Agricultural Innovation Systems (AIS).

This chapter provides a history of agricultural extension approaches since the development of *Diffusion of Innovations* in the 1950s, the widely adopted Training and Visit Schemes (T&V) though the 1970s and 1980s, leading on to the emergence of participatory methods based on the broader concepts of Agricultural Knowledge and Information Systems (AKIS) being critical to facilitating change within farming communities through the 1990s.

This is followed by a description of AIS approaches, which has been embraced within many developing countries since the 2000s as they seek to build farmers capacity to innovate in the rapidly changing complex modern world, through institutional change. An AIS conceptual framework described in Chapter 3 has been used in Chapters 5 and 6 to analyse each case study countries of Egypt and Iraq's abilities to implement successful participatory extension programs and achieve sustainable agricultural development, and to help identify any critical barriers to achieving this.

Outlining the progression of agricultural extension approaches over the last 70 years provides important context to the research that this study has undertaken within the case study countries. This chapter provides important reference points to assist in understanding how well Egypt and Iraq's agricultural extension has progressed to achieve the innovation that can build the capacity of their rural communities, compared to regions outside the Middle East, and what may be needed to bring about necessary change.

2.2 Defining Agricultural Extension

Agricultural extension has been described in many ways, from simple terms such as being an out-of-school education system for rural people (Savile 1965), to more complex definitions encompassing "a diverse range of socially sanctioned and legitimate activities which seek to enlarge and improve the abilities of farm people to adopt more appropriate and often new practices and to adjust to changing conditions and societal needs" (Jones and Garforth 1997 p1). It means a broad range of things to different people, ranging from transferring knowledge from researchers to farmers, improving farmers' decision making and capacity to clarify and realise their goals, right through to stimulating desirable agricultural development (Feder, Willett et al. 2001).

The goals of agricultural extension include transferring information from the global knowledge base or from local research to farmers, enabling them to clarify their own goals and possibilities, educating them on how to make better decisions, and stimulating desirable agricultural development. Extension services have been described by Anderson, Feder and others (2003) as an important element within an array of entities and agents that enhance human capital as well as information flows that can improve farmers' and other rural peoples' welfare in development.

Röling (1988) developed the idea of extension science as an "instrument for promoting change" (p21) involving many complex social interactions and strategies working together to achieve varying levels of success. While there have been many forms and methods of extension, Röling describes the key elements of:

- being an intervention process;
- communication being its tool for inducing change;
- achieving voluntary change being the key to its effectiveness;
- involving many targeted processes; and
- being generally deployed by some form of organisation or institution (pp39-49).

He emphasised that extension involves both the transfer of agricultural information and techniques, as well as building peoples' skills and abilities to be able to put this new knowledge into practice.

Leeuwis (2004) reflects on both the *educational* processes of extension in teaching farmers to acquire knowledge, skills and attitudes about methods and techniques to improve production efficiency and income. He also highlights the further *problem solving* dimension that helps farmers identify and analyse their production problems and potential opportunities, to maximise their ability to form conscious, independent, sound opinions and make good decisions.

Governments use extension to increase agricultural production to help feed the people and increase wealth and sustainable development on a national or provincial level. The farmers are needing to increase their ability to produce a good income, feed their family and improve

their living standards. The World Bank and other NGOs fund agricultural extension as a tool to fight poverty in agriculture, funding many agricultural extension activities to help poorer rural communities better their capacity to achieve sustainable growth and prosperity (World Bank 1990).

Agricultural advisory services have needed to develop from that of just focussing on the transfer to technical knowledge for improving agricultural productivity, to encompass the wider objectives and new functions that creating a suitable environment for this change to happen. There has been a shift from a focus of individual behaviour to extension fostering new patterns of co-ordination, from predefined directions and policies to the generation of ideas. Extension is now more than just decision making, but emphasises social learning and negotiation, moving from being one dimensional learning to a multidimensional process with many stakeholders contributing and benefiting from relevant insights, actions and outcomes (Leeuwis 2004).

This has led to a broader definition of agricultural extension that encompasses areas of social interactions and capacity building within the new challenges of an ever changing world. The World Bank (2012) states that most extension programs have moved away from centralised systems to programs which improve links between farmers and researchers, build social capital among farmers including women and youth, and facilitate better links with markets.

In seeking to redefine agricultural education and extension Shinn, Wingenbach and others (2009 p83) state that it is "a knowledge system that engages change agents in a participatory persuasive process of educating global stakeholders and preparing future farmers, agricultural specialists, and agribusiness leaders in a changing world".

2.3 The changing models of Agricultural Extension

Over the years there have been many programs and techniques employed to achieve successful agricultural extension. Extension services in developing countries were generally formed following World War 2. After enduring the food shortages during the war, and increasing populations post war, it was vital for these countries to move from small, low input subsistence farming, to higher production that would lead to industry development and growing economies. Most extension departments or services were placed within the ministries of agriculture, as generally these countries had poor university resources (Jones and Garforth 1997, Wesa 2002).

The World Bank and the organisations such as the United States Agency for International Development (USAID) played a key role in project development and the promotion of extension using technology transfer right across the globe, along with IFAD (International Fund for Agricultural Development), the Inter-American Development Bank (IDB), and the United Nations Food and Agriculture Organisation (FAO) (Blackburn 1989).

Many extension models and strategies have been developed, adopted and promoted over the last 70 years. This has been within a global landscape that has seen significant changes to the way people think and interact, their attitudes to authorities, the relationships between governments and interfaces between vastly differing cultures. There have been huge advances in communication, marketing, agricultural technologies and accessibility through this period. However, there are also many areas where rural poverty and capacity have remained the same or even deteriorated, particularly in poorer developing countries, often associated with conflicts, limited resources, overpopulation and very little agricultural development. All these factors demand that agricultural extension methods must change to meet the real needs of rural communities and strengthen countries' abilities to feed their populations and compete within the global economy.

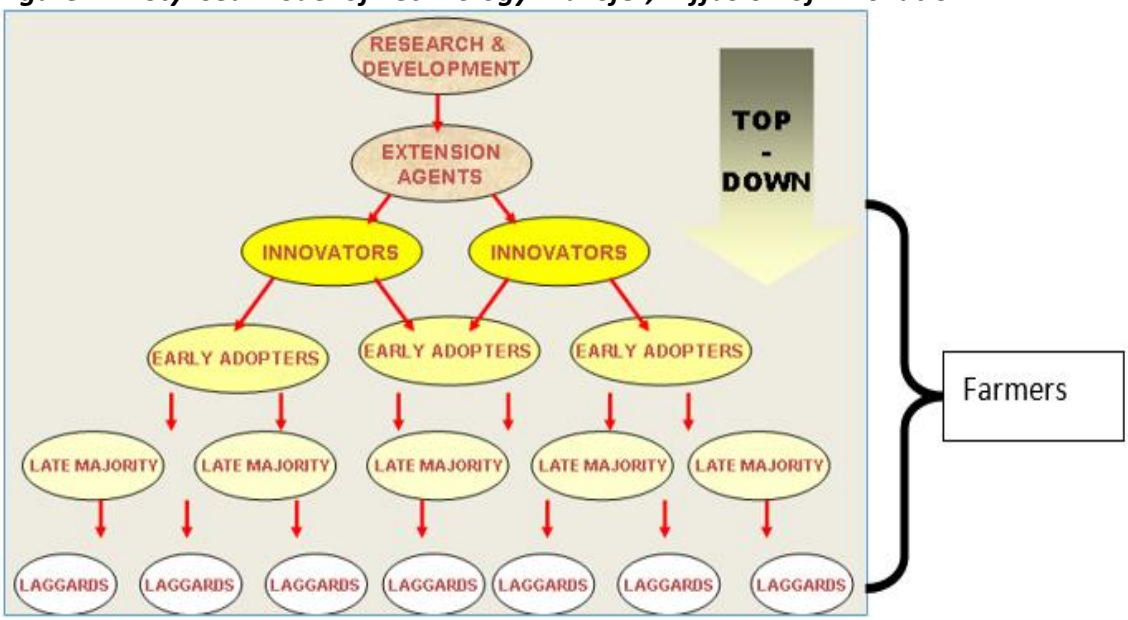
2.3.1 Technology Transfer and Diffusions of Innovations

The 1950s and 1960s was a period which saw the institutionalisation of national extension services within many countries' ministries of agriculture. There was increasing confidence in western technology which led to the adoption of the 'diffusions model' or 'Technology Transfer model' (Ponniah, Puskur et al. 2008). This involved a hierarchical flow of information, backed by advancements in mass media, with a focus on interpersonal communication and community development. A professor in rural sociology, Everett Rogers (1962) published *Diffusions of Innovations*, which became the centrepiece for agricultural extension theory at the time. He focussed on the elements of the innovation, communication, channels and time, and how these influence the spread of an idea within a social system. Rogers indicated that an individual will progress through stages of gaining knowledge, persuasion, decision making, implementation and then confirmation of results, but the rate of adoption can vary greatly between different people. Diffusion happens as the innovation is communicated through a range of channels throughout a social group over time (Rogers 1995). The model represented a top down flow of information and innovative technology from researchers, universities or experts in their field, generally through practical demonstration for the farming community to observe and adopt. The extension officer role involved convincing farmers of its merits through farmer friendly explanation or modification, including functions such as credit delivery, distribution of inputs and other co-ordination duties (Ponniah, Puskur et al. 2008).

There was a strong emphasis on the demonstration of the technology, as this would logically lead to uptake and adoption, first by the *innovators*, also seen as venturesome technical enthusiasts (estimated at 2.5% of the target population) and more prepared to take risks. These are followed by the *early adopters* or respectable visionaries (13.5%) who serve as the opinion leaders or trend setters that are well respected by their peers. When these have demonstrated success the *early majority* or those pragmatists (34%) who very deliberately make sure of the proven applications by interacting with their peers so they can reliably move into the new technology. They also become strong opinion leaders but later in the process. Then follow the *late majority* or conservatives (34%) who are initially sceptical and cautious,

with limited resources and so require sure solutions to appease their technology shy, cost sensitive natures before they eventually respond to peer pressure. The last group are described as the *laggards* or sceptics (16%) who are isolated from opinion leaders and often from social networks. They are very suspicious of innovations, having their point of reference in the past and are very slow to change (Rogers 1995). Figure 2.1 provides a stylised representation of this which was used within interviews and surveys within this study, showing the top-down flow of information and technology through the farming community.

Figure 2-1 Stylised model of Technology Transfer, Diffusion of Innovation



This diagram was used in this study's interview/survey forms (Appendix 1), and based on the descriptions of information flow and innovation diffusion based on Rogers (1983, pp252-270).

Diffusion research demonstrated that once a new idea was introduced into a social system, it would spread from one farmer to another, at varying rates as a direct result of social interactions (Ponniah, Puskur et al. 2008). Rogers also recognised that both trial ability and complexity had a major impact on the rate of adoption.

By the mid-1970s, however, there were clear deficiencies recognised within this extension model. Röling, Ascroft and others (1976) stated that many so called "laggards" were generally very small, poor landholders who lacked the opportunity to change, rather than being resistant to change. They reported that increasing the social equity and capacity was most needed by the rural poor, rather than placing the majority of resources into an elite group of highly productive farmers in the expectation that diffusion of new technologies will eventually occur. The diffusions of innovations strategies would often contribute to widening the gap between these farmers and the less advantaged small farmers.

Röling (1988) stated that the diffusion of innovations extension strategy assumed that gaining good technical information was the main driver of change, that all farmers learn and process information to make decisions in the same way, and therefore one extension package should

suit everybody. It neglected the social, political and cultural issues within the system that may be impacting on decision making and actions. The model also led to extension agents working with relatively few *innovators* and *early adopters* with both training and resource distribution. This led to advantages gained at the expense of other farmers as they were able to dominate new markets. "Extension workers and progressive farmers attract each other like magnets" (Röling 1988 p66).

This technology transfer diffusion model was developed through the 1960s when there was less consideration given to interpersonal communication and hierarchical, unidirectional processes of development were still prevalent (Feder, Willett et al. 1999). The model assumed farmers had little to contribute to the planning and development of technology, and promoting the belief that the researchers and technical experts were the source of knowledge for innovation, even though far removed from its practical application on farm. It could not explain the complex social processes, as well as the vast range of differences in farms, management styles and natural resource conflicts that are all critical to farmers adopting change (Klerkx, Schut et al. 2012).

In his later edition of his *Diffusion of Innovations* text book, Rogers (1983) wrote that initial thinking was limited to innovations emanating from a centralised groups of technical experts at the top of very linear diffusion systems. He stated that while this is appropriate in some instances, they now realise there are systems of decentralised diffusion, where there is a wide sharing of power and control among the members of the diffusion system. This involves much inventive development of the innovation as people problem solve and adapt, and share their ideas with other users in more horizontal networks. The clients become their own change agents, taking a vital role in the extension process.

2.3.2 Training and Visit Schemes

Training and Visit (T&V) schemes were developed as an integrated rural development approach that was widely adopted for agricultural projects sponsored by the World Bank through the 1970s and 1980s (Swanson and Rajalahti 2010). Like the previous extension systems, they were still largely technology driven, but with more support for recognising and addressing local constraints to adoption. The T&V schemes essentially involved intensive periods of on-the-ground training of local farmers so they could experience and understand the application of improved farm practices, with a prescription of support packages and services. They generally worked through engaging with key contact farmers in each district, and involved the giving participants many incentives, such as cheap credit or direct resources to help them follow the prescribed instructions (Ponniah, Puskur et al. 2008).

While the T&V approach had many positive results, it was still essentially a supply-driven, top-down rigid system, promoting messages developed and prescribed by research scientists, with very little input or feedback from the farmers at the receiving end. It generally did not stimulate and encourage farmers to make their own decisions, or build their knowledge and

capacity to grow and initiate lasting change for themselves. T&V schemes were rigidly structured and very costly to run. Furthermore, many of the larger contact farmers were found to share little in common with the resource poor peasant farmers which stifled the diversity of programs (Ponniah, Puskur et al. 2008, Rivera 2011).

In India the T&V system was effective in increasing production in the irrigated areas, but performed poorly in the rain fed areas. By the 1990s it was apparent that the number of Village Extension Workers (VEWs) required to effectively run the programs had become financially unsustainable. Many were inadequately trained and poorly resourced to carry out complex extension activities. The Government of India were using it to control the food production within the country, making it more commodity and supply driven, rather than market driven, allowing farmers to diversify and focussing on maximising their own farm income. This led to department staff being mainly accountable to the government, rather than the real needs of the farmers. Extension workers viewed private agricultural dealers as competitors, rather than partners to work with. It was also found to weaken the researcher-extension worker linkages, and made little effort to organise and empower farmers and farmer groups (Christoplos 2010).

At the end of the Kenyan T&V program in 1998, the countries extension system had become generally ineffective due to poor management and a lack of strategic direction. The institutional program design lacked a critical focus on empowering farmers, using inappropriate incentives with poor accountability and responsiveness to clients actual needs and a lack of participatory engagement, all resulted in disincentives for innovation, partnerships and efficiencies (Gautam 2000).

In their review of the T&V extension system that was promoted by the World Bank in over 50 countries between 1975-1998, Anderson, Feder and others (2006) conclude that it did not empower clients in ways that they could articulate their actual needs and demands through to service arrangements that would heed them, and programs lacked flexibility. Evaluation of programs were unreliable as they needed to be independent of those running them, with no preconceived positions on the innovation being reviewed. There were very high fiscal challenges in upscaling successful innovations from initial pilot programs. They became very reliant on donor organisations, which also caused issues where NGO agendas did not always match domestic needs. Even though T&V schemes increased extension efforts with more direct communication between extension workers and farmers at the village level than previous systems, they were still essentially delivering standardised predetermined information to farmer clients.

2.3.3 Participatory Extension Approaches

The shortcomings of these previous extension approaches led to the emergence of participatory extension approaches in the late 1980s and developing through the 1990s, which instigated a change from top-down supply driven extension to more bottom-up

inclusive processes where the clients on the ground play an active role in the identification, planning and development of innovations. One of the pioneers in this field, Robert Chambers (1994) described participation as a *co-opting practice* to secure local action and resources, as well as an *empowering process* that enables people to take command and do things themselves. It implied a transfer of power from dominant institutions above, to people, groups and disciplines that have been subordinate.

This required a paradigm shift embracing a reversal in roles within agricultural development, as poor farmers showed they had far greater abilities to appraise, analyse, plan and implement actions than most professionals had expected. Chambers (1994) described important outcomes resulting of participatory projects, which changed from being seen as institutional programs that local farmers are involved in, to the local communities saying these are "our" projects that "they" (the outside institutions) contribute to. Participatory approaches become successful because when local people help design and construct activities they take ownership. This means they are more likely to meet running costs and undertake maintenance, greatly improving the sustainability of extension efforts.

This up-front engagement of end-users was all part of the realisation that extension needed to play more of an active role in the processes of innovation, design and adaptation, through the facilitated interactions of the people involved. Extension workers could then take these practical applications and share them with others in further regions with similar needs (Leeuwis 2004).

The key advantages of participatory extension approaches over transfer of technology diffusion models and T&V schemes are that they seek to empower farmers, not just give them information. The needs and priorities of the rural communities are developed by the farmers and wider stakeholders, rather than exclusively from governing institutions. The extension agent becomes a facilitator in social change, rather than just a technical expert and teacher. They assist in helping farmers to understand the learning principles, methods and choices involved, rather than just the key messages from a package of practices. The agenda is not fixed, but rather is developed in response to the needs and desires of the key participants. The farmers are not just hearing and implementing practices, but rather using methods, understanding, applying principles and choosing pathways that meet their goals, while making adaptations that practically improve their outcomes. The communication is more about negotiations and sharing ideas, rather than the transmission of advice (Flood 1994, Hagmann, Chuma et al. 1999, ICARDA 2011).

Through the 1990s a method for engaging and assessing the needs of rural communities was developed called Participatory Rural Appraisal (Pretty and Vododuhe 1997). This differed from earlier techniques that were more focussed on exploring technical research needs, in that it collected and analysed local problems which included socioeconomic factors. It emphasised the importance of local knowledge, engaging rural people to carry out their own needs assessments and help shape extension plans and priorities (Swanson and Rajalahti

2010). This helped develop new systems of agricultural learning and action which had a defined methodology and cumulative learning process for all of the participants, with multiple perspectives coming from local farmers, suppliers and community members, as well as extension agents, with the role of experts being more seen as resources that could be brought in to help achieve goals, rather than the main force driving change to pre-organised programs. The activities became more context specific, which all led to sustained action being undertaken, because it was agreed upon, with implementable changes that could accommodate different conflicting views. The debate and analysis at the local level helped give people ownership of the solutions and motivated them to take action and implement defined changes. The facilitated process helped strengthen and build the capacity of farmers and rural communities to be able to initiate further action on their own (Pretty and Vododuhe 1997).

As participatory extension practices grew through the 1990s, there was a transition that was taking place as many (mainly developed western) governments sought to restructure their extension systems (Rivera 1996). This involved levels of decentralisation, cost sharing, cost recovery and the participation of more stakeholders in development initiatives. This was happening as many governments were putting less resources in to public extension systems, and finding there was increased competition from the private sector.

Pretty and Vododuhe (1997) discuss how the term "participation" is often loosely used and can actually refer to various levels or perceptions of participatory approaches. These included:

1. Manipulative participation: where people are unelected representatives on boards with no real power, but giving the pretence of participation.
2. Passive participation: where people are merely told things that have already been decided and have no ownership of the information.
3. Participation by consultation: where information may be passed on with some modification to suit local situations, but there is little shared decision making.
4. Participation for material incentives: where farmers get involved in programs to benefit from the incentives offered.
5. Functional participation: where local farmer councils would help extension agents choose key farmers to introduce technologies and run demonstrations for others to learn from.
6. Interactive participation: collaborating with farmers at the start of the processes with farmer needs being central, and extension agents looking to facilitate ways to help the farmers to change, rather than just passing on predetermined information.
7. Self-mobilisation: people take initiatives independent of external institutions to change systems.

Levels 6 and 7 more reflect the core values and essence of participatory extension, where the farming communities are engaged from the start and take an active role in the development of programs that will best meet their needs and build their capacity to improve. Activities

that are reflective of Levels 1 to 5 are still more associated with the previous extension systems built on information transfer and institutional control.

Participatory extension approaches are more successful than technology transfer models because they are relationship based, focussing on helping farmers and rural communities to change and develop, rather than just passing on information. They place farmers at the centre, engaging them in the process from the outset, meeting their actual needs in practical ways, and giving them ownership of their destiny, rather than treating them as the end recipients of something from people above them. They become more committed to the process and willing to change (Swanson 2008).

2.3.4 The role of Participatory Extension within Agricultural Knowledge and Information Systems for Rural Development (AKIS/RD)

Participatory extension was based on the realisation that the knowledge needed for lasting change and growth was far more than the teaching of technical information, but came from many directions and stakeholder sources. The idea of Agricultural Knowledge and Information Systems (AKIS) was originally proposed by Röling (1988) as better way to comprehend the extension communication process. He stated that knowledge is the inherent function of an individual's brain that can be generated and utilised, but not transferred. Information, by contrast, can be collected, analysed and transmitted. AKIS thinking focuses more on the often complex linkages of ideas, relationships, priorities and systems components involved in achieving the goals of sustainable agriculture.

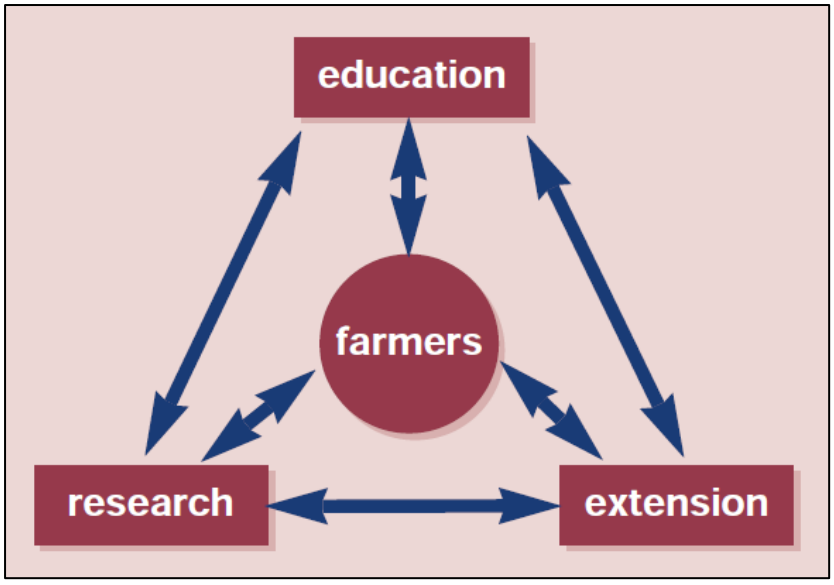
Over 20 years ago, Jones and Garforth (1997) stated that the future will call for more able, independent, client orientated extension workers and their success will lie in the quality of their interactions with the clients and stakeholders, rather than movements of the messages through a hierarchical system. Effective AKIS is shown where farmers, extension agents, researchers, policy makers, rural suppliers, media outlets, private consultants and other stakeholders form many interactive links of information and support that help bring about change.

The FAO and World Bank outlined their strategic vision and guiding principles on Agricultural Knowledge and Information System for Rural Development (AKIS/RD) in 2000 (FAO and World Bank 2000). They presented a knowledge triangle of agricultural educators, researchers and extension, (both public and private) with two-way information flow between each of them (Figure 2.2). At the heart of the triangle are the farmers, interacting with each sector to improve their productivity, incomes and welfare through sustainable development. "Farmers and other rural people are partners within the knowledge system, not simply recipients" (p. 2). This central farmer group also encompasses rural industry groups and representatives.

Agricultural Knowledge and Information System consists of all the organisations, individuals and processes involved in generation and modification of knowledge, and in the acquisition, transformations and exchange of information (Kalim 2005). AKIS integrates agricultural

education, farmers, researchers and extension agents to promote mutual learning and generate, share and utilise agriculture-related technology, knowledge and information.

Figure 2-2. AKIS/RD framework for Participatory Extension



(Source: FAO and World Bank 2000).

AKIS not only involves the introduction of new information about potential innovation, but also encompasses the way people think and make decisions based on their beliefs, values and preferences that all affect peoples' desires and abilities to change activities and therefore are fundamental to implementation of participatory extension. They encompass all the technical understanding, both indigenous (the farmer and rural communities) as well as expertise from outside. Applying AKIS acknowledges that all these factors may impact on peoples abilities to work together to achieve innovation and therefore need to be taken into account, rather than just providing technical answers, so that all the relevant needs can be addressed to help facilitate change. This is why facilitated communication between each of the main stakeholders is vital to achieve the strategic decision making and co-operation to improve collective innovation performance (Engel and van den Bor 1995).

The basic knowledge processes include generation, transformation, integration, storage and retrieval. Knowledge generation within AKIS is greatly enhanced by group collaboration of stakeholders rather than what is attempted by individuals and important synergies are created by all the components working together (Ponniah, Puskur et al. 2008). This process becomes a means to empower people to become critical thinkers and problem solvers, as they engage with other stakeholders' viewpoints to share information, and address problems and priorities. This is important as farmers share about coping with unpredictability being key to survival, and how this impacts on adopting innovation (FAO and World Bank 2000).

In exploring the various knowledge systems and tools associated with achieving agricultural innovation and development, Engel and van den Bor (1995) discuss various participatory action-research methodologies. When these systems of enquiry are adopted, the teacher

disappears from front-of-class lecturing, to participate as co-researchers and facilitators who take responsibility for quality researching, communicating and learning to proceed. These tools include *participatory technology development*, *participatory rural appraisal*, *rapid appraisal of agricultural knowledge systems*, and *soft systems methodology*.

Soft Systems Methodology (SSM) provides an organised way of tackling complex real life situations which are never static and contain multiple layers of interacting social perceptions (Checkland and Poulter 2010). This is of particular value within AKIS/RD because the world views of public policy makers, researchers and extension officers may differ greatly from the farmers they hope to engage with. SSM brings together all the stakeholders involved, asking them what they think the problem is, where they fit and what they believe possible solutions may look like. A rich picture is then formed of all the interactions so that each participant can see and better understand all points of view and the motivations behind them. The reality is that people will only act in accordance with their own world view, and while they may be part of the problem, they will also be part of the solution, if they can be listened to, understood and work with to find shared understandings and practical solutions (Bunch 2003, Checkland and Poulter 2010). This aligns well with activities associated with Participatory Rural Appraisal, and the interactions of many stakeholders in AKIS RD.

The evolution of AKIS has meant that agricultural extension has essentially become a social science with understanding people, building relationships and trust and working with local communities being fundamental to lifting peoples' capacity to change and embrace the adoption of new technologies. In earlier extension models the technical information could not easily be adopted by the farmers, because their knowledge and beliefs about their own situations and experiences were not immediately compatible with the knowledge or aspirations of those who generated the techniques to be applied. Swanson and Rajalahti (2010) suggest that farming systems approaches to extension needed to change from merely delivering messages, to one of engaging farmers in the learning process. This is because all farmers situations are different and farmers know more about their actual farms than any research scientist or extension worker could know.

2.3.5 The emergence of Agricultural Innovation Systems (AIS).

Agricultural extension has clearly advanced from the transfer of agricultural information to train farmers how to increase production levels. Participatory processes within AKIS led to a changing role within government extension agencies and programs from expert teacher to facilitators of change through building relationships, understanding grass roots needs and working with all relevant stakeholders both within and outside of government. Now extension encompasses farmers and farming groups dealing with marketing issues and partnering with other service providers and agencies, building knowledge and innovation within the whole market chain (Rivera 2011).

Klerkx and others (2012) state that while participatory research and extension increased uptake and impact by considering the broader knowledge systems (AKIS) in which farmers were embedded, it mainly focussed on the famers, researchers and extension workers as the main drivers of change. There was a need to engage with a broader network of actors and institutional factors that were critical to agricultural innovation. This became known as the Agricultural Innovation Systems (AIS) approach, which looks beyond research and technological development, toward involving other stakeholders influencing areas such as marketing, labour, distribution, financing and land tenure, which are fundamental to the practical implementation and uptake of the innovation. In the rapidly changing world, extension system needed to broaden its focus from enhancing research uptake, to supporting the necessary linkages and interactions between relevant stakeholders, and creating an enabling context for innovation that can be more easily developed and implemented.

Garforth (2013) described AIS as a way of thinking about the influences and interactions that support and constrain positive change on farms and in the agricultural value chain. It recognises that new ideas come from a variety of sources, not just the government's agricultural departments, and that farmers are constantly experimenting, adapting and absorbing new ideas to meet new challenges and respond to opportunities. It also recognises that innovation is not "new technology" but rather the process by which new ideas emerge, are evaluated, adapted, adopted and integrated within agricultural communities. It works most effectively where government support structures actually allow, encourage and support this to happen. This can mean a relinquishing of control over activities, and allowing the interaction of all the interconnected stakeholders including research, extension, financial services, education, traders, marketing and infrastructure to support this innovation.

The World Bank (2012) described *innovation* as "the process by which individuals or organisations master or implement the design and production of goods and services that are new to them, irrespective of whether they are new to their competitors, their country, or the world" (p2). It goes on to define an *innovation system* as "a network of organisations, enterprises, and individuals focussed on bringing new products, and new forms of organisation in to economic use, together with the institutions and policies that affect their behaviour and performance" (p2).

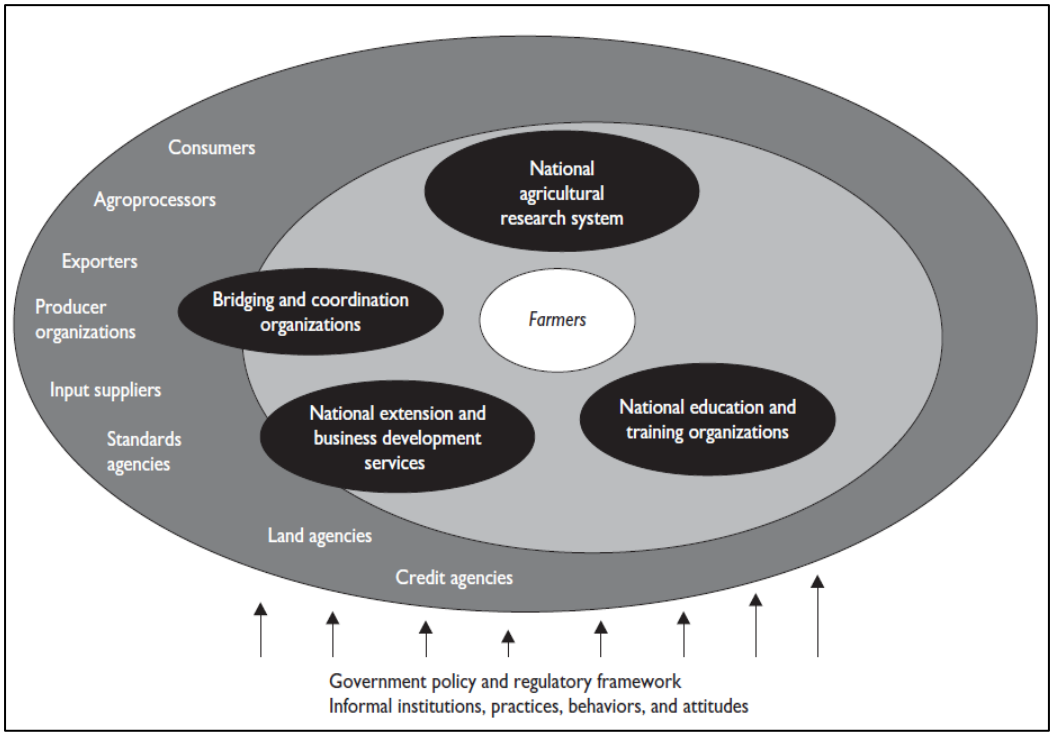
Ponniah and others (2008) state that innovation involves more than just research and development, and goes beyond a knowledge systems focus to encompasses the working of the market place and value chains. It incorporates key reform measures such as decentralisation, encouraging public sector alliances with private sector entities, creating demand driven services and supports for innovation to flourish.

Sanginga, Best and others (2004) assert that for participatory research and innovation to be successful in benefitting the rural poor, a market driven, market-led or market oriented approach must be taken. This requires transforming subsistence agriculture to make farming a business within entrepreneurial communities, where farmers produce for markets rather

than trying to market what they produce. Gaining a better understanding of how different communities can best achieve their income and other livelihood aspirations through better links with markets is key, and requires an effective process of community learning and empowerment to achieve this innovation.

Figure 2.3 is a representation how the participatory AKIS/RD model, involving the interactions of farmers, researchers, extension agents and education/training entities operate within the framework of AIS (World Bank 2012) and is an modification of an earlier model designed by Rivera (2011). It shows how farmers or farming organisations may be producing new or improved products, but may now be more directly involved in their processing, distributing and marketing. While the role the extension agent involves promoting access to the best technical information available to help produce the goods, it will also be to facilitate farmer groups to form and function successfully in marketing the product, while linking them with the relevant processors, analysts or distribution companies. The role of government is to create policies, financing pathways or trade agreements that will allow the innovation to flourish. However, where these support structures are not in place and easily accessible then innovation struggles, not due of its technical failure, but because the farming communities or various rural stakeholders lack the capacity to make it easily happen.

Figure 2-3. Agricultural Innovation Systems



(Source: World Bank 2012)

AIS has been described as a response to the increased speed at which the farming and rural community must move to remain competitive/productive in a rapidly changing world according to Rajalahti, Janssen and others (2008). They describe how Innovation Systems thinking is particularly necessary due to:

- markets, not production, being the key driver of agricultural development;
- production, trade and consumption of agricultural produce becoming more dynamic and unpredictable;
- knowledge, information and technology now being mainly generated and applied through the private sector;
- the rapid growth in information and communication technology;
- the changing knowledge structures within agricultural sectors of foreign countries; and
- agricultural development increasingly taking place in a global rather than local setting.

Successful agricultural extension programs can be challenging to implement in developing countries with high numbers of small farmers that are often illiterate, geographically dispersed and supported by limited infrastructure. There are limited effective channels of communication available outside of meeting with them face to face. The number of clients makes it very difficult for governments to adequately resource enough extension agents to work closely with farmers (Anderson and Feder 2004). While the value of operating within AIS would appear more relevant for farmers in more advanced and modernised developed countries, Rajalahti, Janssen and others (2008) argue that it may be more relevant in areas with lots of small landholders, as they stand to greatly benefit from become more organised collectively in purchasing their inputs or marketing of their produce. Otherwise they continue in their poverty and stand to become even more disadvantaged.

Kilelu and others (2011) highlight the case of the East Africa Dairy Development program (EADD) which operated in Kenya by a consortium of five organisations that have roles in demand articulation, stimulation for technologies, knowledge, accompanying services, brokering networks and support learning for innovation. The stakeholders involved include farmers, government agencies, researchers and private business. They not only supported farmers with finance, artificial insemination and animal health, but also assisted dairy companies in building their capacity with milk chilling plants and have introduced a credit and payment scheme that improved access and trust between these actors. They emphasised that innovation brokering covers many tasks that goes well beyond technical knowledge. While there were many layers of negotiations and activities involved, it is clear that the poor farmers themselves could not have sustained their integrations into the sound innovations associated with improving their quality milk production without all the other regulatory, processing, marketing and financing actions being simultaneously established.

There are many other examples of successful AIS described in the World Bank (2012) AIS Investment Source Book, including the National Agricultural Advisory Service (NAADS) operating in Uganda to enhance small-scale entrepreneurship through market orientated production services. Since 2002 about 50 enterprises were developed and promoted, engaging 45,000 farmer groups, with the establishment of 200 higher level farmer organisations. Public-private partnerships were formed, supporting out-grower schemes with nucleus groups of small-scale farmers, encouraging them to increase their market

orientation by value adding with agro-processing facilities. This was so successful, that with increased production levels and more farmers becoming involved that more organised marketing and agro-processing facilities were needed. More private providers emerged to support the needs, but they also required capacity building and policy support from the government to help sustain this development. There are still many challenges at many levels, including farmer empowerment, poor links in value chains and marketing issues, but overall there has been significant improvements in lifting the level of innovation and entrepreneurship amongst the rural communities. Adoption of innovative activities can still be very slow among more traditional farmers, but the process benefits from the various complimentary programs can begin to generate trust among the farmers and other partners, which can be the first step toward initiating change.

In Zambia there have been issues of small-scale farmers having seen little improvement to their living standards, despite the country experiencing a strong period of economic growth. Their productivity was very low when compared with commercial farmers, despite living in fertile areas, mainly due to lack of land title, limited finances and insufficient supporting infrastructure. The government started a strategy to reduce poverty by expanding contract farming and out-grower schemes facilitated the linking of small landholders to commercial farmers or agro-enterprises. Through partnering with World Bank initiatives, Zambia's Ministry of Agriculture and Co-operatives (MACO) networks of competitive value chains were able to be set up in high quality, high value commodities such as cotton, horticulture, honey and dairy. This involves the training of the farmers in technology, capacity building, production services, processing and marketing in value chain development. It has required the government to improve the network of rural feeder roads to allow for the safe transport of product as well as access to the many business networks. There has also been significant public institutional support for market development (World Bank 2012).

Needs for innovation and the partners committed to these processes can be very location specific. Agricultural innovation is increasingly being seen as a product of social negotiation. The focus of extension intervention within this setting should be geared toward strengthening mechanisms for joint learning and sharing of experiences and communication among farmers and with outsiders. This can efficiently increase the development and spreading of technologies, as well as improve self-governance of farmers (Hagmann, Chuma et al. 1999).

While AIS is strongly associated with governments becoming decentralised and allowing for higher levels of privatisation and pluralism, Rajalahti and others (2008) suggest that the public sector still has a very important role to play, as market forces are not enough to promote the interaction required, particularly in poorer less developed countries. Capacity building is required to strengthen learning and collaboration, and there is a great need for the facilitation in co-ordinating the relevant stakeholders. Innovation thrives in a proper enabling environment which may require co-ordination of the whole value chain, and this often needs government intervention to make this possible.

Birner and others (2009) designed a conceptual framework for analysing agricultural advisory services. It places the agricultural advisory services, in terms of its governance structures, capacity, management style and advisory methods, within the compartments of AIS. It seeks to establish its relationship to various contextual factors within the country in terms of the policy environment, the capacity of potential service providers and partners, the countries production systems and market access as well as other community aspects. It then explores how these factors impact on farm households, practices, productivity and the farmer's capacities. This framework is presented in the Chapter 3 (Figure 3-1), as it is used in analysing the extension services within the case study countries of Iraq and Egypt to assess whether contextual or operational factors create too many barriers for AIS to develop and participatory approaches to operate. The framework can be used to identify what areas within or outside of the agricultural advisory services would need to change to improve the development of their agricultural industries and improve the livelihoods of their rural poor.

2.3.6 Decentralisation Challenges.

For AIS to function well with the support of a country's agricultural advisory services, changes in government policies toward decentralisation and pluralism are essential. This shift toward decentralisation of public extension systems is a key recommendation of many papers on improving agricultural development, particularly in poorer countries (FAO and World Bank 2000, Christoplos 2010, Swanson and Rajalahti 2010). Swanson (2008) states that in many countries, markets rather than technology, are becoming the primary driver for agricultural development. This means the concepts of agricultural innovation systems (AIS) are becoming more important as innovations will be driven from many market sources, both locally and globally, rather than mainly government controlled technology transfer systems.

Swanson and Samy (2002) highlight the need to develop partnerships between private, public and NGOs, and suggests that NGOs are vital in assisting the rural poor with social capital and poverty alleviation programs. "Public extension should not view these new organisations as threats, but as opportunities to forge new partnerships" (p9). Swanson (2008) claims that the top-down information and new technology driven extension approaches needed to change with the rapid economic development across the world towards more decentralised, market driven extension systems. This means that more support is required for farmers to receive, understand, evaluate and be responsive to good market information, and for the support structures to be in place for all of the important links in the market chain to be effective.

Extension strategies need to face the task of supporting market competitiveness for commercial agriculture operating in a global market, as well as addressing poverty in rural areas (Alex, Byerlee et al. 2004). This poses a significant challenge, and places a direct responsibility on governments as they seek to move to more market based economies.

India, for example, has implemented a number of programs in an attempt to decentralise and revitalise their public sector extension system. Glendenning and Babu (2011) report on the

progress of the Agricultural Technology Management Agency (ATMA) in its attempts to decentralise and apply participatory, bottom-up approaches. They conclude that the inherent organisational capacity, culture and management existing within the public sector has certainly limited the success of this program. Breaking from the entrenched mind set of government control and top-down approaches has proven to be a key challenge for many extension officers. They need to change to a mindset and acceptance that their expertise lies in their abilities to embrace indigenous knowledge and build farmer capacity to develop and implement lasting improvements to their livelihoods, rather than providing technical answers. The question still remains as to how well the Ministry of Agriculture officers and extension agents are willing and able to change their roles, particularly when culturally there is pressure for them to be the expert, as they have been educated and need to "save face". Many find it easier to remain within their traditional roles.

It is not always easy for governments to know the levels of market controls they need to maintain for the benefits of their peoples and economies, against embracing decentralisation and allowing private influences and market forces more control. Anderson and Masters (2009) reveal how much of the rural poor of Africa have been disadvantaged by macroeconomic, sectoral and trade policies, but also how positive changes in these areas have led to faster economic growth and poverty alleviation. The Public Distribution System (PDS) in Iraq was a scheme, that although playing an important role in helping to feed the population, was extremely expensive, inefficient, distorted prices (such as local wheat prices) and proved to be a disincentive to local primary production and secondary industry development (Iraqi Strategic Review Board 2005, World Bank 2011).

The FAO and World Bank (2000) report stated that Worldwide the relationships between government and people were altering due to political and institutional developments. Economic liberalisation has meant that governments could no longer provide agricultural services as effective and efficiently as the private sector or civil-society organisations. The public sector began concentrating on creating policy and regulatory environments that assisted private sector initiatives while improving the services that only governments could offer in the late 1990s. The report identified a key outcome of democratisation and decentralisation is that governments become more accountable to their peoples, with local authorities and community members gaining a stronger voice in setting priorities for government actions. This means that even poor farmers have greater opportunities to articulate their demands about the nature of services provided to them by the public sector, and more dependable access to inputs, with better options for marketing their outputs.

The question remains whether the less democratic governments that operate within many Middle Eastern countries that retain high levels of control over their people with limited accountability, are able to embrace AIS as a way to achieve sustainable rural development.

2.3.7 Global moves toward Participatory Extension methods within Agricultural Innovations Systems (AIS) frameworks.

The modern view of extension has now expanded with the need to encompass marketing issues and partnerships with the private sector. Agricultural extension is becoming very complex, and the development of AIS is a response to the increased speed at which the farming and rural communities must move to remain both productive and competitive in a rapidly changing world. Profitable agricultural enterprises have become more diverse and market driven, and this has presented challenges for governments to become more pluralistic in attitudes to extension services (Rivera 2011). AIS approaches have proven to be successful in both developed and developing countries across the world. Garforth (2013 p2) states that "the new global architecture for agricultural research and advisory services has taken agricultural innovation systems to their hearts".

Each of these main phases of agricultural extension that have been discussed within this chapter are represented in Table 2-1, from technology transfer, though the AKIS phase (participatory approaches), through to the modern focus on AIS. Klerkx and others (2012) use this table to summarise how the various characteristics of each extension approach has changed from their mindset, scope, core elements and the roles of the key players involved over time.

Of particular significance is the progression of innovations, methods and drive coming from scientific experts (supply driven), to then originating from collaboration with scientist, farmers and extension worker (demand pull from farmers), to the AIS approach involving multiple actors, platforms and networks (responding to the complex challenges to successfully function in a changing world). The focus has gone from farmers being shown how to make technical advancement, to empowering famers to set directions and co-develop the innovations that meet their needs, to seeing farmers becoming partners within holistic institutional changes that build a community's capacity to innovate and influence through value chain marketing. The critical role of decentralisation from central government control through research and advisory services, to partnering with multiple players who are best placed to respond to demands is very evident within many of the perspectives expressed.

For a country to modernise its extension approach within its agricultural advisory services, it involves far more than just restructuring activities (Table 2-1). It has involved paradigm shift from all levels and stakeholders involved, from the government policy makers, researchers, extension agents, farmers, the private sector and NGOs. Advancements in social sciences, knowledge systems, capacity building, market driven economies, information exchange and opportunities within the ever changing world environment has demanded these changes in agricultural extension approaches and innovation systems to best meet the needs of sustainable rural development (Klerkx, Schut et al. 2012).

Table 2-1. Shifts in theoretical perspectives on agricultural development and innovation

Characteristics	Diffusion of Innovations/Transfer of Technology	Agricultural Knowledge and Innovation Systems (AKIS)	Agricultural Innovation Systems (AIS)
Era	Central since 1960s	From 1990s	From 2000s
Mental model and activities	Supply technologies through pipeline	Collaborate in research (participatory research) and extension	Co-develop innovation involving multi-actor process and partnerships
Knowledge and disciplines	Single disciple driven (e.g. breeding)	Interdisciplinary (e.g. plus sociology & farmer experts)	Transdisciplinary, holistic systems perspective
Scope	Productivity increase	Farm-based livelihoods	Value chains, institutional change
Core elements	Technology packages	Joint production of knowledge and technologies	Shared learning and change, politics of demand, social networks of innovators
Drivers	Supply-push from research	Demand-pull from farmers	Responsiveness to changing contexts, complex patterns of interaction
Relation with policy and institutional environment	Science and technology are relatively independent of political and other social partners – institutional factors as external conditioners of the adoption process	Science and technology develop and are embedded within in a historically defined social, political, economic and agro-ecological context.	Besides contextually embedded science and technology, institutional change is considered a *sin-quo-non* for innovation
Innovators	Scientists	Farmers, scientists and extensionists together	Multiple actors, innovation platforms and networks
Role of farmers	Adopters or laggards	Experimenters	Partners, entrepreneurs, innovators exerting demands
Role of scientists	Innovators	Collaborators	Partners, one of many responding to demands
Key change sought	Farmers' behaviour change	Empowering farmers	Institutional change, innovation capacity
Intended outcomes	Technology adoption and uptake	Co-evolved technologies with better fit to livelihood system	Capacities to innovate, learn and change

(Source: Klerkx, Schut et al. 2012)

2.4 Summary and Conclusions

Since the 1950s, extension systems have significantly changed in their attempts to improve rural production, increase innovation by farmers and lift the livelihoods of rural communities.

Traditionally, "Technology Transfer" models essentially involved researchers the passing on of information (often through the demonstration) about improved agricultural methods to farmers. This was generally a very top-down supply driven approach instigated and managed through central governing bodies. This was followed by the World Bank embracing the use of T&V schemes, which involved more support for recognising and addressing local constraints to adoption. Like the previous extension systems, the extension was still essentially delivering standardised predetermined information to farmer clients, which was very expensive to operate and largely failed to empower farmers to develop their capacities to innovate.

Participatory extension approaches gained momentum in the 1980s and involved farmers and end users actually being consulted about their needs, and sharing in the development and implementation of new technologies. The development of AKIS became integral to participatory approaches by integrating agricultural education, farmers, researchers and extension agents to promote mutual learning, empowering farming communities and building their motivation and capacity to change.

Since 2000 there was clearly a need to engage with a broader network of actors and institutional factors that were critical to advancing agricultural innovation. In the rapidly changing modern world, extension system needed to broaden its focus to be more market driven, partnering with other service providers and agencies, building knowledge and innovation within the whole market chain. AIS looks beyond research and technological development, toward involving other stakeholders influencing areas such as marketing, labour, distribution, financing and land tenure, which are fundamental to the practical implementation and uptake of the innovation.

AIS incorporates much of the participatory approaches and AKIS thinking and can have important implications for alleviating poverty, enhancing economic growth and developing agricultural industries within communities. However for AIS to thrive relies on governments being prepared to decentralise and take a pluralistic approach to effective and efficient service provision, while it creates a more enabling environment for innovation to happen.

This study focusses on the extension processes within Middle Eastern countries that are characterised by strong levels of centralised government control, which brings into question their abilities to embrace participatory extension approaches and AIS as a way to achieve sustainable rural development.

3 Social research methodology and methods

3.1 Introduction

This applied research explores both the barriers and opportunities for utilising participatory extension within AIS approaches to improve agricultural development in Middle Eastern countries, using mixed methods of social research along with a review of existing literature.

The author was engaged in the training of agricultural workers associated with a number of AusAID funded programs involving both Egyptian and Iraqi delegations. The author was also commissioned to conduct the monitoring and evaluation of the major "On The Ground" (OTG) AusAID funded 4 year project in Iraq. This work provided the majority of the access to the participants and the activities that have been researched within this thesis.

The timing of this research was opportunistic in that it followed the Arab Spring and downfall of the long standing Mubarak regime in 2010. It was also at a time of rebuilding agricultural advisory services in Iraq after many years of tension following the removal of Saddam Hussein. This meant that that government agricultural workers were less inhibited to express their opinions on the issues relating to the previous Government's programs and performance.

The collection of data for much of the social research was gathered by the author as he engaged in numerous international projects and extension training exercises for multiple groups of agricultural research scientists, extension workers, government officials and farmers from both Egypt and Iraq. While there is diversity in government structures, specific extension histories and strategies between these two Middle Eastern countries, the research sought to identify consistent issues, regarding their abilities to engage participatory methods and AIS strategies. This would provide key insights into the application of agricultural extension across the region.

This chapter describes the theoretical framework used to analyse the agricultural advisory services within the two case study countries. It also explains the methodology employed to answer the key research questions using qualitative analysis. It explains the use of content analysis, interview and survey techniques, the coding and representation of data with the assistance of the QSR-NVivo computer program, soft systems methodology, sample size for analysis, participant observation and the triangulation of research methods.

The chapter concludes with references to a number of scientific studies that have used similar approaches to analyse the state and effectiveness of advisory services in other countries.

3.2 Methods for data collection

The gathering of information is described as purposeful sampling (Patton 2001) in that it targeted a range of participants that have a direct connection to agricultural extension and rural development within 2 case study Middle Eastern countries. Data collection methods included:

- intensity sampling of information rich cases;
- critical case sampling;
- snowball or chain sampling; and
- opportunistic sampling.

Intensity sampling, according to Patton (2001), consists of targeting information rich cases that can represent and manifest the experiences and information around the phenomenon of interest. This was undertaken with through the semi-structured, in-depth interviews undertaken with Egyptian and Iraqi agricultural workers, spanning a large variety of roles, responsibilities and locations. Through this process a rich picture of research topic was able to be constructed through the multiple perspectives of high ranking government officials, regional agricultural and program managers, researchers, agricultural advisors, local extension workers and farmers.

Critical case sampling was used of both key individuals and project work that was likely to be true and representative of other cases, allowing for generalisations to be made (Patton 2001). Examples of this include observations and evaluations made of the OTG program establishing 7 project sites in Iraq based on participatory extension principles, as well as visiting and analysing the a successful community project in northern Egypt implementing AIS. It was also achieved through the participant observation and analysis of participant training groups as they designed and presented 16 agricultural development projects they intended to implement when they returned to their work places in Iraq and Egypt. These cases represent what could happen in other similar areas, as well as the barriers to be overcome, if the right strategies are planned and well implemented. These critical cases provide some contrasts and validity to the conclusions reached through the intensity sampling interview process in as they represent actual life examples involving the principles of implementing participatory extension and AIS being examined within this study.

Snowball or chain sampling as described by Patton (2001) is where the pursuit of initial and planned information lead to further opportunities to gather data within that field of inquiry. This was achieved where interviewing one person lead to discussions about other peoples' work or perspectives, who were then approached for further comment. Bhattacherjee (2012) states that this method is often necessary to reach more specific or harder to reach participants that can provide important information that contribute to the rich picture. For example, on one occasion a key issue was raised by an agricultural worker from his perspective as also being a farmer. This brought into question critical relationship issues

between Egyptian farmers and local village extension workers, which resulted in the convening of a workshop discussion with a wider group to specifically confirm and explore further the implications of this critical issue and its impacts for the application of participatory extension. This led to further contact with specific farmers to pursue their perspectives on this issue. Once confirmed and understood, this led to a significant conclusion about barriers to adoption and needs for change. In some other cases where both workers and their direct managers were interviewed separately, this led to further questions being pursued to clarify key processes in decision making, information flow, resources and system failures or successes, between these hierarchical management levels.

Patton (2001) describes opportunistic or emergent sampling as an important strength of qualitative fieldwork strategies as it takes advantage of what unfolds, as it unfolds. Some examples of this included observations that were recorded after visiting a project site near Alexandria, Egypt that appeared to be operating according to AIS principles. When a participating local farmer spoke about his role within the project and was questioned by the whole group of researchers and extension agents about his farming strategies and his vision for the future, it revealed many insights into the gaps in understanding of participatory processes within these workers. When training, monitoring and evaluating the OTG Iraqi project with the group in Jordan in 2013, there were a number of project farmers that were intermittently present, but who contributed vital information to some of the recorded group workshop discussions, as well as being briefly interviewed at functions or on bus trips when available, through the use of any available interpreter at the time.

Other opportunistic sampling occurred by interviewing or observing the activities of project farmers or high ranking government ministry officials that became available at, or contributed to various project training activities within Egypt or at an Iraqi project team meeting in Jordan, or key moments at other locations that revealed critical elements of cultural leadership or learning styles, or attitudes to undertaking various activities. These participant observation were regularly noted by the author to be referred to in further data analysis.

The many logistical challenges associated with implementing the Iraqi OTG over the 3-4 year period, including training the workers technically as well as in extension approaches, supplying equipment, empowering field workers to be able to upward manage. For them to be able to practically shape the project to suit the requirements of the agricultural communities within a war torn country of Iraq, provided many insights into the barriers that need to be overcome to achieve significant agricultural development. The observation and evaluation of the activities within this project, including the interviewing of many of the participants provided vital insights into what could be achieved. The observations of these projects both support many of the findings from interviews with workers from both Egypt and Iraq, as to the barriers for achieving participatory extension and AIS, as well as uncovering many further insights into specific issues associated with its practical application.

A key component both case study countries data collection was the use of semi-structured, in-depth interviews. An interpreter was used where participants preferred to communicate in Arabic and all interviews were record and a later transposed for analysis. In Egypt written response surveys using the same initial questions and diagrams were also used (refer to Appendix 1). The questioning in both the interviews and surveys were aligned with key classification criteria described by Birner and others (2009) for assessing advisory methods of extension services, and provides the theoretical framework within which this research is based. The questions followed the structure of establishing participants' perceptions of:

1. The nature of agricultural extension. They were asked for their own definition, who is involved and what roles they play, followed by a description of successful extension activities they have been directly involved in, and unsuccessful programs they were aware of.
2. Which models of extension most reflected the situation in their country, and the relationships between the various stakeholders involved. They were presented with a number of extension models ranging from technology transfer "diffusion of innovations" to more participatory designs,
3. Barriers to achieving agricultural extension in their country, and what needed to be addressed to improve the situation.

The direct responses, along with the ensuing discussion provided insight into all component of conceptual framework for analysing the processes and effectiveness of each country's agricultural advisory services.

3.2.1 Data collection for the Iraqi case study

For the Iraqi case study, this qualitative research used content analysis with a combination of data collection methods including semi-structured interviews with open-ended questions, facilitated group discussion and participant observation involving project preparation, presentation, extension training and field visits. 59 Iraqi agricultural directors, researchers, extension workers and farmers, from various Ministries, institutes and locations across Iraq were participants. Most were among delegates selected by the government for extension and leadership training programs in Australia, as well participating in the AusAID funded "On the Ground" project developing 7 regional irrigation and livestock project sites across regional Iraq, between 2010 and 2013 (Tables 3-1 and 3-2). The principal author was involved in the training and evaluation of these programs, both in Australia and one OTG project team meeting in Jordan, and approached these delegates to participate in this research.

The timing of this research was important in that it followed the downfall of the long standing oppressive regime of Saddam Hussein in 2003, after a period of rebuilding following the war, but still within a time of intense political and social unrest. Of the 59 participants 39 were a part of the Ministry of Agriculture, 16 from the Ministry of Water Resources and 8 were Iraqi farmers (4 of whom also worked within the government). Of these participants, 3 were high level government officials within their Ministries. This group represented key stakeholders in

agricultural development, being directly involved in research, extension, education, administration and primary production of agriculture in Iraq. Four Australian consultants directly involved in Iraq based project work were also interviewed about the project's progression and its ability to achieve participatory outcomes.

Twenty one semi-structured, in-depth interviews were conducted (using a voice recorder with responses then transposed), along with another 7 opportunistic interviews and 2 facilitated discussion group meetings (involving 39 Iraqi agricultural workers) about general and specific extension issues in Iraq. Data was transcribed, coded and grouped into themes and sub-categories using conceptual content analysis (Walter 2010) and the NVivo 11 social research computer analysis program.

Data was also gathered through participant observation and evaluation of the preparation and presentation of 4 extension projects involving 20 Iraqi agricultural workers involved in extension training in Adelaide in May-June 2010. There was an expectation that these projects would be attempted to be implement when these delegates returned to Iraq. These activities were analysed in terms of how well they involved key participatory principles of building relationships with all key stakeholders, understanding their needs and building their capacity to change, rather than top-down information flow from agricultural experts. Feedback from the Australian trainers was given to all groups, and this assessment fed in to the analysis of this exercise.

A second Iraqi delegation of undertaking training in Farm Management Extension were also observed and evaluated for project presentations at the conclusion of course. A facilitated group discussion on understanding and overcoming the barriers to achieving participatory extension approaches was also recorded and contributed important practical data on real life experiences and challenges to agricultural extension within Iraq.

A major source of data came from the author's monitoring, evaluation and reporting for the AusAID funded 4 year "On The Ground" (OTG) project (McDonough 2013, Appendix 2) managed by Rural Solutions SA. Project evaluation was based on a Monitoring, Evaluation, Reporting and Improvement "MERI" model. This involved data collection, interviews, observation, report analysis, photographic evidence, reviewing of correspondence, tracking of participant progress and appraisal of achievements throughout the life of the project.

A 2 hour workshop was help with the OTG team in December 2012 in Jordan specifically to discuss how the participants could advance the practical application of participatory extension approaches within Iraq. They were asked to identify the many extension challenges they faced in their own situations within their various communities. They broke into their livestock and irrigation groups for facilitated discussions on how they could best overcome these barriers and strategically implement the principals of the OTG project into the future. The groups then re-emerged to share their outcomes and summarise. This workshop discussion was recorded and analysed as an important data source for this research.

Table 3-1. Participant details of Iraqi group trainees and farmers

Participant No.	Ministry	Role	Governerate / City	Gender	Farmer	May-June 2010, Agricultural Extension Training, Adelaide	July 2011 Farm Management Extension Training, Adelaide	Interview (I)	Presentation and Summaries of Planned Extension Activites	Facilitated Group Discussion on Applying Extension
1	MOA	Research / Extension	Baghdad	F			●		●	●
2	MOA	Research / Extension	Baghdad	F			●		●	●
3	MOA	Agronomist, Work in IPM	Baghdad	F			●	I	●	●
4	MOA	Research / Extension	Al-Qadesiyeh	M	●		●	I	●	●
5	MOA	Senior Agronomist	Kirkuk	M			●	I	●	●
6	MOA	Research / Extension	Baghdad	M			●		●	●
7	MOA	Director of Extension	Mosul, Kurdistan	M			●	I	●	●
8	MOA	Research / Extension	Baghdad	M			●		●	●
9	MOA	Agric investment	Baghdad	M			●	I	●	●
10	MOA	Agronomist	Diyala	M			●	I	●	●
11	MOA	Research / Extension	Karbala	M			●		●	●
12	MOA	Investmetnt Planning	Baghdad	M			●	I	●	●
13	MOA	Research / Extension	Baghdad	M			●		●	●
14	MOA	Research / Extension	Erbil	M			●		●	●
15	MOA	Research / Extension	Wasit	M			●		●	●
16	MOA	Research / Extension	Meesan	M	●		●	I	●	●
17	MOA	Head of Cultural Dept	Dakar	M			●	I	●	●
18	MOA	Research / Extension	Baghdad	M			●		●	●
19	MOA	MOA, Plannning	Dohok	M			●		●	●
20	MOA	Research / Extension	Baghdad	M			●		●	●
21	MOA	Animal Production	Thi Qar	M		●			●	
22	MOA	Agricultural Engineer	Al-Thi-Qar City	M		●			●	
23	MOA	Assistant Agronomist	Baghdad Al-Dora	M		●			●	
24	MOA	Assistant Agronomist, TV Programs	Baghdad	M		●			●	
25	MOA	Agronomist	Basrah	M		●			●	
26	MOWR	Green House Project	Erbil	M		●			●	
27	MOA	Office for Agricultural Engineers	Baghdad	M		●			●	
28	MOA	Agronomist Assistant	Anbar - Ramadi	M		●			●	
29	MOA	Agronomist	Erbil	M		●			●	
30	MOA	Head of Agronomy	Mosul	M		●			●	
31	MOA	Assistant Agronomist	Baqubah	M		●			●	
32	MOA	Media Office Manager	Baghdad	M		●			●	
33	MOA	Agronomist Assistant	Najaf, Al-Haidaria	M		●			●	
34	MOA	Chief Advanced Agronomist	Kirkuk	M		●			●	
35	MOA	Agricultural Engineer, Vegetable Production	Al Mathana	M		●			●	
36	MOA	Assistant Agronomist	Baghdad Al-Dora	M		●			●	
37	MOA	Senior Agronomist	Baghdad	M		●			●	
38	MOWR	Agronomy	Sulaimania	M		●			●	
39		Farmer	Baghdad	M	●			I		
40		Farmer,	Nineva Mosel	M	●			I		

Table 3-2. Details of Iraqi OTG project participants

Participant No.	Ministry	Role	Governerate / City	Gender	Farmers	June-Sept 2011, OTG Training Program in SA	Dec 2012 OTG Training and Project Meeting, Jordan	Interview (I)	Group Discussion on Applying Extension
41		OTG Farmer	Kirkuk	M	●		●		●
42		OTG Farmer	Karbala	M	●		●	I	●
43	MOA	OTG Steering Committee	Baghdad	M			●	I	●
44	MOWR	OTG Steering Committee	Baghdad	F			●	I	●
45	MOA	OTG Steering Committee	Baghdad	F			●	I	●
46	MOWR	Irrigation Team, OTG	Wassit	M		●	●	I	●
47	MOA	Irrigation Team, OTG	Wassit	M		●	●		●
48	MOA	Irrigation Team, OTG	Karbala	M	●	●	●	I	●
49	MOWR	Irrigation Team, OTG	Karbala	F		●	●	I	●
50	MOA	Irrigation Team, OTG	Kirkuk	M		●	●	I	●
51	MOWR	Irrigation Team, OTG	Kirkuk	M		●	●		●
52	MOA	Sheep Station Project Manager, OTG	Karbala	M	●	●	●	I	●
53	MOA	Sheep Reproduction Team	Diyala	M		●	●		●
54	MOA	Sheep Reproduction Team	Salah al-Din	M		●	●		●
55	MOA	Sheep Reproduction Team	Erbil	M		●	●	I	●
56	MOA	Sheep Reproduction Team	Karbala	F			●		●
57	MOA	Sheep Reproduction Team	Diyala	M			●		●
58	MOA	Sheep Reproduction Team	Salah al-Din	M		●	●		●
59	MOA	Sheep Reproduction Team	Erbil	M			●		●

Tables 3-2 and 3-3 in provide a more detailed description of all Iraqi project participants and activities. This includes timings of training activities, roles of participants, locations, and details of engagements.

Data gathered from these various means was analysed against existing literature describing the Iraqi agricultural systems and modern extension methods. This has provided information about the governance structures, the capacity, the management and the advisory methods of the Iraqi Agricultural Extension Services, as well as the contextual framework in which these services fit, as set out by Birner and others (2009).

Due to the security risks and possible consequences that could results in participants speaking candidly about their situations and work environments, participants were promised as a part of their consent that any sensitive responses given or actions observed would not be able to be directly identifiable back to the source. Care has therefore been taken throughout this thesis to attribute quotes and activities to general groupings of people or regions.

3.2.2 Data collection for the Egyptian case study

Similarly for the Egyptian case study, this qualitative research used content analysis with a combination of data collection methods including semi-structured interviews, surveys with open-ended questions, facilitated group discussion and participant observation involving project preparation and presentation, extension training and field visits. Thirty seven leading Egyptian agricultural research and extension workers from various government departments, institutes and locations across Egypt directly participated. They were amongst delegates selected by the Egyptian government for extension and leadership training programs in both Egypt and Australia in 3 cohorts over the period June 2011 to March 2012. The principal author was a trainer facilitating this program and approached these delegates to participate in this research.

The timing of this research was significant in that it followed the downfall of the long standing Mubarak regime in 2010. As such this this leading group of agricultural workers were less inhibited to express their opinions on the issues relating to the previous Government's programs and performance. Of 37 participants, 32 were a part of the MALR (Tables 3.3 and 3.4) involved in Research Institutes (including the Agricultural Extension Rural Development Research Institute (AERDRI), the Soil, Water and Environment Institute (SWERI), the Agricultural Engineering Research Institute (AERI) and the Central Laboratory for Agricultural Climate (CLAC)) and Regional Research Stations, and one from within the Central Administration for Agricultural Extension Services (CAAES). Five participants were employed by various universities. Of these participants, 6 were in higher level management or director roles, 3 also worked as private agricultural consultants, 2 also worked for NGOs and 5 respondents were also directly involved in their own family farms. This group represented a key sector of stakeholders in agricultural development, being directly involved in research, extension, education and administration of agriculture in Egypt, with many having direct linkages with senior MALR managers and policy makers, while also associated with activities at the farmer level. By hearing the stories (Cooksey 2011) and understanding the actual experiences of this group that are central to the governments agricultural programs, important deficiencies in the application of participatory processes were able to be explored.

Data was collected during interactions with 3 agricultural extension training delegations including one based in Cairo in June 2011, the second in Adelaide in February 2012 and the third in Adelaide and Brisbane in September 2011 (Tables 3-3 and 3-4).

Twenty two semi-structured, in-depth interviews were conducted (using a voice recorder with responses then transposed), along with 13 written response surveys, with all data being coded and grouped into themes and sub-categories using conceptual content analysis (Walter 2010). An interpreter was used where participants preferred to communicate in Arabic.

Table 3-3. Participant details of Egyptian group trainees and farmers (A)

Participant No.	Organisation	Role	Governerate	Gender	Farmer	June 2011 Training Group, Cairo	Feb 2012 Training Group, Adelaide	Interview (I) Survey (S)	Group Dicussion on Applying Extension	Summaries of Planned Extension Activites
60	Ain Shams University	Agricultural Engineering	Cairo	M		●	●	I	1, 3	●
61	Higher Institute For Agricultural Cooperation	Program Manager	Cairo	M		●	●	I	1, 3	●
62	MALR/Rice Research & Training Center	Nutrients in flooded soils	Giza	M		●	●	I	1, 3	●
63	MALR/SWERI ARC	Crop water requirements	Giza	F		●	●	I	1, 3	●
64	MALR/WNRDP	Projec Officer	Nubaria	M		●	●	I	1, 3	●
65	MALR/WNRDP	Livestock Officer	Nubaria	M		●	●	S	1, 3	●
66	MALR/DRC	Water and wastewater use, water use efficiency	Cairo	M		●	●	S	1, 3	●
67	MALR/FTI ARC	Food technology; food safety; HAACP	Cairo	M		●	●	I	1, 3	●
68	MALR/AERI ARC	land levelling & related	Alexandria	M	●	●	●	S	1, 3	●
69	Mansoura University	Agricultural Extension and Rural Sociology	Dakahlia	M	●	●	●	S	1, 3	●
70	MALR/AERDI ARC	Extension and agric. development publication	El Geeza	M		●	●	S	1, 3	●
71	MALR/CLAC ARC	Greenhouse horticulture	Giza	M		●		I	3	
72	MALR/AERI ARC	Irrigation Design	Giza	M		●		S	3	
73	MALR/AERI ARC	Irrigation Management	Cairo	M		●		S	3	
74	MALR/AERI ARC	Irrigation Systems Design	Cairo	M		●		S	3	
75	MALR/CLAC ARC	Micro irrigation and protected agriculture	Various	M		●		S	3	
76	MALR/SWERI ARC	Crop water requirements, simulation and modelling	Giza	F		●			3	
77	MALR	Micrometerology, GIS	El Geeza	M		●		S	3	
78	MALR/SWERI ARC	vegetable field irrigation	Giza	M		●		I	3	
79	MALR/AERDI ARC	Extension and survey analysis	Cairo	M		●		I	3	
80	MALR/AERDI ARC	Extension, community leadership, gender	Cairo	F		●			3	
81	MALR/AERI ARC	Extension Engineer	El Beheera	M		●		S	3	
82	MALR/AERDI ARC	Extension researcher	Cairo	M	●	●		S	3	
83	MALR/AERDI ARC	Extension researcher	Alexandria	M		●		I	3	
84	MALR/AERDI ARC	Extension researcher	Alexandria	M		●		I	3	
85	MALR/AERDI ARC	Extension researcher	Elmonofia	F		●		S	3	
86	MALR/WNRDP	Research Officer	Nubaria	M		●			3	
87	MALR/AERDI ARC	Agricultural extension	Giza	M		●		I	3	

(NB there were 3 Egyptian Focus groups, referred to by session number within this Table)

Table 3-4. Participant details of Egyptian group trainees and farmers (B)

Participant No.	Organisation	Role	Governerate	Gender	Farmer	Sept 2011 Extension Training Group Adelaide/ Brisbane	Interview (I) Survey (S)	Group discussion on Applying Extension	Summaries of Planned Extension Activites
87	MALR/AERDI ARC	Agricultural extension	Giza	M		●	I	2	●
88	Zigazig University / ICARDA	Officer for Land and Water Management	Cairo	M	●	●	I	2	●
89	Kafr El Sheik University	Enginbeering herbal and aromatic plant harvesters.	Kafr EL Sheik	M	●	●	I	2	●
90	MALR/AERI ARC	Chief Researcher in Agricultural Mechanisation	Giza	M		●	I	2	●
91	MALR/DRC	Conservation Tillage and System analysis	Zagazig	M		●	I	2	●
92	MALR/FCRI	Senior Researcher, Integrated Pest Management, Rice	Kafr El-Sheik	M		●	I	2	●
93	MALR/SWERI ARC	Head of Research, Farm irrigation	Kafr El Sheik	M		●	I	2	●
94	MALR/DRC	Sustainable Development Center	Marsa Matrouth	M		●	I	2	●
95	MALR/SWERI ARC	Water Requirements & Field Irrigation	Cairo, Alexandria	M		●	I	2	●
96	MALR/CAAE	Training Officer - Agricultural Extension	Cairo	M		●	I	2	●

(NB there were 3 Egyptian facilitated discussion groups, referred to by session number)

With 13 of the Egyptian participants it was more appropriate to give them survey forms to fill in, do to time constraints and availability of interpreters within the periods of interaction with these training group programs. Arabic survey responses were later translated into English. While the survey responses did not allow for the same depth of discussion, probing and information gathering as the interviews, they still provided valuable data for analysis, adding weight to the responses gained through the interview process.

Three facilitated group discussions took place amongst these groups and were recorded for further analysis. The first group involved 11 Egyptian workers (Table 3.3) and explored barriers to achieving agricultural development in Egypt, and what improvements were needed to overcome these. The second group involved 10 different Egyptians (Table 3.4), and discussion centred on the difficulties they perceived with the VEW network, including how they related to researchers, their abilities to work with farmers and their resourcing needs. This was in direct response to some major issues regarding mistrust of VEWs by one of the interviewees who was also a farmer, which had not clearly arisen in previous interviews, and helped to clarify that these issues were widespread among the areas that the wider group worked in. The final discussion group 3 involved a practical exercise in conducting participatory group meetings and discussing how easily these principles were, or could be applied in Egypt and involved 28 participants (Table 3.4). Key agreed outcomes and observations from these discussions have been reflected within the results.

Data was also gathered through participant observation of the preparation of 7 extension projects involving 16 workers, another 5 project presentations involving 11 workers,

participatory extension training exercises involving 28 workers, and 1 site visit to a major Egyptian extension project involving interactive farmer / government worker discussions. These activities were analysed in terms of how well they incorporated key participatory principles of building relationships with all key stakeholders, understanding their needs and building their capacity to change, rather than top-down information flow from agricultural experts.

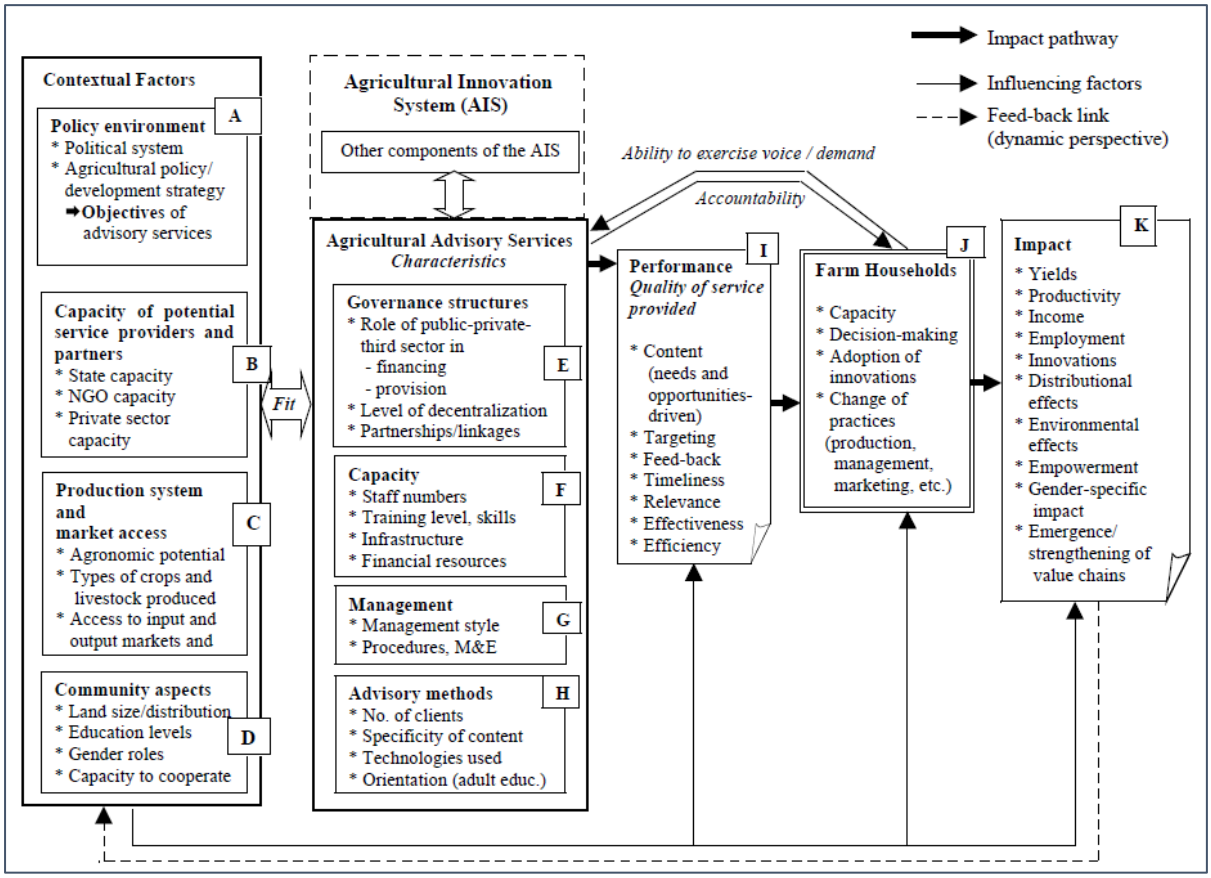
Due to the security risks and possible consequences that could results in participants speaking candidly about their situations and work environments, participants were promised as a part of their consent that any sensitive responses given or actions observed would not be able to be directly identifiable back to the source. Care has therefore been taken throughout this thesis to attribute quotes and activities to general groupings of people or regions.

3.3 Theoretical Framework

To analyse agricultural advisory services, Birner, Davis and others (2009) describe a conceptual framework based on contextual factors, and how they fit with key characteristics of the services provided (Figure 3-1). This involves gaining a practical understanding of governance structures, capacity, management and advisory methods. Participatory extension approaches within AIS are central to this framework and, when working well within a country, delivers the government support for rural development that empowers the farming communities to innovate, grow and flourish. This theoretical framework has been used as a basis for analysing the functions and operational activities of the Iraqi and Egyptian government advisory services in the context of moving forward to embrace modern challenges for agricultural development.

The framework is designed to assess an advisory services' ability to apply pluralistic strategies that are critical to the success of AIS. It recognises that the key for successful innovation to occur within modern market driven economies, agricultural advisory services are greatly influenced by their contextual environment (Boxes A-D). This comprises a government's policy environment including its political system, its agricultural policies and development strategies and its aptitude for decentralisation. The context is also set by the capacity of potential service provides, whether they be government, NGOs or the private sector, to be able to operate and form the partnerships required to facilitate successful innovation. Furthermore, it is set by the practical realities of production systems, market access as well as community, cultural and social parameters. Understanding these contextual factors provides critical information about how well modern approaches to agricultural development can be applied in partnership with a country's agricultural advisory services, and what adaptations may be needed to best fit the two.

Figure 3-1 A framework for analysing agricultural advisory services



(Source: Birner, Davis et al. 2009 p344)

The second section of the framework highlights the need to understand the characteristics of the agricultural advisory services in more detail (Boxes E-H, Figure 3-1). This includes their governance structures for operating within more pluralistic activities, including the financing, resourcing, provisions and linkages. The capacity of staff, including their numbers, levels of training and skills, their supporting infrastructure and financial resources all needs to be assessed, along with leadership and management styles, procedures and abilities to monitor and evaluate activities. This is all underpinned by their advisory method and numbers of clients, as well as extension content, the technologies being promoted and used, as well as who is being targeted with the services. This framework section has been the main focus of this thesis, given the access to participants and the resources available.

Birner, Davis and others (2009) suggested that different sectors of the framework model (Figure 3-1) may be best researched in a variety of ways, such as concepts of organisational theory, and empirical approaches involving staff surveys and analysis of management processes. Expert and key informant interviews are highlighted as a very important tool to gain useful insights into management problems that are not readily picked up in formal research, to explore what is really happening. This can provide key information as to the actual performance of services and the impact they are having on the ground. They suggest that the framework can also be used to compare different countries and learn from this what works best under various circumstances.

The final three boxes I–K (Figure 3-1) are what Birner, Davis and others (2009) refer to as the impact chain. This represents to the quality of outputs from the advisor services (I), and how well they are taking a participatory approach involving policy makers, service providers and clients. This will directly impact the accuracy and the relevance of the advice, its timeliness and outreach, the quality of the partnerships created, feedback and accountability, as well as the efficiency of service delivery. Farm households and clients (J) as it is all about how well the clients are making use of the services. One key indicator at this point is how well these farm households can exercise a voice or influence over the directions and decision making of the advisory services. The final box (K) in Impact which should be aligned to the policy objectives that the advisory services were originally established to achieve, and may include measurable yields, productivity, income and employment, but also include distribution or environment effects, levels of empowerment achieved by various social groups, as well as the emergence and strengthening of value chains.

While Birner, Davis and others (2009) suggest research methods for the three impact areas, such as changes in spending on services, analysis of changes to business incomes, measuring the formations of effective grower organisations, household and community level surveys, advisor to farmer ratios, and the disaggregation of household data using socio-economic criteria, but this was essentially beyond the scope of this study. However, while the data collection focused more on the performance of agricultural workers, many of the impacts of the current advisory services of Egypt and Iraq are reflected within the interviews, observations and literary sources examined and analysed.

3.4 Qualitative Research Methods and Analysis Undertaken

Patton (2001) emphasises that in qualitative analysis, assessment methods and designs must be appropriately matched to the research question, and the results be understandable, credible and relevant. The key questions to be investigated within this study is to identify what the barriers are to achieving participatory extension and AIS in the Middle East, and can changes be made that effectively address these issues. Understanding these barriers (both real and/or perceived) is vital to being able to design strategies for agricultural development that meet the actual needs of the farmers and give them the capacity to successfully implement meaningful and lasting improvements.

This study falls mainly under the category of applied research (Patton 2001), in that it is essentially dealing with problems that agricultural workers area dealing with in trying to implement successful agricultural development with farmers, under the direction of policy makers. The study explores how easily the principles of participatory agricultural extension (where the farmers are at the centre of program planning and activities that will improve their capacity to change, as opposed to being the endpoint receivers of technical information) can be applied within the real world societal situations of Middle Eastern countries. The agricultural workers involved bring many insights into the recommendations given due to their extensive experiences within these environments.

There are also significant aspects of summative evaluation (Patton 2001) as the principal researcher was directly involved in training agricultural workers within projects that aimed to apply participatory extension approaches. This involved problem solving with participants as they attempted to apply these strategies, and evaluation as to the effectiveness of their progress. Each project provided a case study as to how easily participatory principles were being applied in actual real life situations within Egypt and Iraq. These sections of the research are seen as contributing toward the understanding of the applied research question of why participatory extension is difficult to apply within Middle Eastern countries, and to the recommendations given.

3.4.1 The use of Content Analysis

Content analysis aims to provide a clear and systematic study of textual content as a basis for analysis and interpretation. It grounds its analysis on empirical content rather than just interpretive argument, creating objective methods for analysing texts such as interviews, surveys and transcripts (Sproule and Walter 2010).

The qualitative research herein used mixed methods of data collection including semi-structured interviews, surveys with open-ended questions, facilitated group discussions, and participant observation involving project preparation and presentation, extension training and field visits in two the Middle Eastern countries. This information has also been contextualised through a review of existing literature relating to the history of agricultural development within these countries, as well as more recent extension programs utilised across the region.

This content analysis is essentially seeking to answer the research questions of:

- *What are the barriers to achieving participatory extension and AIS in Middle Eastern countries;*
- *Is it possible; and*
- *What are the key things that will need to change for these approaches to be successfully applied?*

The population of interest for this study are key groups of government agricultural industry workers involved in research, extension, policy development and agricultural development project work that have been directly involved in specific AusAID and ACIAR funded training and project initiatives (Australian Government Department of Foreign Affairs and Trade 2018) with the countries of Egypt and Iraq between 2010 and 2013. These were programs and activities in which the author was directly involved both within Australia and in Egypt, Iraq and Jordan, giving him direct access to project participants and program activities. This also allowed for some of the associated high ranking government officials and farmers that were available to be interviewed.

The key concepts being explored using content analysis within this population and related programs included:

- the participatory principles used within their extension approaches;
- the understanding of participatory extension methodology;
- the direction of flows of both influence and information;
- inclusiveness, networking and partnerships;
- the key relationship factors of trust, empowerment and responsibilities;
- the resourcing of activities; and
- pluralism and decentralisation.

Key barriers for programs within these countries to engage in participatory extension and AIS were identified using content analysis of semi-structured interviews, surveys and facilitated group discussions and participant observation and evaluation of the many extension activities undertaken.

3.4.2 Semi-structured interviews and surveys

The semi-structured interviews were carried out with the assistance of an Arabic interpreter if required, and sometimes over a number of sittings, depending on the time involved. Examples of the interview/survey questionnaire are included (Appendix 1), along with a handouts explaining the background of the research as well as the complaints procedure and consent forms. All documents were provided to the participants in either Arabic or English as required. Ethics approval was granted by the University of Adelaide Human Research Ethics Committee. Due to serious security concerns and potential consequences associated with any statements made that could be attributed to individuals within these countries, a strict code of confidentiality has been observed within this document, as consented to by participants.

With 13 of the Egyptian participants it was more appropriate to give them survey forms to fill in, do to time constraints and availability of interpreters within these periods of interaction with these training group programs. Arabic survey responses were later translated into English. While the survey responses did not allow for the depth of discussion, probing and information gathering as the interviews, they still provided valuable data for analysis, adding weight to the responses gained through the interview process.

The questioning in both the interviews and surveys were aligned with key classification criteria described by Birner, Davis and others (2009) for assessing advisory methods of extension services (Figure 3-1). This included the types of training or technology transfer activities, the number of clientele, the extent of client involvement in planning and problem solving, and the types of media used to communicate messages. They followed the structure of establishing participants' perceptions of:

a) The nature of agricultural extension. They were asked for their own definition, who is involved and what roles they play, followed by a description of successful extension activities they have been directly involved in, and unsuccessful programs they were aware of.

b) Which models of extension most reflected the situations within their countries, and the relationships between the various stakeholders involved. They were presented with a number of extension models diagrammatically representing technology transfer "diffusion of innovations" to more recent participatory approaches.

c) Barriers to achieving agricultural extension in Egypt and Iraq, and what needed to be addressed to improve the situation.

As the interview questions were mostly open ended, encouraging in-depth discussion and exploring various concepts of extension, there were relatively few sections where a direct percentage of participant giving a specific response could be presented. Much of the findings discussed within this chapter are derived from the consistent themes emanating from a variety of stories conveyed by participants and in-depth discussions that collectively support the conclusions reached. Patton (2001), Walter (2010) and Khalil, Ismail and others (2008) assert that this is a valid and vital process in gaining an understanding of the motivations behind decisions made and the consequences of actions, the competencies of those involved and can aluminate the processes in ways that cannot be obtained through specific data responses to defined questions.

Some interviews lasted for over several hours in total over numerous sessions, due to the depth of inquiry taking place. They were voice recorded for the purposes of later transcription, coding and analysis. The line of enquiry within interviews involving these in-depth discussions mostly did not allow for a concise tablature of responses. Instead, percentage responses to specific questions (such as identifying the predominant extension model used within the country) have been provided. These fundamental statements then become the foundation for the many reasons and motivations brought out in the open ended discussions that are integral to these extension approaches being applied. The understanding gained through these probing discussions provide the key insights as to what strategies should be pursued for these countries to embrace a more participatory approach to agricultural development, and to answer the key research questions within this study.

Silverman (2001) discusses the use of open ended questions and the possibility of interviewers, who are well familiar with the field of reference, unduly directing the conversation. However, he also states that there can be great advantage of the knowledgeable interviewer being able to bring far more critical information leading to fuller and deeper comprehension through more insightful questioning due to their intimate understandings of the issues. In this study, the researcher's 20 year experience actively involved in agricultural development programs using participatory extension methodology was viewed as a positive influence in drawing out key information from participants. This led to a greater exploration of the relationships between stakeholders, the motivations involved and the recognition of key success factors or barriers to adoption. The keys to maintaining neutrality within interviews is to avoid one's own opinions influencing the interviewee, and to refrain from direct or overt affiliation with (or disaffiliation from) their expressed

statements (Rapley 2001). Capturing actual examples of experiences encountered was important to avoid the interviewer unduly influencing responses and interviewees giving answers they thought they were expected to give. This added significant richness to the findings and allowed for a more accurate interpretation of results.

Creating discussion with semi-structured interviews allows a researcher the ability to apply the creative activity of theory building that is found through their good observational work (Silverman, 2001). Gaining rapport with foreign workers and encouraging them to open up about their own experiences often required positive identification with what they were trying to achieve or the difficulties they were experiencing, from one agricultural professional to another. This proved vital in being able to achieve a rich picture of their stories from which to gain interview data that more fully conveyed the actual agricultural extension issues within their countries. The interview style necessary for this research was more active and interactive (co-operative and self-disclosing), rather than attempting to be completely passive and neutral.

Patton (2001) discussed many of the complexities involved with cross cultural interviewing, including the possibilities for misunderstandings to take place. Care must be taken with actively listening and seeking clarification where clarity is lacking or where evidence or motivations are unclear. The translators used in this study were generally involved in the agricultural training courses and became very familiar with the agricultural technical, social and cultural issues at hand, which allowed for them to provide clear explanations without contaminating the interviewee's actual responses. On occasion there were other workers present who could speak English, or the interviewees had some understanding of English, which also helped ensure the accuracy of the translation. There were some cultural matters that needed to be understood in questioning, such as the difficulties for some subordinates to talk candidly about superiors, or in asking higher ranking leaders questions about which they may not have known the answers, but feel they must positively respond. Any such issues were able to be quickly rectified due to the good relationships built with the participants involved. Undertaking interviews at a time when both countries had recently undergone release from dominating authoritarian regimes appeared to result in workers speaking more freely about the past (at times with strong criticism) and present conditions and approaches. Patton (2001) highlights that ethnographic interviewing is better grounded in longer term relationships and in-depth participant observations, and was certainly evident in data gathering activities within this study where many participants were engaged and observed over a period of time.

Three versions of interview data are described by Silverman (2001) and each are utilised within this study. Firstly, there were small aspects of "Positivism", which focuses on gaining facts about behaviour and attitudes using more random samples, standard questions as tabulations. All interviewees were asked specifically about their positions or roles, as well as shown diagrams of different extension models for them to select which most represented

their practices. This information was used directly to tabulate factual percentages of people operating under which methods of extension. However, the majority of data falls under the heading of "Emotionalism" which gains data of authentic experiences, using unstructured and open ended interviews. For emotionalists, the interviewers seek to formulate questions and provide an atmosphere that is conducive to open and undistorted communication (Holstein and Gubrium 1997). This requires gaining rapport with the participants to actually avoid manipulating them. This may involve the interviewers telling some of their own stories to the respondent in a way that will encourage deeper engagement with them, which happened on occasion in this study.

The third version is described as "Constructionism" where the data is mutually constructed and any interview is actually treated as a topic for analysis in itself. Rapley (2001) argues that interviews are inherently social encounters, dependent on many local interactional contingencies in which each participant draw from, and co-constructs the broader social norms. In open ended semi-structured interviews it is virtually impossible for the interviewer to be both facilitative and neutral, as espoused by purely passive interview techniques. The interviewer will generally control the trajectory of the discussion, which is appropriate, and will always be influenced by their own understandings and experiences. The data obtained is highly dependent on, and emerges from this specific interaction, and data must be analysed with this in mind. Rapley shows that much of the richness of understanding of the topic, the motivation and the interactions can be easily missed or misunderstood when researchers only focus on the responses given, rather than the interactive context in which they are given and the way they are communicated. The art of interviewing is therefore very important using social interaction skills that will lead to the best results.

In the case of the Egyptian or Iraqi agricultural workers, the interviewer would often use questioning for clarification and reflection, or describe his own experiences in the subject matter to help set context to the question or convey understanding. There were also times of showing empathy as the interviewer reflected how they may have felt or responded if faced with similar circumstances to the participant's situation, to better understand things from their point of view. This was found to greatly improve the level of trust, willingness to share and depth of engagement throughout the interview process. This provided greater insight, leading to clearer analysis toward answering research questions, when compared to the responses gained from the same questions conveyed as a written survey response.

Cooksey (2011) reasoned that hearing and understanding stories that are actual experiences of all stakeholders, is vital in assessing the needs, directions and opportunities for AIS. If questions are only asked of research and development organisations, who operate from a particular world view, the much of the important "out-of-house" story telling will be missed. In complex situations "juxtaposing in-house and out-of-house stories provides a co-evolving emergent pathway for innovation" (p383). While fewer in number, the interviews conducted with farmers within this study, along with discussions had with non-government project

associates, were shown to provide key insights that helped reveal many key deficiencies in the application of participatory processes within the government advisory services that were able to be further discussed and explored.

Patton (2001) asserts that it is good to use direct quotations about experiences, opinions, feelings and knowledge in qualitative interviewing and analysis. The key interview and survey questions regarding extension issues used in this study were mainly open-ended, rather than fixed, closed, quantitative questions. They have captured many stories to find out what has happened in each country, in terms of extension and agricultural development, timings of events and who was involved, as well as the consequences flowing from these actions. Patton emphasises the key to using stories in analysis is that they generate findings that are useful, which means they must be clearly aligned to the purpose of the enquiry. Patton states that storytelling is valid, as stories explain what has happened and what the consequences were of those happenings. They are useful to the extent that they aluminate the processes and outcomes of programs of those participants were involved in.

Walter (2010) emphasised that for narrative analysis of stories and life histories it is important that the focus is not so much on gaining factual truths about the social situation, but rather on understanding the peoples' interpretation of the events. It is important for the interviewer to still facilitate conversation to establish what was done (the act), when or where it happened (the scene), who did it (the agent), how it was done (agency) and why (purpose). These critical questions became central to the open interview style used within this study.

Khalil and others (2008) stated that when analysing extension systems one should not just focus on the structure of the system or the models being used, but also on the competencies and attitudes of the extension workers and in this case their leadership qualities. While this study is qualitative and, therefore, has no formalised statistical survey analysis of extension agents, much evidence was gathered that reflected their competencies as agricultural workers through the responses given and stories told through the interview process.

3.4.3 Complexity and Soft Systems Methodology

Traditionally agricultural extension models have been based on the premise that pathways to change are relatively simple and linear. A need is perceived, research is conducted, the resulting technology is demonstrated with leading farmers which is observed by other farmers and reproduced, leading to widespread adoption, with extension workers facilitating this process. In contrast to this, Maguire (2011) defines complex systems as featuring many different elements that are richly influencing and impacting one another in non-linear ways. This is clearly more reflective of the task of modernising agricultural innovation and development in Middle Eastern countries which includes many varied stakeholders including farmers, families, suppliers, marketers, government officials as well as the impacts of regulations, available resources, population, poverty, education levels, information accessibility, water availability, transport, infrastructure and political uncertainty.

To achieve change in complex systems, Checkland and Poulter (2010), Leeuwis (2004) and Cooksey (2011) discuss the value of using a Soft Systems Methodology (SSM) approach to gain a more effective rich picture of situations and the many and varied relationships between all the stakeholders involved. It works on the theory that they all have a role to play in solving the problems, but will only operate effectively from the perspectives of their own world view, rather than having to submit, survive or try and work with what is imposed upon from authorities with vastly different world views or core values. Vital to the SSM process is the need to gain the key stakeholders' perspectives of the problems and potential solutions to the given issues at hand, if effective shared resolutions are to be found and implemented, that will empower people to act positively and interactively for better AIS outcomes.

The research herein focusses on the unique perspectives of agricultural workers, such as extension agents, researchers, regional government leaders, policy makers and farmers who are involved at the coalface of the agricultural development systems in these countries. This key group of stakeholders have been directly involved in the programs that governments are attempting to implement to affect change. However, many have little influence on what is being driven from above and how programs could be made more effective, or improve engagement with farmers to meet their actual needs that may go well beyond the provision of technical information. Although wider stakeholder interviews could not be included within the scope of this study, the participants' stories that were collected describing the problems experienced and potential solutions to issues has gone a long way to gathering a rich picture of current situations and challenges ahead. Applying these aspects of SSM has been a key process in the analysis of their agricultural advisory services within the conceptual framework.

3.4.4 Coding and the use of QSR-NVivo for data analysis

Interviews and surveys were analysed using the computer based QSR-NVivo program for coding. Coding data is a way of formally representing data within analytical thinking (Tashakkori and Teddlie 2003). Categories and themes are developed and carefully marked across the relevant research data using the codes, which may be in the form of key words, colours or numbers. This then allows groups of data to be more easily compared and analysed, that will assist in informing and answering the key research questions.

The coding of data and further analysis of results in qualitative research is greatly aided by the use of computer assisted qualitative data analysis. Walter (2010 pp416-417) discusses the advantages of using computer based models for managing and organising large amounts of qualitative data. The NVivo program is specifically mentioned as excellent tool for sorting data from which to make informed analysis. The interview data gathered from this thesis was first transposed into the program while listening to the individual recordings. As many of the interviews involved an Arabic translator, the transposition was condensed into the English sections of the recordings. The transcripts were then coded using the program, to assist in the grouping of data into the main themes of the research. Some manual coding was also used where it was most efficient and convenient. There were some complexities experienced

with language and cultural understanding issues, and some interviews were very in-depth and requiring much clarification of meaning to assist in conveying the true intent of the answers given. By studying this data closely through the coding process, the researcher has been able to accurately analyse the relationships between the coded categories and themes.

QSR-NVivo has been widely used in many projects for the development of qualitative data analysis. Hutchison and others (2010) describe the key characteristics as:

- having an interactive process of data collection and analysis;
- sampling aimed at theory generation, as a direct function of the research question;
- creating analytical codes and categories from the data itself, covering a wide range of observations;
- advancing theoretical development throughout, which may utilise a range of techniques;
- making systematic comparisons, establishing analytical distinctions through identifying variations in the data patterns; and
- theoretical density, showing evidence that depth of observations presented can justify the presentation of the theory, including evidence of theoretical saturation, or where new data reveals no new theoretical insights.

The authors go on to discuss examples where QSR-NVivo has been successful in facilitating research in many of these six key areas. They conclude that QSR-NVivo is a powerful tool if used well in qualitative research to assist with the design and sampling procedures, the analysis of data, the development of theories and the final presentation of data.

Other advantages of using QSR-NVivo is in the use of its search function of words or phrases that can easily be used to easily and quickly to recognise new emerging themes that may not have been previously coded (Welsh 2002), particularly where large sets of data are involved. Welsh concludes that QSR-NVivo can definitely improve the rigor of the analysis process through more fully validating the researchers understanding of the data. Walter (2010) stated that computer programs provide a useful research tool to assist in the management of data, but should not be seen as more than this.

The QSR-NVivo program was used within this research for the storage, sorting and linking of recorded interviews, transcripts, visual images, web pages and articles. It enabled the creation of the analytical codes and categories generated initially from the research questions around extension models and usage, but then out of the discussion data itself, exploring the key relationships and activities involved. It was also used to help the theoretical development and direct comparison of responses to key questions of participants as to their understandings of, and experiences with agricultural extension. In many key areas this data analysis did suggest that theoretical saturations had been reached, due to the consistency of participant responses.

The nodes that were used to analyse the data focused on the key aspects of extension methodology, such as:

- communication and flows of information between policy makers, researchers, government field workers and farmers;
- relationships, issues of trust, caution, uncertainty, superiority, fear or disrespect between the various stakeholders involved;
- barriers to participatory approaches or key success factors;
- government policies;
- the role of extension workers;
- workers understanding of agricultural extension and how it should be achieved; and
- availability of resources.

Analysing these groups of responses gave a clear indication as to the main extension models that were being undertaken, how they were being applied and what essentially were the driving forces behind them. While the extension activities in both countries were generally built around top down technology transfer models, there were some examples of more participatory approaches and sufficient exposure to AKIS thinking amongst those participating in the research to be able to make adequate assessment of the implications for these approaches being attempted within these countries.

The coding of data sought to categorise not only the extension methods being used, but also the motivations behind the activities, and the reasons why they were successful or unsuccessful. This is described as "implicit coding" (Sproule and Walter 2010) and requires a framework to be used that defines the codes conceptually. The open ended questions and probing nature of these semi-structured interviews resulted in a great deal of storytelling and understandings of deeper issues and motivations involved. Issues of social connectivity and trust between all stakeholders is key to the success of participatory extension methods, and the depth of coding as well as the links between interview responses has been a key part of this data analysis.

3.4.5 Interpretive Data Collection and Participant Observation

In social research, *direct observation* and *participant observation* are important tools described within interpretive research that can greatly complement and augment the knowledge gained through interviews (Bhattacherjee 2012). *Direct observation* means the enquirer is a neutral or passive external observer. *Participant observation* allows for investigator interaction, even when their mere presence may actively influence the phenomenon being studied. In these cases the role of the researcher must be made clear during data analysis. In this study the author was more often a *participant observer*, in that he was an active participant in much of the training programs and agricultural project management and evaluation involving the majority of contributing participants.

Walter (2010) states that when analysing quantitative data, memos and field notes of observational data become very important in documenting the process, in developing a reflexive approach to research and providing useful analytical information. This provides a connectivity between experiences being encountered, interview data collected and broader ideas. The author made many field notes and brief observational recordings when in the field or engaging with participants, which have contributed to the rich picture of data gathered for analysis. These observations included:

- participant engagement within training sessions;
- group and individual responses to planning and activating participatory approaches to projects and tasks;
- the interactions of participant with farmers and higher ranking officials during field visits and meetings;
- discussions with both Middle Eastern participants and Australian co-project workers trying to work though barriers and opportunities to achieve desired outcomes; and
- how various groups interacted and co-operated within their cultural parameters.

Patton (2001) emphasises that when using observational methods for scientific enquiry the observer must learn to pay attention in both hearing and seeing what is happening, write descriptively and use discipline in recording field notes. The researcher must move from a level of just looking ordinarily at a situation, to the rigor of systematic seeing. Patton states that there are many strengths in using direct, personal contact with observational field work, rather than just relying on interviews, because the enquirer can:

1. better understand and capture the context within which the participants are acting, which is essential for gaining a holistic perspective;
2. gain firsthand experience, allowing a more open, discovery oriented inductive process, that is less influenced by pre-conceived ideas from less accurate written sources or reports;
3. see things that may have escaped the awareness of the subjects involved because it is part of their routine activities, and may discern critical elements that no-one else has ever paid attention to;
4. have the opportunity to learn things that people would be unwilling to discuss within a recorded interview setting due to culture or other sensitivities;
5. can move beyond the selective perceptions of interviewees, as they see them operating; and,
6. carefully draw from their own personal knowledge, experience, reflection and introspection to for impressions and analyse events as they unfold.

The observational field work and project evaluation applied within this study found all six of these factors to be important in analysis of the agricultural advisory approaches within Iraq and Egypt.

3.4.6 Mixed Methods and the Triangulation of Data

A range of sampling strategies must be selected that fit the purpose of the research, the available resources, the questions being asked and the constraints involved. Patton (2001) states that the use of information rich case studies can reveal a great deal about matters of importance, alongside participant interviews and literature review. Using different approaches are not mutually exclusive, but complimentary. While they can result in very similar findings and outcomes, they can also add great richness to the larger picture and capture different realities that may not become evident within a single data gathering approach.

Triangulation of data sources, as advocated by McMurray (2006) has been achieved within this study, represented by:

1. Direct interviews, surveys and group discussions with participants;
2. Participant observation as they pursued activities central to this research; and
3. Analysing this data against key literature describing the Iraqi and Egyptian agricultural systems, Middle Eastern culture and core texts describing standards and recommendations of modern extension methods.

This has provided information about the governance structures, capacity, management and methods of each case study country's advisory services, and how they fit within the contextual framework of Birner and others (2009) and has greatly strengthened the findings and conclusions of this study.

Faure and others (2011) applied similar triangulation of data combining interviews, project evaluation, and literature sources to characterise these framework components of Benin and Burkina Faso's advisory services. In Malawi, Chowa and others (2013) also used focus group discussion, key informant interviews and non-participant observation to enable triangulation data to strengthen the validity of their assessment of its advisory service.

Within this study, triangulation of approaches to data gathering and analysis proved to be important for gaining a more in-depth understanding around the research question of whether participatory extension methods and AIS can be successfully applied within the Middle East for improved agricultural development. Examples of this include:

- When interviewing many government agricultural workers, due to cultural reasons or departmental pressures, the interviewees would naturally tend towards responses that would show them in good light, or be the answers that they thought were expected of them. The open question design also allowed for the in-depth enquiry and discussion. Observation of many of participant groups designing and implementing participatory extension and rural development initiatives, along with project presentations also gave significant insight as to how well they were able to break from traditional methods and embrace participatory extension principles with the pluralistic approaches of AIS;

- The evaluation of the "On the Ground" project work in Iraq uncovered many of the logistical barriers to applying participatory approaches that were not clearly recognised or defined within the participant interview process; and
- The review of existing and historical literature surrounding the national and provincial agricultural development strategic plans, government departmental structures, project reports, extension worker training, NGO funding, etc. was also used to provide context to current activities, priorities and difficulties in attempting to apply participatory extension approaches. It became very clear through the interview process that there is often a large disconnect between statements and ideals of the strategic plans compared with realities happening at the "coalface".

3.4.7 Sample Size

Patton (2001) states that there are no rules for sample size in qualitative inquiry. It will depend on what the researcher wants to know and the purpose of the inquiry, what is useful and has credibility and what resources and time are available. There is often a trade-off between depth and breadth. Patton goes on to argue that the richness of the cases selected and the observational and analytical capabilities of the researcher are more critical to ensuring the validity, significance and insights generated from qualitative inquiry, than the actual sample size. In the past social researchers spoke of determining adequate sample size by reaching the point of theoretical saturation, which is defined as the point at which any further sampling will likely provide negligible additional understanding. Tashakkori and Teddlie (2003) subsequently suggested that is better to consider theoretical sufficiency, by ensuring that the categories being investigated are adequately represented and described by the data. This is because we can never know all there is to know, and there is never one complete truth.

In their study into transforming the public extension agency to strengthen innovation in Bangladesh, Chowdhury and others (2013) used a targeted case study approach to represent the overall stakeholder group. The enquiry employed a case study method that used a flexible approach for empirical inquiry involving in-depth investigation of examples representing the key extension issues within its real-life context. This is an example of how the research did not need to be exhaustive or reach a complete level of saturation to still provide excellent insights and recommendations to the situation within that countries agricultural advisory system.

Within this research, it was not possible to study every Middle Eastern country in detail, and within the two focus countries there was only limited access to available participants who were directly involved in agricultural extension activities. Despite this, it is likely that the purposeful sampling described involving 96 agricultural industry representatives, plus the triangulation of data through interviews, surveys, participant observation and evaluation of "on the ground" participatory extension project development and case studies, along with review of relevant existing literature including national and provincial strategic plans for

agriculture, has reached the required level for theoretical sufficiency. While engaging with wide ranging locations, people, situations, events and stories, there were many consistent results and findings to adequately describe the barriers within these Middle Eastern countries to successfully apply participatory extension methodology and AIS to agricultural development, as well as the challenges that lie ahead.

3.4.8 Examples of Research applying similar methodologies

Faure and others (2011) use the same conceptual framework as Birner and others (2009) as a basis for systematically evaluating the agricultural Advisory Services to family farms in West Africa to analyse two Advisory Services approaches. They were able to explore the relationships between famers, the agricultural suppliers as well as all the organisations involved in the planning, evaluation, and financing mechanisms of the advisory services, by conducting many interviews with individuals and focus groups (producers, advisors, managers of service provider, and representatives of producers' organisation). They focused on four interlinked components key to the function of Advisory Services, being *governance* of the Advisory Services, *financing* mechanisms, *skills and qualifications* of the advisors and managers of service providers, and finally *methods by which the advice is provided*, characterised by the relationships between advisors and farmers. From these interviews and literature reviews they were able to characterise the main components and the interactions to then go back to the stakeholders to discuss results and recommendations to help overcome the constraints within the present advisory systems. Their study was able to demonstrate that the characteristics of an advisory services depend on the context, including the policy environment, the main organisations in place, the farming systems involved and access to markets as well as other community aspects. The study herein explores many for the same relationships, structures and contextual factors, mainly from the perspectives of the agricultural workers, but also including input from policy makers and farmers.

In a study into NGOs, pluralism and advisory services in Timor Leste, Kelly (2013) also used the qualitative research methodology of semi-structured interviews with key personnel in the NGO sector, focusing on agricultural production systems. Interviews were conducted with international NGO staff and national workers to ascertain how organisations engage with communities, their objectives, inputs, coverage and impacts. The research also used the Birner, Davis and others (2009) framework for their analysis in understanding the key interactions between stakeholders, from which to make recommendations.

Faure and others (2013) used a modified version of the same framework to assess project funded advisory systems in Madagascar, aimed at fostering learning processes for sustainable changes at farm level. They focused on assessing the governance, the extension methods and the capacity of the key advising bodies to be able to deliver. The study used was mainly based on surveys, participant observation as well as analysis of the structures involved.

Table 3-5 Studies utilising the Birner and others (2009) conceptual framework for analysing agricultural advisory services.

Author/ Year	Countries	Framework areas targeted	Stakeholders studied	Methods of inquiry	Key area of focus
Birner et al; 2009	Unspecified	A-D E-H I-K	Government departments, advisors, producer organisations, farmers, communities	Organisational theory, Longitudinal assessment, Expert and key informant interviews	Governance structures, capacity, management, Advisory methods, Actual change at farmhouse level
Faure et al; 2011	Benin, Burkina Faso	A-D E-H I-K	Farmers, Advisors, Advisory Service Managers, Producer organisations	Interviews of individuals and focus groups	Advisory methods, stakeholder relationships, education levels, funding
Kelly; 2013	Timor Leste	A-D E-H I-K	Local, national and inter-national NGO personnel,	Semi structured interviews with key informants	Community engagement, objectives, coverage, impacts
Faure et al; 2013	Madagascar	A-D E-H I-K	Farmers, Advisors, Advisory Service Managers, Producer organisations	Interviews of individuals and focus groups	Governance and funding mechanisms, Advisory methods, Capacity of those involved to deliver
This Study	Egypt and Iraq	A-D E-H I-K	Advisors, Researchers, Government program managers, Farmers	Semi-structured interview of key informants, facilitated group discussions and participant observation	Advisory methods, Relationships between stakeholders, Governance structures Capacity of those involved to deliver

Table 3-1 shows a summary of these various studies that have been conducted based on the Birner, Davis and others (2009) framework. Each study used similar research techniques, particularly in regard to key informant interviews and survey, literature review, participant observation and group interactions. While a variety of methods were used to better focus on different aspects of the overall framework to suit the particular situation and aims of each study, it is clear that the stories told by participants were used to inform aspects of the whole framework. This provides comparative justification for this study to use the same conceptual framework as a basis for this research.

While not specifically using this framework, a similar strategy of using mixed methods of semi structured interviews, surveys and participant observations of key stakeholders was used by Chowa and others (2013) in their assessment of the pluralistic agricultural extension methodology in Malawi. Based on their data they were able to clearly argue that the extension systems needed to be more demand driven to meet the diverse needs of the smallholder farms, rather than based on the traditional supply driven Training and Visit scheme "top down" methodologies. They were also able to identify significant areas of market failure that presented barriers to the support for improved agricultural development.

3.5 Limitations of this research

This research focusses on data collected from a representative group of agricultural workers within a specific but significant time period. Each country was engaged in high levels of unrest and this along with the authors distance and restricted access to people and places meant that access to wider sources of information was limited.

This research was able to focus on the government advisory services and farm households to a lesser extent, within the theoretical framework used, while most of the contextual factors were derived from literary sources. Far greater resources would be required to complete a more comprehensive analysis of Iraq and Egypt's agricultural development strategies and abilities to embrace AIS.

3.6 Summary

This study has used mixed methods of social research to explore both the barriers and opportunities for utilising participatory extension within AIS approaches to improve agricultural development in Middle Eastern countries, along with a review of existing literature. This chapter has both detailed and justified data gathering processes, the theoretical framework that has been utilised within this scientific enquiry, as well as the processes of data analysis applied.

The mixed methods of enquiry included semi-structured interviews, surveys, facilitated group discussions, participant observation and reviews of current literature, creating a depth of discussion from many key stakeholder perspectives, including government extension agents,

researchers, departmental managers, policy makers and farmers. The methodology has been critical in constructing the rich picture of the Egyptian and Iraqi agricultural development process, with the main focus on government agricultural workers directly involved in research and extension. The data gathered provided their unique perspective on key areas of government structures, capacity, management, advisory methods and performance. Through the interviews and various project activity observations the researcher gained understanding of important contextual factors of the government policy environments, the capacity of potential service providers and partners, the production systems and market access, as well as many other community and cultural influences. This led to many insightful disclosures about the overall impacts of the current agricultural advisory service activities.

Much of the social research was achieved as the author engaged in numerous international projects and extension training exercises for multiple groups of agricultural research scientists, extension workers, government officials and farmers from both Egypt and Iraq. The author has also explained the appropriateness and advantages of being an active participant within the collection of interview data as well as observational research and interpretation. This has been important in increasing both depth and insight into the analysis of agricultural extension approaches being used.

While there is diversity in government structures, specific extension histories and strategies used between these two Middle Eastern countries, this applied research sort to identify consistent factors impacting their abilities to engage participatory methods and AIS strategies, which would provide key insights into the recommendations for the modernisation of agricultural extension across the region.

While it was not within the resources or capacity of this research to provide a more comprehensive analysis of each country's agricultural advisory services, the depth of interview discussion and observation of a wide group of stakeholders and the triangulation of data gathering techniques has added a great deal of weight to the veracity of the findings. While this study has mainly focused on the agricultural workers perspective, the mixed methods used in content analysis of the data gathered has provided key insights into where weaknesses within this framework have contributed to breakdowns in achieving participatory extension, and what key factors will need to change for these countries to engage in more successful agricultural innovation systems.

4 Context of the Middle East, identity and cultural issues relating to agricultural innovation and participatory extension.

4.1 Introduction

This chapter seeks to define the parameters of this study within the Middle East region by examining the history and formation and modern definition of the term "Middle East". It studies the common cultural attributes and attitudes found across Middle Eastern countries, particularly of those characteristics that may impact on their ability to embrace and engage in participatory extension practice and agricultural innovation systems (AIS).

The chapter then specifically focuses on the relevant history and status of the two case study nations of Iraq and Egypt, to better understand the context to their development in agricultural extension, and the challenges involved. It establishes why Iraq and Egypt are worthy national case studies to represent the agricultural extension issues within the Middle East.

Many traits within the two case study countries of Iraq and Egypt that affect its agricultural development are identified, which appear to be consistent across the Middle Eastern region. However, there are also many clear factors attributable to the specific countries history, geography and political situations that add to the depth and diversity of the issues at hand.

This overview sets the scene for the following chapters that describe the results and conclusions of the research conducted in the two case study countries of Iraq and Egypt. It also lays the foundation of cultural, religious and political traits that are established within the Middle East that are then highlighted within the case study research, leading into the concluding chapters that seek to answer to key research question of "can participatory extension principles within AIS be successfully applied throughout the Middle East?"

4.2 Historical context to the term "Middle East"

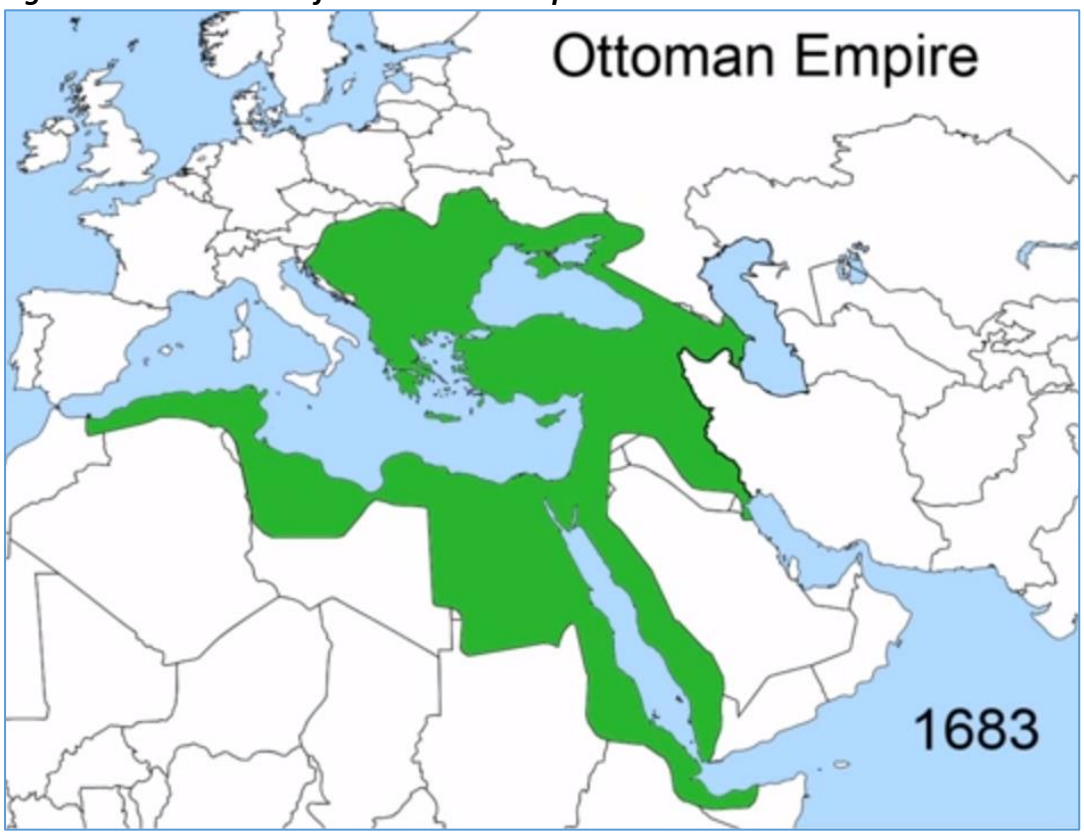
It is important to set the historical context of what we now term the Middle East region, since this has a significant bearing on many of the entrenched cultural and societal values that impact on the approaches countries within the region take towards agricultural extension.

Since the times of the Crusades the term East was associated with Islam, and the West identified with Christianity (Özalp 2011). This was more based on a Eurocentric view of the culture and religion, rather than specific geographic borders. While comprising of many differing people groups, the region was generally seen as a whole by Europe. Over time, Europeans began using the term 'Orient' for identifying a wide range of Arabic speaking countries, as well as Turkey, Iran, India and China, even into the 19th century.

The expansion of the Ottoman Empire was from the Turkish and Balkan region mainly during the 16th century (Goodwin 2011), spreading throughout the Mediterranean to northern Africa, the Horn of Africa, parts of the Arabic Peninsula and as far east as western Asia (Figure 4-1). This accompanied the spread of Islam as the Ottoman imperial system existed as the power of Muslim control, with many leaders claiming the status as Islamic caliphate (Khoury and Kostiner 1990). There was allowance, however, for the integration of non-Muslim ethnic groups to gain state recognition and protection in the Islamic tradition (İçduygu, Toktas et al. 2008).

Most Europeans considered the Near East to begin at the western Edge of the Ottoman Empire. The spread of Islam through northern Africa following the Mediterranean coastline with the Ottoman Empire also led to many of these countries being associated with the East by some. So while the term "Middle East" became a refinement of this larger area (Halliday 2005), it is clear that the religious cultural impact of the former Ottoman empire has been influential in what is now considered the Modern Middle East.

Figure 4-1. The extent of the Ottoman Empire in 1683



(Source: https://youtu.be/KuwanQyGKHw?t=36 and *closely aligned to 1683 Ottoman Empire territory as shown in Agoston and Masters (2009, p xxxi).*

With the expansion of Western Imperialism in the 19th century, many of these lands, countries and tribes became governed and defined by European nations. By the end of the 19th century, more specific terms like Near East (centred on Turkey and the Balkan region), Middle East

(centred on India) and Far East (centred on China, through to Japan, Malaysia and Indonesia) began to emerge (Davidson 1960).

The First World War essentially saw the end of the Ottoman Empire and the birth of the modern State of Turkey. The term Near East began to fade. Reference to the Middle East began to change leading up to the Second World War when the British commissioned Middle East Air Command (based in Cairo) was charged with protecting Egypt, Sudan and Kenya, and then Palestine, Trans-Jordan, Iraq, Aden and Malta, followed then by Cyprus and the Persian Gulf. By 1942, under extreme military pressure from the Nazis, the Middle East Command was stretched to dealing with Ethiopia, the Somali-lands and Eritrea, Libya, Greece and Crete, Iraq and Iran. While the areas of fighting fluctuated, inevitably the whole region was both officially and popularly referred to as the Middle East (Davidson 1960).

After the Second World War there continued much debate within the British and American Parliaments, the newly formed United Nations, Geographical Societies and others as to how the Middle East could be accurately geographically defined. Some would associate it directly with the area of the Ottoman Empire, while others with the Arab speaking world, or even over a large portion of the Islamic world, from Morocco in the west to Pakistan and Russian Turkistan to the east. It was suggested that the Middle East was more of a psychological or a cultural area, rather than a geographical area. While some groups tried to re-establish it as centring around Turkey and the Balkans, in 1946 the Royal Geographic Society stated that the Middle East at least comprised of the area of Egypt, Palestine, Cyrenaica, Syria and Lebanon, Transjordan, Iraq, the Arabian Peninsula, and in most cases, Persia and Turkey (Davidson 1960).

The inclusion of many countries in or around the Middle East often became a product of the political issues, agendas and sensitivities at hand. Özalp (2011) presented the following Table 4-1 showing three broad areas within the Middle East (being the Arab East, the Gulf Region and the Arab West), along with the countries that are considered to be either centric or more edge countries to these regions.

Table 4-1. The Middle East and its Parts as Sub-System.

The Arab East (Mashreq)		The Gulf Region (Khaleej)		The Arab West (Maghreb)	
Centric Countries	*Edge Coutries*	*Centric Countries*	*Edge Coutries*	*Centric Countries*	*Edge Coutries*
Egypt	Turkey	Iraq	Bahrein	Algeria	Tunisia
Israel	Cyprus	Iran	Qatar	Morocco	Mauritania
Syria	Sudan	S. Arabia	U.A.E.	Libya	
Jordan	N. Yemen	Kuwait	Umman		
Lebanon	S. Yemen				

(Source: Özalp 2011, p11)

Since the Second World War, many significant events shaped the composition and political tensions throughout the Middle East. In 1948 the creation of the State of Israel resulted in numerous armed conflicts with neighbouring countries over rights to lands of Palestine. The superpower influences of both the USSR and the USA added greatly to regional tensions and alliances between various States, such as the formation and activities of the United Arab Republic (UAR) of Egypt and Syria. Popp (2006) suggests that the "Six Day War" in 1967 between Israel and the UAR resulted in far reaching consequences that continue to affect the strategic setting of Middle Eastern politics to this day, both regionally and internationally.

Throughout the 1970s the oil rich Persian Gulf countries gained worldwide prominence and power (Jones 2012). 1979 saw the removal of the US backed Shah of Iran by the Islamic Revolution of the Ayatollah Khomeini. Iran became a powerful Shia Muslim country supporting, challenging and influencing many Muslim groups throughout the Middle East and beyond. This created huge tensions with the other major regional power of Saudi Arabia, who were essentially Sunni Muslims run by the Royal family (the House of Saud) who did not want to see any revolution or leadership change or loss of control in their country.

Shia or Shi'ite Muslims believe that the Imam (or leader) is a direct descendant from the line of Mohammad and that his authority is infallible because it comes directly from God. They do not recognise the authority of elected Muslim leaders. Sunni Muslims believe that there is no hereditary privileged class of spiritual leaders (Robertson, Al-Khatib et al. 2001). While these are very simplistic definitions of what in reality are very complex and deep divisions in the interpretations of Islamic traditions, Mallat (1988) states that the arguments essentially come down to the legitimacy of Muslim rulers and caliphs, which then interacts with many other social elements and structures, religious patterns and identity. Sunnis make up 85% of Muslims across the world while significant populations of Shia Muslims are mainly found in Iran, Iraq, Yemen, Bahrain, Syria and Lebanon.

Middle East tensions escalated in 1990 when Saddam Hussein's Iraq invaded Kuwait around issues of oil, debt and power. As a result, the United States led coalition began the Gulf War to free Kuwait and defeat the Iraqi military in early 1991. This resulted in many UN sanctions against Iraq and the eventual overthrow of Saddam Hussein in 2003 (Schnepf 2004). The involvement of coalition forces in both Iraq and Afghanistan post the September 11 terrorist attacks on the USA in 2001 has greatly influenced the way in which many Middle Eastern countries view the West. There is a great deal of fear and mistrust of these outside forces, and a strong perception of the United States just wanting to control less powerful countries for their oil reserves (Jones 2012). A great deal of money and resources have been spent in trying to rebuild and establish order and democratic rule within these countries, by the Western powers (mainly the USA), and many mistakes have been made along the way.

The collapse of the Soviet Union in 1991, which had formed northern limits of the Middle East through most of the 20th century, also caused changes in international relations and geographical areas that led to a redefinition of the region. The countries of Azerbaijan,

Kazakhstan, Turkmenistan, Kyrgyzstan, Uzbekistan and Tajikistan all gained independence, and had generally come from having an Islamic cultural tradition from the Central Asian and Caucasus lands. Their ethnic, religious, linguistic and historic background gave them strong association with the Middle East (Lewis 1992).

Turkey has therefore been seen as a key player in what is now described as the Greater Middle East, for both the European Union and America, as a model Islamic nation operating under an economically successful democratic political system, and providing an important influence for the surrounding nations, including the troubled countries of Syria and Iraq. This has led to the addition of a fourth sub-region to the Middle East described as Central Asia, in which Turkey become a centric part, rather than just an edge nation as described in Table 4-1 (Özalp 2011). However, this Turkey's rise in democratic standards, attributed to its inclusion within the European Union, does not necessarily fit easily with many of the other Islamic Middle Eastern countries which have histories of longstanding autocratic leaders.

In recent years the World Bank has linked Arabic states with northern African countries to create the Middle East and North African Region, stretching from Iran and Syria, down to Yemen and across to Algeria and Morocco (World Bank 2018). The FAO have now categorised a region as the Near East and North Africa, with encompasses Middle Eastern countries, but also includes much of the Sahara Desert and across the greater Maghreb region (FAO 2017).

For the purpose of this paper, the Middle East refers mostly to the geographic area of the North African region of Libya and Egypt, through to the more eastern countries of Iraq and Iran, and encompassing Turkey to the north and the Arabian Peninsula to the south. This follows the same line defined and mapped as "the Middle East and North Africa" by Beaumont and others (2016), and often now referred to by the acronym "MENA" (Ncube, Anyanwu et al. 2014).

4.3 Characteristics of Middle Eastern Countries

4.3.1 Religion, Tribalism and Politics

Middle Eastern countries, with the exception of Israel and Lebanon, are characterised by populations that are at least 86% Muslim (Kettani 2010). Islamic culture has family at the centre of society towards family, strongly supporting each other, and with the father or grandfather generally having complete authority over his family and the final word in decision making (Shahin and Wright 2004). While eastern culture tends to support more tribal attitudes within society, Islamic countries are generally ruled by strong, authoritative leaders with tight control over highly centralised governments, including the executive, judiciary, military leaders and police. Monotheism in Islam means Allah is the comprehensive and source of authority. The term "Islam" in Arabic means the act of submission to God and the religion requires accepting a personal responsibility for Godly ideals and standards of action held to have transcendent authority (Hodgson 2009). Muslims do not tend to question

events, but are generally more fatalistic and accept life's uncertainties. This is often reflected in their saying "inshallah" meaning "if Allah wills it".

Historically, pre-Islamic Arabia had a collection of many local religions and attitudes that enforced the unity of local communities and tribes. Religious belief systems provide a focus for social organisation. The shift in Arabia to a universal and monotheistic Islam in the 1400s overriding tribal boundaries and creating an Islamic state led to a centralised public authority, asserting control through violence and fear, starting in Medina and moving on through Mecca (Tibi 1990).

In his book on classical Islam, Hodgson (2009) asserts that early on, Muhammad's new society started including Muslim and non-Muslims, but its strong organisation and envoys sent to preach the Qur'an began to take control, collect money, govern disputes and dispense its justice across regions. They depended on the willingness of a majority to accept the system being offered to keep the peace and as protection against other rivals. However, the establishment of this new governing power and belief system was not always done with the co-operation of the various tribes.

Tibi (1990) states that Muhammad created a commitment to the Islamic *umma* (or single community) that ranked above tribal commitments and boundaries. This paved the way for a new overarching Islamic state structure that, while subduing the existing tribal systems at the time, allowed for many differences and factions between many groups beneath. So from the beginning it was never a completely homogenous community, which is still very evident across the many Islamic countries in the 21st century.

During the expansion of the Ottoman Empire, regional leaders often played a key role in linking the Empire or State hierarchy with the tribes. While local leaders always sought autonomy, this was dependant on the power of the sovereign rulers. The local leaders were often co-opted by accepting payments or rewards for keeping their people under control. It was found that with nomadic people or stronger tribes, it was far easier to use this method of more indirect rule than trying to control them using direct bureaucracy. These confederation leaders could become powerful as their role as legal authorities for the tribes they controlled increased (Khoury and Kostiner 1990).

Post World War 1 and the breakup of the Ottoman Empire, which encompassed much of what we now define as the Middle Eastern region, there are many strong societies, but weak States (Khoury and Kostiner 1990). The Ottoman Empire, while asserting some level of overall control, still functioned by forming alliances with the local traditional communities of the day. This still allowed for some tribal autonomy and local ownership to function. However, much of the Middle Eastern region was not prepared for the new pattern of nation state sovereignty with centralised power over an entire territory, establishing citizenship and demanding national loyalty that came as a result colonial influences following the Ottoman Empire (Khoury and Kostiner 1990). This was due to many countries being artificially created by

outside imperial powers with little appreciation for many traditional and persistent tribal, ethnic and sectarian ties that are the sources for identity and loyalties. As a result, some people groups, such as the Kurds, now find themselves divided into four to five different countries (Syria, Iraq, Iran, Turkey and Armenia), and all experiencing problems as minority groups with little autonomy in any of them.

The Kurds in particular have maintained their identity and autonomy to some extent, despite many threats and impositions. Historically they composed of both sedentary and nomadic tribal units in rugged mountainous terrain that was less attractive to invaders seeking profitable conquests. They were known for their military skills, but their lack of formal political organisation has been a disadvantage as their leaders could only ever persuade their followers, not command them. The Empires that dealt with these types of tribes prior to the imposed Statehood tended to work around them, but still control them in areas of vital interest and periodically engage them in punitive military campaigns, but otherwise generally leave them alone (Khoury and Kostiner 1990).

Some of the controlling States with centralised powerful governments seized land from local and traditional owners and redistribute for their own gains or influence. This tension created between traditional tribalism and State imposed control is a significant factor underpinning much of the mistrust of local farming communities towards the central governments across much of the Middle East.

Tibi (1990) asserts that while the socio-political and economic order Islam created historically (and has developed into most modern Islamic countries) has superseded the pre-Islamic tribal order, it failed to fully impose these structural changes to the strong and tribal associations and commitments. So when such tribalism within Islam is referred to, one must be careful to distinguish between *tribal organisation of society*, which is essentially controlled under the centralised State authorities, and the *tribal attitudes*, which are more about individual and community self-awareness, which is still incredibly strong, particularly within the Arab nations. Tibi states that "Islam remains an urban culture directed against the tribes" (Tibi 1990, p136). But even with the increases in communication, transport, urbanisation and the eroding of much of the smaller village peasant communities, there remains a very strong sense of tribal loyalty, self-awareness and tribal identity.

In discussing the question of whether Islam can be compatible with democracy, Tessler (2002) states that Islam will have strong political implications because it is a religion of laws pertaining to societal organisation as well as individual morality. He suggests that Islam has become even more influential in Arab cultural and political life as many associations and institutions have been campaigning under the banner of "Islam is the solution". Many observers assert that Islam is incompatible with the openness, competition, pluralism and tolerance of diversity required by democracy. Huntington (1991) states that Islam presents clear obstacles to democratisation, as Islamic countries stretching from Morocco to Indonesia

had non-democratic regimes, with the exceptions of Turkey and possibly Pakistan (at that time of writing in 1991).

Alsoudi (2003) suggests many analysts believe that while democratic values need not precede the establishment of Islamic governments, democratic transitions involving the reform of political institutions and procedures can follow, giving examples of Korea and Taiwan. However, Alsoudi goes on to state that "*Unfortunately no Arab ruler is elected in free election or abides by the law, rather their sayings and deeds are the law and they are above the law" (p1509).* He goes on to say that some of these Middle Eastern leaders have appointed themselves for life, while others perform false elections and win them with 99.9% of the votes.

Kedourie (2013) describes how classic Muslim philosophers regarded democracy as a *"low and degraded regime in which the masses, moved by their passions and appetites, sought to exercise unrestrained power" (p2)*. He went on to describe many democratic fundamentals such as popular sovereignty, representation, elections, government regulation by laws established by a parliamentary assembly, independent judiciary, secularity of the state, and society being composed of many self-activated groups, as being profoundly alien to Muslim political traditions. However, with the variety of interpretations of Islamic Law some theologians and Muslim scholars suggest that these democratic principles and progressive innovation are well represented within their religious traditions and are entirely compatible with Islam. They argue that it is more the forces of history and economics that account for the absence of democratic governance in much of the Arab world (Tessler 2002).

Tessler's study of ordinary Islamic citizen attitudes across four Islamic populations, found there was often support for democracy amongst individuals that had very strong religious attachments. Many were deeply discontented with their existing political arrangements and were in favour of changes that would incorporate democratic principles of choice and accountability while still adhering to the Islamic principles of justice and protection for the weak. This suggests that the ordinary Arabs who are more defined by their inherent tribal identity, loyalties and community support, wish for a more democratic expression of Islam in the governance of their daily lives.

Khoury and Kostiner (1990) state that the tribe-state system involves a constant tension. *"As a basis for identity, political allegiance, and behaviour, tribe gives primacy to ties of kinship and patrilineal descent, whereas state insists on the loyalty of all persons to a central authority, whatever their relation to each other" (p68).* They further argue that tribe stresses personal, moral and hereditary factors in status and is within the individual, whereas state is impersonal, external and recognises contract, transaction, and achievement. A key aspect of a tribe is that it is socially homogeneous, egalitarian, and segmentary; as opposed to the state which is heterogeneous, stratified, and hierarchical. While Middle Eastern society warms to the traditions of tribalism, from the state's perspective, a Muslim belongs to a universe which transcends the tribe.

4.3.2 Urbanisation and Population Increases.

Across the world over the last century, growing populations have been becoming increasingly urbanised. This has led to particular impacts in many Middle Eastern countries. In Egypt the urban population has risen from 32% in 1950 to 43% in 2010. In Iraq this change has been even more dramatic, with its urban population rising form 35% in 1950 to 69% in 2010, and Saudi Arabia has changed from 21% in 1950 to 82% in 2010 (World Heath Organisation 2016). The population in Egypt as risen from 56 million in 1990 to 91.5 million in 2015. Egypt has expanding cities but very limited land available for productive irrigated agriculture to sustain this population. Remarkably, Iraq's population was reported at 17.4 million in 1990, and 36.4 million in 2016 which has been greatly influenced by the impacts of military conflicts. The Saudi population has risen from 16.3 million in 1990 to 31.5 million in 2015 which has seen substantial changes since the impact of oil exports from the 1970s (World Health Organisation 2016).

The majority of farmers and graziers across most countries are amongst the poorest of the populations, using relatively primitive farming techniques and equipment on a very small scale, when compared to western farming. It is not surprising that many Iraqi farmers or their children moved to the city for employment, or joined the army to gain regular income, particularly during times of conflict when resources became very limited and poverty grew. All these factors, which can vary greatly between Middle Eastern countries, have a major impact on their abilities to improve their agricultural production and build the capacity of the rural communities.

4.4 The Arab Spring

The Arab Spring uprisings of 2011 resulted in peoples' revolutions in the Middle Eastern countries of Tunisia, Egypt, and Libya causing leadership change. While the reasons for the upheaval and the authorities confronted were very different within each country, there were consistent themes of aging leaders being seen as overseeing corrupt ineffectual governments by their educated, unemployed and disaffected youth (Anderson 2011). While social media played a significant role in mobilising people within each country, the Egyptian revolution came as a result of perceived injustices occurring over many years. According to Aouragh and Alexander (2011) there were initially large concerns over the Egyptian governments responses to the US (and British) invasion of Iraq. This was followed by an explosion of protests calling for constitutional reform in 2004/05, which led up to a march by judges demanding an end to state interference in their role of monitoring elections. There were large strikes in textile factories and other workers protests, and accusations of police brutality and torture which came to a head following the murder of a young internet user. After the Tunisian uprising, Egyptians took to their 23 million broadband internet users and 9 million mobile phone internet users, using Facebook to mobilise their people against the government (Aouragh and Alexander 2011). The subsequent removal of President Mubarak from power led to constitutional change and the eventual quasi military regime change.

In Tunisia, the democratic transition failed, and in Libya tensions remain high with continued political unrest, since the ousting of Colonel Gaddafi. Similarly the Yemini president was removed, but it too has undergone continual political unrest. The Arab Spring continued to impact many other Middle Eastern countries including Jordan and led to civil war and a humanitarian crisis in Syria, but did not results in any immediate changes in government there.

So while the Arab Spring caused remarkable and somewhat unexpected changes to persistent authoritarian regimes within the Middle East, and significant destabilisation of others, it has not generally resulted in transitions to stable democratic governments where the people have increased freedoms and capacities to change their livelihoods. For many countries the situations have deteriorated. History has shown that the pathways to change out of authoritarian regimes are never easy (Bellin 2012).

4.5 Agricultural Development within the two case study countries of Iraq and Egypt.

This study focusses on two important Middle Eastern countries where the author has been directly involved in agricultural project work, allowing for a more in-depth analysis of extension processes from the perspectives of the key stakeholders involved. It is therefore important to set the context of agricultural development within these representative countries, being:

1. Iraq, which is central to the Gulf (or Khaleej) Region of the Middle East, and has clear ethnic and sectarian divisions impacting on societal progress and agricultural development, and,
2. Egypt in the Arab East (or Mashreq) Region, which is seen as one of a group of Middle Eastern countries that has not endured such strong ethnic fragmentation.

Both countries have undergone dramatic changes in longstanding leadership, since the overthrow of Iraqi leader Saddam Hussein in 2003, and the ousting of Egypt's Hosni Mubarak in the Arab Spring uprising of 2010. They are described in terms of their geography, agriculture, political history and developments in agricultural extension support and approaches.

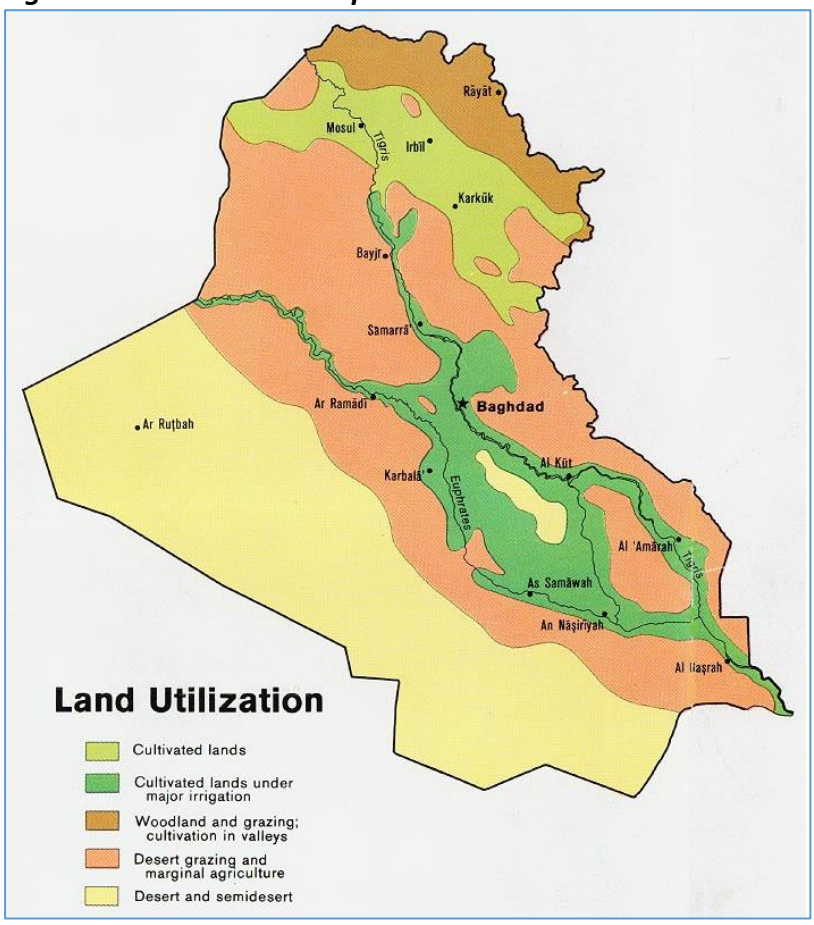
4.5.1 Agricultural Development within Iraq.

The agro-ecological regions of Iraq (Figure 4-2) are made up of:

- Mountainous region to the north with high rainfall (600-1000mm), mainly used for grazing, with limited areas of rain-fed cropping as well as irrigation;
- Northern zone (mainly Kurdish areas) with 300-600mm mainly used for rain-fed cereal cropping which also supports some irrigation and livestock enterprises;

- Irrigated agriculture in the Mesopotamian areas following the Tigris and Euphrates river systems through the centre of the country, which is supported mainly by highly fertile alluvial plains that are becoming increasingly threatened by salinity in downstream areas; and
- Sparsely populated grazing areas south of the Euphrates River have very low rainfall (mainly less than 150mm) and are dominated by the Western and Southern Deserts.

Figure 4-2. Land use in Iraq



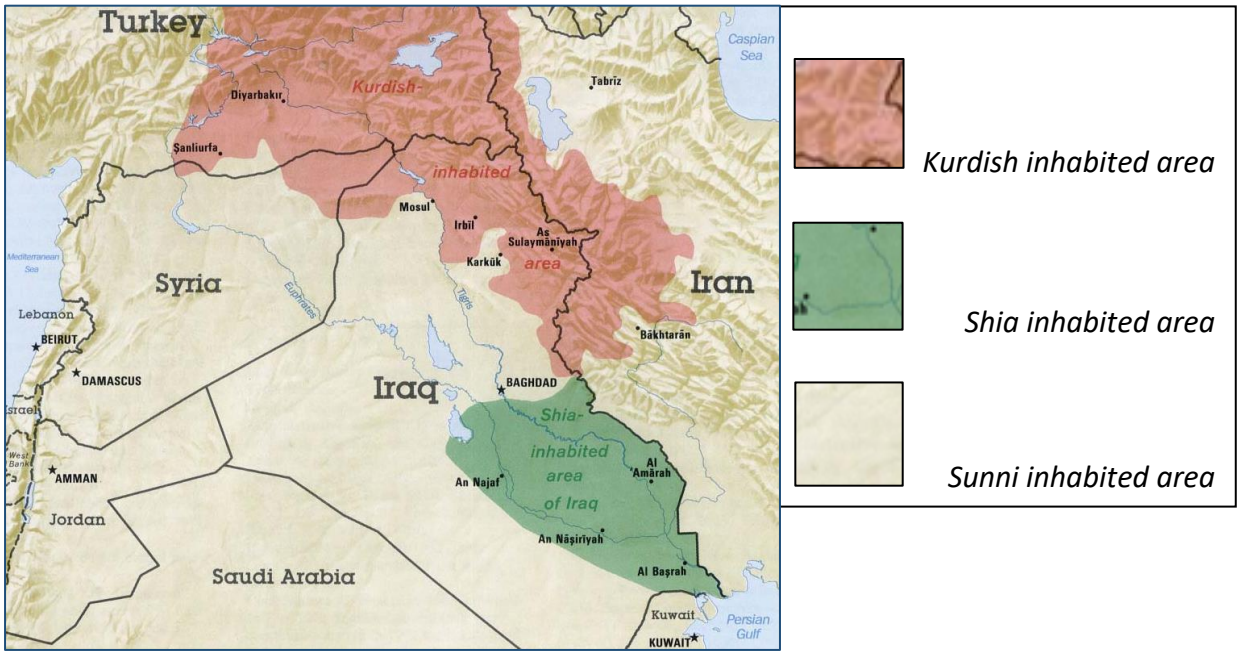
(Source: Omer 2011)

There have always been ethno-sectarian divisions and political decisions at the heart of Iraq's struggles which has also influenced agricultural development. At the end of the First World War the British forced three communities that had nothing in common (the Sunnis, Shias and Kurds) to live together in the same country following a long history of antagonism and hatred. Al-Ali (2014) argues that there is nothing inherent in Iraqi sectarian dynamics that should prevent a sense of nationalism that could move the nation forward. It is rather greed, corruption, personal incompetence, foreign interference and many other factors that have hampered Iraq's development since 2003. The sectarian divisions have been used as a diversion tactic to cover up poor governance. This author suggests that a democratic system could work in Iraq, with functional co-operation between all sects. He believes that most Iraqis favour a secular form of government rather than an ethno-sectarian framework. There

are calls for less religion to be expressed in politics and that Iraq should be governed for all Iraqis. This has not always been the case with previous Iraqi governments.

The unique history of Iraq has strongly influenced the development of its agriculture and attitudes toward extension. Iraq's system of land tenure, inefficient implementation of land reform, and interventionist agricultural policies has led to a perpetuation of low productivity, slow growth in the agricultural sector and a dependence on imports to meet domestic food needs (Schnepf 2004).

Figure 4-3. Traditional sectarian areas of Iraq



(Source: Foundation-Kurdish-Insititute-of-Paris 1992)

The rise in oil prices in the 1970s saw a significant investment in an attempt to modernise Iraqi agriculture, particularly in the irrigated areas. Springborg (1981) reports that there were many ambitious expansive programs introduced that were not well planned or implemented, and generally made little attempts to engage with and modify peasant farming practices. The Iraqi decision-making elite attempted to buy in technologies that often became riddled with problems, but were ignored or swept under the carpet by all levels of management to simply hide any evidence of failure. The Ministry of Agriculture was spending vast sums of money without conducting any pilot projects often resulting in complete disaster, but with no-one assuming responsibility. Attempts at achieving technology transfer were often compromised by these failed projects, or by European project workers fulfilling their specific contracts and then leaving, without adequately passing on the knowledge to the Iraqi people.

When Saddam came to power in 1979 he placed a large emphasis and resources into agricultural investment in irrigation, but little into the rain-fed agricultural zones, as he did not wish to promote success in the mainly Kurdish regions (Schnepf 2004). Saddam considered Kurds as insidious enemies supported by foreign powers, and had brutally dealt

with regional Kurdish rebellion in the mid-1970s as deputy president, and overseen the forced relocation of hundreds of thousands of Kurds (Post 1991).

Saddam encouraged privatisation and much foreign investment, but with poor local support, expertise and infrastructure, investments often struggled. Lavish, extensive government subsidies resulted in the emergence of a system of cronyism and political patronage under the guise of privatisation and capitalism. The Baathist party confiscated much land to the state and leased it back to peasants, or to co-operatives, all under supervision of the state. They highly subsidised farm inputs, such as fuel, seed fertiliser and water, and controlled much of the marketing of produce. Unfortunately the Iran-Iraq war (1980-88) drew resources away from agriculture with extension services greatly diminished, and completely stopped in the Kurdish governorates. Rural labour was brought in from countries such as Egypt as Iraqi farmers were required for military service. With an increasing urban population, Iraq was forced to become a major importer of staple grains, mainly from the USA (Schnepf 2004).

International sanctions applied after the 1991 Gulf War reduced these imports by half. Under the terms of Iraq's military defeat, three northern governorates came under de facto independence, referred to as the Kurdish controlled northern Iraq, with assistance and protection from US European Command, endorsed by the U.N. Security Council. Political tensions between the north and south escalated in 1992 with all food shipments and subsidised fuel cut off by Baghdad. The U.N. increased its humanitarian effort into the Kurdish region to counteract this. However, these international relief efforts eventually reached a scale that suppressed agricultural incentives in the region (Mahdi 1998, Schnepf 2004).

The central government's economic blockage of northern Iraq froze all the assets of the Iraqi banks in the region, paralysing agricultural investment. NGOs and the local black market became the main financiers of agricultural activities. The two main Kurdish factions failed to coordinate their efforts, and in 1996 established two separate areas under each group's control. Iraqi Kurdistan was left as a market economy with a weak governing structure and heavily influenced by the substantial flow of international humanitarian aid (Schnepf 2004). There were many land disputes with the return of Kurdish refugees, finding that their land had been seized by neighbouring tribes or local landholders who had links to the central government. Rival Kurdish parties sought alliances with influential landholders to increase their power and opportunities. Agricultural activity suffered from a lack of fertiliser, pesticides and fuel. While Baghdad still controlled storage points for the *Oil for Food Program* and restricted their flow to the Kurdish north, along with other agricultural commodities, there were no food shortages reported. The outcome of this was that the locally produced food was not in demand, and farmers were often forced to smuggle their produce into Iran to obtain higher prices. This was a disincentive for agricultural development through this period. Leezenberg (2005) reported that misguided policies, protracted conflicts and the international market, as well as oil related enticements and corrupt activities had seriously jeopardised the prospect of achieving self-sufficient agriculture through this period.

The 15 southern governorates remained under centralised control from Baghdad. These sanctions, and the Saddam Hussein government's response, were devastating for the rural sector and the countries food supply. New, very tightly controlled agricultural initiatives were introduced to try and boost food supply, including subsidies for production as well as severe penalties for any lack of compliance. The government monopolised the marketing of all grain and oilseed crops in Iraq and introduced a rationing system of basic foodstuffs. Agricultural productivity began declining in the mid-1990s due to over exploitation and a reduction in available fertiliser, vaccines and support due to budgetary shortfalls, rampant inflation and a rapidly depreciating currency (Schnepf 2004).

The implementation of the oil for food program from the mid-1990s gradually saw more resources begin to flow back into rural development and agricultural extension. However, Alnasrawi (2001) asserts that while the oil-for-food programme provided some relief, it failed to change the underlying conditions of the deteriorating economy. It also had the effect of increasing the government control over the population, because all of the transactions for supplying their most basic needs were channelled through the government. The ongoing culture of governmental control continues to dominate society.

The devastating effects of a decade of war followed by a major air campaign against the country's infrastructure and eight years of severe and comprehensive sanctions should not be underestimated (Mahdi 1998). The diversion of resources to military activities and lost production represent only a section of the accumulated society costs, including the loss of life, physical impairment, breakdown of societal institutions, declining morale, emigration, and all the associated decline of skills and intellectual capabilities.

A severe drought across the middle east region in 1999-2001 had a devastating effect on many Iraqi famers, greatly reducing production, damaging irrigation systems due low water flows and increased sediment, as well as increasing salinisation and land degradation (Schnepf 2004). Fodder shortages and resultant disease decimated the livestock industry.

After the 2003 Iraq War and the removal of the Hussein government, increased stability has allowed for agricultural development to proceed. This opened up much of the country to agricultural investment, particularly in the northern Kurdish areas which was more secure than the south, making international agricultural support feasible. Production has steadily increased, with approximately 4.8 million ha of the 9.6 million arable ha being cropped. The Minister of Agriculture was hoping to announce that Iraq would achieve self-sufficiency by the end of 2015, but unfortunately the incursion of Islamic State occupying much of northern Iraq reduced production by approximately 40% with much of the vital agricultural infrastructure being destroyed (al Hassoun 2015, Glenn 2016, Rosiny 2016).

National strategic plans in the agricultural area stressed the need to increase crop and livestock production in a sustainable way by farming more land to its potential (Iraq Ministry

of Planning 2010). However, apart from providing a few production statistics, the plan provided very little information as to how this would be achieved.

4.5.2 Agricultural Extension Development in Egypt

Egypt experienced political upheaval with the fall of the Mubarak regime in 2010. The increased uncertainty had a significant impact on agricultural sector investment, resourcing, governance and security. Despite these political changes, the long term goal of the Ministry of Agriculture and Land Reclamation (MALR) as outlined in the mission statement of the Sustainable Agricultural Development Strategy Towards 2030, is for "modernising Egyptian agriculture based on achieving food security and improving the livelihood of the rural inhabitants" (ARDC 2009). The challenge for Egypt's public sector involved in research, development and extension services must be to support market competitiveness for commercial agriculture operating in a global market, while at the same time addressing poverty in rural areas. The development strategy makes it clear that achieving this will require a shift in the way agricultural development programs are planned, co-ordinated and managed, both within and across government departments and by engaging with all relevant institutions and rural organisations.

Historically, extension services have been set within a very complex structure essentially involving the ministry or nationally managed Agricultural Research Council, with various research institutes and Subject Matter Specialists providing information and support about new technologies to the many Village Extension Workers (VEWs) managed under the Agricultural Directorates at the Governorate level (Rivera, Elshafie et al. 1997). The role of the VEWs was to take and simplify these technical recommendations for implementation with the farmers in the local villages, convincing farmers to adopt new methods through using persuasive arguments, recommending what could be applied under the local circumstances and taking farmer issues and problems back to the researchers to find solutions. The MALR generally invested heavily in providing answers to solve technical problems, with less energy being directed towards capacity building, support systems for change and meeting farming families' wider needs, and often poor co-ordination and communication between the groups across the agricultural sector (Rivera, Kalim Qamar et al. 2005).

In 1985 the National Agricultural Research Project was established to help boost Egypt's agricultural productivity. However, initially it was so focussed on research that it spent little time on technology transfer and extension. After 3 years, the Technology Transfer Component was added to improve the process of getting the research to the farmers, and to improve the capabilities of the "research and extension system". In 1991 the Agricultural Extension and Rural Development Institute (AERDRI) became responsible for conducting "action studies" for technology transfer. There continued to be lack of communication between researchers, VEWs and farmers and research conducted was often driven by university higher degree study requirements, rather than needs analysis conducted at the farmer level. Hence, much research conducted was not used because it wasn't applicable or

did not meet the needs of the intended clients. The various research institutes lacked staff experienced in social science to conduct interdisciplinary rural development research, which would explain their focus on technical issues rather than the wider social considerations required to create easier pathways for people to embrace change (Honadle 1994).

There was a lack of communication between various components of the Ministry of Agriculture, in the planning, resourcing and dissemination of research initiatives. The AERDRI needed to build stronger partnerships within and outside the Agricultural Research Centre to build on and co-ordinate research, instead of acting in isolation. Poor resourcing was also identified as constraining extension programs through lack of transport for worker to get in to the field, cramped working conditions with poor access to computers and equipment, and administrative delays in reimbursement of travel costs (Honadle 1994).

By the mid-1990s, Egypt's extension system had become a very large, centrally managed bureaucracy that needed to adapt to the new environment of privatisation and market liberalisation (Fleischer, Waibel et al. 2004). Rivera and Elkalla (1997) describe key areas of the Egyptian agricultural extension system that were needing reform. Firstly, there was the lack of extension policy on which to base strategies and a lack of co-ordination both within the MALR (undergoing transition) and other Ministries and related agencies and programs. Secondly, within the MALR, top and middle level staff were said to be poorly qualified and managed and there was a lack of structural clarity between research and extension, with offices poorly resourced to carry out basic tasks. Thirdly, a lack of attention was given to farmers' commercial needs. Realising the need for participatory, farmer oriented approaches the Egyptian government introduced pilot programs with facilitator training based on Asian Farmer Field School techniques, with the support of foreign bi-lateral aid agencies. However, the VEWs found it difficult to embrace the participatory methods involved, and were more focused on lecturing farmers about improved technologies, rather than facilitating interactive discussion, learning and experimentation that would lead farmers to become better decision makers (van de Pol and Awad 2002).

In the early 2000s the public Egyptian agricultural system was still strongly oriented toward scientific disciplines, lacking interdisciplinary exchange among staff, generally using traditional top-down, information driven, technology transfer methods of extension and deficient in addressing farmers actual information needs (Fleischer, Waibel et al. 2002, Rivera, Kalim Qamar et al. 2005). The Egyptian government continued with numerous participatory extension programs, with assistance from bilateral donor agencies to help transform the extension agencies toward capacity building of both extension workers and farmers. There was some evidence of moves toward decentralisation, with agricultural directorates at the governorate level participating in the development of extension plans for local areas. Regional Research and Extension Councils were established to help ensure services were closer to meeting farmer needs and encourage the use of participatory approaches to engage all stakeholders.

Traditionally, agricultural extension models have been based on the premise that pathways to change are relatively simple and linear. A need is perceived, research is conducted, the resulting technology is demonstrated with leading farmers which is observed by other farmers and reproduced, leading to widespread adoption, with extension workers facilitating this process. In contrast to this, Maguire (2011) defines complex systems as featuring many different elements that are richly influencing and impacting one another in non-linear ways. This is clearly more reflective of the task of modernising Egyptian agriculture which includes many varied stakeholders, including farmers, their families, suppliers, marketers, government officials, regulations, available resources, poverty, education levels, information accessibility, water controls, transport and political uncertainty. Maguire goes on to say that interactions in complex systems are typically short range, have positive and negative feedback loops, are not in equilibrium, have histories, and people are often ignorant as to the effects of their behaviour on other stakeholders. To achieve change in complex systems, Checkland and Poulter (2010) expressed the need to gain the perspectives of the problems and solutions of all key stakeholders, if effective shared resolutions are to be found and implemented.

The government agricultural workers are key participants in the process of bringing about agricultural reform in Egypt. Their perceptions of how to best effect change through the way they communicate with farmers, representative groups, communities, other government workers, NGOs and policy makers will greatly impact their capacity to become part of the solution within these complex situations (Leeuwis 2004). In the past there has been little information gathered on the challenges facing these workers, particularly through times of the previous government's cutbacks to resources in extension services, and when any perceived criticism was not tolerated. The current thesis provides key insights as to how well participatory extension principles are being implemented in Egypt, from the perspectives of key government workers within this system.

In 2011 there was a change in the Egyptian government as a result of activities instigated in the Arab Spring. While re-elections initially resulted in the installation of the Muslim Brotherhood, the military coup in 2013 saw the eventual election of the el Sisi government establishing quasi military rule.

4.5.3 Comparisons between the case study countries

The two case study countries of Iraq and Egypt are within the heart of the Middle East, lying within two the three Arabic regions, the Khaleej and Mashreq respectively (Table 4-1). They share geographical and cultural attributes that impact on each country's abilities to apply participatory extension principles to their agricultural development. Both are Islamic countries that were once part of the Ottoman Empire, but have since undergone various forms of colonial administration before becoming the independent countries that we know today. Both have a recent history of being governed by long standing domineering leaders in Saddam Hussein and Hosni Mubarak, who reigns were dramatically ended with significant political upheaval within their countries.

There are also key differences within each country's history, geography and people that greatly influence their approach and capacities to facilitating change. The Iraqis have three distinct sects that shape society and government policy, being the Sunni and Shi'ite Muslims, as well as the Kurds (Figure 4-3). Progress in agricultural extension and rural development has been greatly disadvantaged by their war with Iran, the Gulf War, the Iraq War and the Islamist war in recent years. Egypt has less sectarian issues and military conflicts, but has finite agricultural resources within the Nile Delta, with greatly expanding population challenges. Both countries have experienced greatly diminishing government resources being spent on agricultural extension workers at the district farmer levels over the last 30 years.

Table 4-2. Comparisons of Iraq and Egypt's historical contexts to achieving agricultural reform

Similarities		
Dominant Religion	>86% Muslim	
Population dynamics	Rapid population growth with rapidly increasing urbanisation.	
Agricultural Sectors	High percentage of small scale poorly resourced peasant farmers	
Leadership History	Long periods under autocratic leadership imposing strong government control, followed by dramatic ousting of leaders and associated upheavals to all government programs	
Agricultural Development	Agricultural research, development, extension, resourcing and marketing largely directed and controlled through associated government departments. Large reductions in resourcing of village agricultural extension networks in recent years.	
Differences		
Country	**Iraq**	**Egypt**
Sectarianism	Made up of Shia, Sunni and Kurdish areas, with strong tensions between groups.	Egypt is strongly dominated by Sunni Muslims, with an estimated 10% Christian.
Agricultural Landscape	Large areas of irrigated horticulture, cultivated rain fed agriculture, and dessert grazing with marginal agriculture.	Dominated by irrigation along the Nile river and delta, and limited desert grazing and marginal rain fed agriculture.
Conflict	Dramatic upheaval throughout Iraqi society resulting from the Iraqi Kurdish War (1974-75), the Iran-Iraq War (1980-88), Persian Gulf War (1990-91), Iraq War (2003-2011), the Iraqi Civil War incl. *ISIS* (2014-2017).	Arab Spring uprising in 2010 leading to the removal of President Mubarak, the election of the Muslim Brotherhood, followed by a Military coup resulting in army chief president in 2013.

(Information sourced from Kettani 2010, Brooke 2017, BBC 2018, CIA 2019)

4.6 Conclusions

The term “Middle East” can mean many things to different people in terms of its geography, history, culture and politics. For the purpose of this paper, the Middle East refers mostly to the geographic area of the North African region of Libya and Egypt, through to the more eastern countries of Iraq and Iran, and encompassing Turkey to the north and the Arabian Peninsula to the south.

The region referred to as the Middle East has evolved over the last few centuries has been strongly impacted by the Ottoman Empire, colonialism from many European countries, two World Wars and local conflicts, as well as the political tensions and alliances often stemming from Western Civilisation. Much of the Middle Eastern lands and nations were divided up by Western powers which showed little understanding of local tribes, people groups, customs or history. While ruling bodies have generally maintained State control and power, the main loyalties often lie with local clans and alliances that have existed for centuries. Historic or more recent State imposed changes to land ownership have led to a general mistrust of controlling governments.

The majority of Middle Eastern countries, with the exception of Israel and Lebanon, are over 85% Muslim which permeates all levels of society, from government laws and traditions to the thinking and behaviour of individuals. The people of the Middle East have a culture that is centred around family structures, loyalties and religion. Since the 1950s most Middle Eastern countries have been characterised by longstanding autocratic rulers with relatively stable controlling governments, until recent wars or the Arab Spring uprising in some jurisdictions, beginning in 2010. There has always been a strong tension in the Middle East communities between conformity to powerful centralised government, and identity with local tribal or family traditions.

The two case study countries of Iraq and Egypt are within the heart of the Middle East, sharing both historical and cultural attributes that impact on each country’s abilities to apply participatory extension principles to their agricultural development. There are also key differences within each country’s political history, geography and people that greatly influence their approach and capacities to facilitating change. Both countries have experienced greatly diminishing government resources being spent on agricultural extension workers at the district farmer levels over the last 30 years. Each country has a strong need to increase its agricultural productivity to both feed their rapidly growing populations and to lift the living standards of their rural communities.

Iraq and Egypt have great opportunity to increase agricultural innovation through improving their extension services and approaches. It is therefore considered to be highly appropriate that both of these countries be used within this study to develop answers to the key research question of “can participatory extension principles within AIS be successfully applied throughout the Middle East?”

5 Challenges to implementing participatory extension approaches within AIS in Modern Iraq.

5.1 Introduction

The history of Iraqi agriculture since the 1960s has been dominated by government control of land, subsidies, products, inputs, marketing and development. Iraqi farmers have been very dependent of government resourcing and regulations, with very limited influence over agricultural policy and programs. They have faced many political, security, environmental, social and financial barriers to improve their livelihoods.

This chapter captures the perspectives of government agricultural directors, researchers, extension workers and farmers involved in agricultural development training programs and the AusAID funded OTG project between 2011 and 2014, but prior to the extremely disruptive impacts of ISIS forces within Iraq. The research method allowed for a depth of discussion involving their participation in and understandings of actual extension activities that is rarely captured by researchers of Iraqi agricultural program approaches. It seeks to answer the question as to whether participatory extension methods, operating within the broader framework of Agricultural Innovation Systems, can successfully be applied within Iraq, and if so, what will need to happen to overcome the many barriers to its implementation once a reasonable level of security and national order has been restored.

5.2 Results and Discussion

5.2.1 Extension approaches currently used by Government Agricultural Workers

When government agricultural workers, representing all governorates across Iraq at various levels of responsibility, were asked to define Agricultural Extension, almost 100% described it in terms of taking technology from researchers and presenting it to farmers in a way they can understand.

Approximately 20% went on to say that it involved two-way communication with farmers, but when questioned specifically about extension work they were involved in, closer to 50% talked about themselves or extension workers discussing the practical issues with farmers. This may have involved working through concerns about the application of new technologies, or problems caused by pests or diseases that required urgent attention, or the farmers needed expert information on.

When asked “who was involved in agricultural extension in Iraq”, there was a very clear response that it is the Extension Department who does extension. It was only after further questioning that the thought of other people like researchers, media, resellers, farmer associations, policy makers, financial institutions or community leaders may be involved. This reflects the clear thinking that extension is essentially focussed on the transfer of information,

and this is solely what passes through extension officers, both to and from the farmers. This involves facilitating new technology training programs as well as responding to farmers' specific questions or needs.

Participants were shown models depicting various methods used in agricultural extension. When presented with any model that showed direct interaction between farmers and researchers, there was a very clear and consistent response that this was very rare in Iraq. Comments were made that "researchers never talk direct with farmers, they wouldn't understand each other", or that "researchers wear suits and would never sit in the dirt with farmers and drink tea, but the extension worker does". It was made very clear that a researcher, being highly educated, would not seek advice from a farmer. There was, however, a qualification that PhD students are often sent to carry out work directly on farms as part of their training and to improve their agricultural experience.

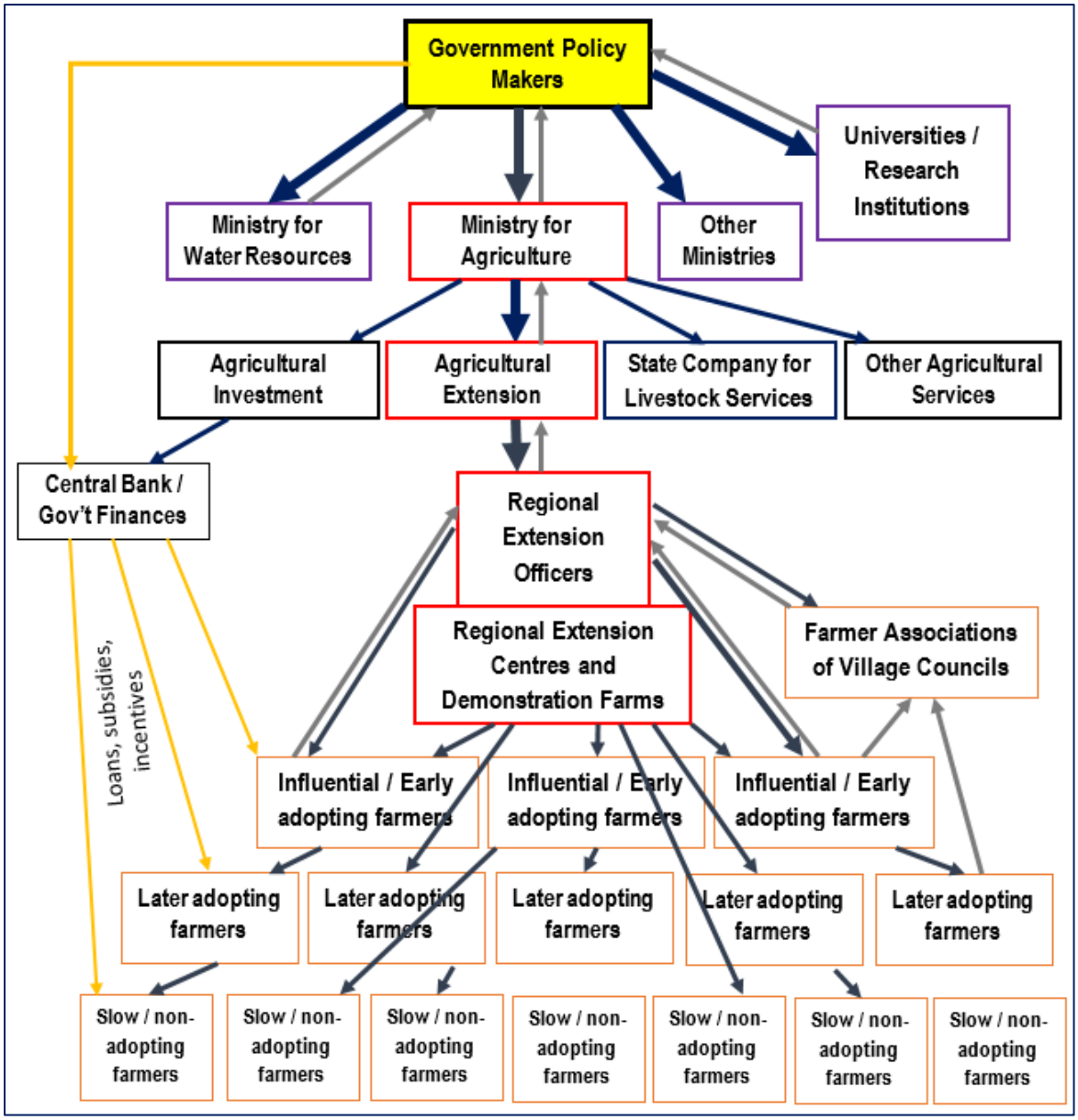
When presented with a "Technology Transfer, Diffusion of Innovations" model (Figure 2-1), the participants were very quick to respond that this is what mainly happens in Iraq. Many went on to draw adaptations or describe features that more reflected their own experiences in Iraq. Figure 5-1 provides a representation of the general structure of government extension activities as understood from these discussions. Participants described the Government Policy Makers at top of the chart as fundamentally deciding the priorities for research or areas that are to be developed. Research would then be commissioned for universities or specific groups within government department to undertake. The resulting technological changes would then be fed back through the central government through to the Agricultural Extension Department to be demonstrated at their regional centres, demonstration farms or on leading farmers' properties. It is generally the responsibility of the extension workers to interpret and develop the research applications into something that is practical and can be best communicated to the farmers.

Extension agents expressed that they would have direct contact with both the innovators (Figure 2-1) and the wider group of early adopters. Training courses run at the demonstration sites may go for a day, over a few weeks or across entire seasons, and often result in some form of farmer accreditation. Training programs will generally be associated with some form of farmer incentive, be it supply of equipment, seed or fertiliser, or possibly subsidies or loans to purchase the relevant materials to assist farmers to use the technology on their own farms. The expectation is that once farmers see the improved practices with their own eyes, they will adopts the changes that will then progress to the next level of farmers below.

Situations were described where the extension staff would work with the local village councils or farmer associations to discuss issues and assist in identify suitable innovative farmers to receive resources for on-farm demonstration sites, which may then become the focus of farmer schools or field days. Figure 5-1 includes influential farmers in the early adopting group, as discussions revealed that it is often farmers with higher status within the

community, or with relatives associated with village council members, who were chosen for farmer demonstration sites.

Figure 5-1 Iraq extension structure as described by Iraqi Agricultural workers



If problems arise in the farming communities, whether it be relating to the application of a new technology, or an important issue, pest or disease to overcome, then farmers are expected to talk to the local extension workers who will then notify their superiors who further inform the policy makers in the government. This will be assessed and may then lead to a request for investigation or research. Once a course of action is decided, this will filter back through the relevant ministries and extension centres to be dealt with at the farmer level. This may involve making products accessible to the farmers to address the issue and reveals evidence of some farmer contribution into the research needs and activities.

The needs of the farming community were also sometimes communicated back to the extension officers through the local farming councils or farmer associations. This appeared to be fairly site specific, however, and some interviewees said that these farmer groups were rare or did not exist in their area.

The "top down" diffusion of innovations model of agricultural extension was clearly evidenced in a paper presented by the Director General of the State Board of Agricultural Extension and Cooperation of Iraq (FAO 2004). He described national programs that *"promote the development and transfer of technologies from the research level to the practical application level through the training of farmers and the application of research results at the farm level" (p31)*. There is no mention in the document of participatory extension or empowering farmers within the decision making processes or involving them in the planning and development of programs. Rather there are further statements as to the tried and true extension methods that have been found to have had a positive influence throughout Iraq's history.

Agricultural extension in Iraq is consistently viewed as a technology issue, rather than a socially dynamic issue. However, as discussed in Chapter 2, the ability for farmers in Iraq to change and become more productive to build their wealth and their communities will be determined by far greater than technical information. The barriers to success are more due to their lack of the farmers' capacity to make the best decisions within an environment that fully supports that change on many levels, as achieved by participatory programs and AIS.

5.2.2 Perception levels of "participatory extension" approaches within Iraq

When interviewing Iraqi Government trainees about participatory extension approaches (where farmers, researchers and extension agents interact from the beginning, Figure 2-2), there was no indication given that this happened in Iraq. It was said that only the extension agents that had any relationship with the farmers, and there was rarely information flow from the bottom up. While there was talk about participatory extension methods being used it was certainly not in the manner engaging grass roots farmers in initial program development, to instigate activities that *"increased the power of the poor and disadvantaged, and strengthened the capacity of people to learn and act"* (Pretty 1995, p1251).

In reference to Pretty and Vododuhe (1997) seven perception levels of participatory approaches (ranging from more manipulative and passive participation, right through to interactivity and self-mobilisation), results from this study's interviews revealed that *participation* in the Iraqi agricultural system was mainly at levels 2 *(passive)*, 3 *(by consultation)* and 4 *(for material incentives)*. Farmers are generally contacted to attend field days or training sessions for technologies that have been initiated by government policy makers, and developed by research and extension teams, with little or no direct input from the farming community. Most interviewees expressed that farmers would only attend, participate or implement technologies if there was a direct incentive to do so. This ranged

from meals and transport to attend field days, the supply of fertiliser, seed or chemicals to grow new crops or varieties, right through to receiving glass houses, irrigation equipment or machinery to significantly upgrade their production potential.

Interviewees spoke of farmers (or sometimes farm owners living in the cities) being given cows and selling them to purchase a car. When challenged they would say the cow died. Similarly, equipment or fertiliser would immediately be sold on the black market for profit. Unfortunately, creating a culture of dependence on handouts has not always proved to provide a catalyst for building farmers capacity to embrace change. It tends to distort perceptions and give the impression that farmers are supporting and embracing the development, when they are more strongly controlled by their immediate monetary needs or opportunistic gains (Pretty and Vododuhe 1997).

There was, however, some evidence given of the level 5 *functional participation* with the local extension officers collaborating with farmer associations and village councils for some key decision making and activities. These councils were led by people of high community standing, but there were some indications expressed of power, control, nepotism and influence motivating many of the decisions and actions of these groups.

There was very little indication from those interviewed of level 6 *interactive participation*, which is where effective participatory extension approaches aim to function. There was no evidence given of any form of Participatory Rural Appraisal (Chambers 1994, Swanson and Rajalahti 2010), as collaborating with farmers at the start of the processes and empowering them to be in control of their future does not fit in with the ever present culture of strong autocratic government control, dependence, fear and mistrust.

5.2.3 The lack of understanding for achieving participatory extension

The majority of agricultural workers involved in the training programs and projects associated with this study emphasised the importance of good farmer relationships for achieving progress. They agreed with participatory extension approaches and were seeking to apply these principles where possible within their spheres of influence. However, there were many barriers expressed that were preventing them engaging with farmers and facilitate more modern and improved farming systems. The very hierarchical, top-down approach within government structures along with the lack of trust that is evidenced throughout much of society made it very difficult for participatory extension to be truly understood, accepted and achieved. Extension was mainly seen as something the Extension Department did, with very little recognition of the more complex interactions involving wider groups of stakeholders, as expressed in AKIS thinking, or AIS frameworks.

5.2.4 Lack of trust by farmers toward the government.

Most agricultural workers stated that farmers do not trust the government, due to historical and sectarian issues, and fears of being controlled. They expressed that there was a resilient

sense of scepticism among farmers about government workers abilities and motivation. There is a strong awareness of corruption and nepotism through all levels of society, which includes the payment of officials to achieve favours, or the promotion of friend and relatives to receive project opportunities and handouts.

There are also many old extension officers that are retiring and the young inexperienced officers are not respected. Some younger workers who do not know answers often try to save face by making things up, rather than resolving to find the answers. This is because they are trained and expected to be technical experts. The need was clearly stated for both extension workers and researchers to go out and experience things with farmers, first hand.

Examples were also given where poor, uneducated farmers with a traditional mindset resisted vital technical improvements due to unrelated issues. One farmer refused to vaccinate his flock because last time it was tried one his sheep died soon after, most likely of something completely unrelated to receiving a vaccination. When there is pre-existing fear or scepticism towards the government, it will only require minimal negativity to influence a farmers resistant behaviour. No amount of scientific explanation or proof will change such a belief, without first gaining trust with such farmers.

Establishing good relationships on a long term, based on mutual trust is a core ingredient of participatory extension and influencing positive change, because it understands what, why and how things must interact and develop into mutually beneficial outcomes. Trust is the glue that holds these relationships together (Rajalahti, Janssen et al. 2008). The culture of innovation requires trust and the appreciation of other perspectives. This will allow for a change in attitudes or practices that is often required to achieve the desired outcomes.

Gabathuler and others (2011) emphasise that for extension agents to gain the trust of farmer clients and stakeholders they need to be seen as being independent of gaining financially. They must take a farmer demand driven approach while still maintaining the competence in management and policy. This means having a level of autonomy, personnel and resources, to be able to support more localised farmer driven programs. However, this level of autonomy was never conveyed by any of the regional agricultural workers in any of the interview discussions or project observations. There was always a clear requirement conveyed of workers performing the expectations and duties that came from superiors in the departments, and keeping their relatively secure government employment within a very challenging and unstable war torn country.

Taking a more participatory extension approach in Iraq is extremely difficult as they are part of the government that is greatly distrusted by farmers, and have mostly been trained in technical delivery rather than being agents of social change. Chowdhury and others (2013) highlight how mistrust, conflicting interests and undisclosed perceptions paralysed many farmer groups' attempts to successfully operate within the AIS that the Bangladeshi government were implementing. The role of the extension worker needed to focus more on

the social interaction issues between large and small farmers, NGOs and private and public stakeholders to support a process of interactive learning and communication.

There is also a lack of trust by government in the private sector, with many looking to take opportunistic advantage for personal gain. However, Swanson (2008) states that the public sector must find positive ways to work with the private sector, developing public–private partnerships with input supply dealers, as they provide most of the one-on-one technical advisory services, especially to both large commercial farmers and small-scale farmers, unless they are organised into producer groups.

5.2.5 Lack of co-operation within government

When running workshops with Iraqi government workers in both Agriculture and Water Resources ministries from different regions of Iraq, it became very clear that many people working within the same fields of expertise had no knowledge of other peoples' work or projects. Many expressed that it was very rare for people from different departments to ever get the opportunity to work directly with each other.

Examples were given of village extension workers not being able to initiate activities that would directly benefit farmers at their point of need because this was not understood or approved by their managers above. It was apparent that in a country so affected by war and insecurity that most government workers were keen to protect their positions by strictly adhering to their directions from above, without any suggestion of challenging authority or causing any perceived concerns.

De Atkine (1999) and Pollack (1996) assert that within Arab leadership there is a strong belief that knowledge is power and it therefore becomes more important and valuable to hold on to one's information and influence rather than to share intelligence in co-operation with other entities who may then become a threat to one's own position. This is extremely counter-productive to a participative AIS approach to development which seeks to empower people at lower levels with knowledge, autonomy and capacity to make positive changes.

5.2.6 Top-down approach lacking real farmer engagement

This study found that Iraqi researchers generally concentrate on solving a problem and make little attempt to understand the context of how it will be applied within the farmer's situation. Universities do not involve farmers in setting their research agendas. Farmers themselves reported that they had virtually no opportunities for shaping or assessing activities and thought that educated extension staff tend to look down on them. They stated that the Iraqi farmer has a lot of pride and likes to be treated with respect.

Some of the interviewed government workers expressed that extension programs must be more market driven to meet the needs of the farmers. Policy makers are not aware of the

actual market needs, and are not thought to be flexible enough. They do not have expertise in many areas that their decisions clearly influence.

These issues represent clear shortcomings of the Technology Transfer, Diffusion of Innovations extension approaches which dominate the Iraqi agricultural system. Collaborating with farmers at the start of the process is central to participation, with extension agents looking to facilitate ways for farmers to change, rather than just passing on predetermined information (ICARDA 2011) or farmers being the end recipients of pre-organised material and demonstrations of technologies passed down to them (FAO and World Bank 2000). There is a clear lack of recognition of indigenous farmer knowledge as being integral to the planning and implementation process, or engaging rural people to carry out their own needs assessments and help shape extension plans and priorities, as encouraged by Swanson and Rajalahti (2010).

5.2.7 Incentives based dependency

It was often said in interviews that if there is no government subsidy, the farmers will keep to their old methods. To attend a field day or workshop, farmers will generally expect to be transported to the event and to receive a good meal. Everyone wants to get something to be involved, even the media want money to promote activities. For bigger programs or projects, the farmers will often be given equipment, livestock, seed or fertiliser, as well as favourable loans for equipment such glasshouses, irrigation or machinery. This is understandable, given that most farmers would be too poor to purchase these items by themselves.

Farmers tend to become reliant on handouts instead of building their own abilities to improve themselves and their farms. The incentives are generally made to promote technologies and agendas approved by policy makers or researchers, which may be of little relevance or limited value to the farmer's real needs or aspirations. Even in the mid-1970s, Röling and others (1976) spoke of early adopters within the Transfer of Technology approach being able to reap "windfall profits" (p162) by making early use of large incentives that would gain them strong market advantage over later adopters.

Pretty (1995) describes how relying on incentives to encourage farmer involvement tends to distort perceptions, create dependency and often results in the farmers abandoning the new technologies as soon as the subsidisation is finished. Change may have been achieved for a period, but not to the extent of lifting farmer capacity for ongoing self-motivated improvement. It also creates and paternalistic attitude toward the government for the recipient farmers, which is the opposite to encouraging the entrepreneurial and self-motivating, market driven approach of participatory extension.

Schnepf (2003) reveals how in the years of Saddam Hussein's rule farmers were initially supplied with some inputs and encouraged with strong incentives to crop marginal lands, but the lack of basic fertiliser, machinery and pesticides meant that productivity suffered. During years of the Oil for Food program, handouts were so strong and prices for produce artificially

raised that many farmers had no real incentive to innovate. This left many farmers very vulnerable to the severe drought and changing market forces at the turn of the century.

Providing subsidy incentives will always be important in a country with high risks for poor farmers. The challenge, however, is to support farmers in ways that help them to achieve the changes they desire, allowing them to build their capacity for continual improvement while managing uncertainties and the associated risk involved.

5.2.8 Farmers' unwillingness to change because of the high risks involved.

While experimenting with a new crop type, an unfamiliar strategy or exploring the benefits of buying new equipment may work in the safety of a research centre, failure for poor farmers in Iraq can be extremely costly and that is why they are very risk adverse. Many spoke of cheap imported vegetables or fruits from surrounding nations causing large and unpredictable price fluctuations that have turned newly promoted opportunities into financial disasters for farmers. The government appeared to be doing very little to control these imported goods.

The technology transfer models currently used do not adequately account for the high risk most Iraqi farmers face when making significant changes. Hagmann and others (1999) reasoned that because researchers concentrate on technology and the extension workers are seen as technical agents, there is no requirement seen for social competence and complex socio-organisations issues are neglected or reduced to a technical level. Taking a participatory extension approach that starts with the farmers' needs and priorities and supporting them through action learning processes helps build their capacity to change. Any new technology is set within contexts of the farmers' actual situations, and must be developed with the required support strategies to help them manage the risks involved.

It can also be risky for farmers to share ideas within a bigger group of other farmers. An example was given of one farmer who was very successful in introducing onion growing which produced a high profit for him in the first year. As soon as everybody saw his successful enterprise and copied it, the price dropped out of the local market and his profitable enterprise was no more (farmer from Table 3-1).

This example reveals the importance of addressing the larger issues in Iraq, such improving market information and access, diversification of production, as well as secure financing. These are all fundamental elements to an AIS approach, for farmers and farmer groups to be successful. Swanson (2008) shows the importance of producer organisations, farmer interest groups, women self-help groups and rural youth in the successful development of participatory extension models for rural development, due to their shared learning approach. Forming groups help build social capital, increases market access and allows producers to more effectively articulate their needs to policy makers, researchers and extension workers. Swanson gives many examples of how collective marketing of produce, bringing in the appropriate private business partners have built profitable industries within rural

communities of developing countries. However, this is not always welcomed by countries like Iraq that have a more top-down controlling approach to government.

Rajalahti and others (2008) assert that it is the smaller, poor farmers who stand to make significant improvements to their livelihoods through AIS in this way. This may require the role of extension officers to facilitate groups of farmers and other private stakeholders to work co-operatively to gain greater market access and sustained profitability. However, these types of initiatives were not evident within the Iraqi agricultural extension system.

5.2.9 Lack of training in Participatory Extension methods

When asked for their views on what was needed to improve agricultural extension in Iraq, there was a very strong call for training of agricultural staff in participatory methods. However, it was clear that many of those interviewed had a reasonable understanding about participatory methods, but were still unable to properly apply them within their government and agricultural systems. Participatory principles need to be understood within higher levels of government so that the process can be properly supported within an AIS environment.

Reports from the major USDA funded "Iraq Agricultural Extension Revitalisation" project (IAER) run by a consortium of five US Universities appeared to re-enforce this lack of participatory extension focus. In summarising the training of 600 Iraqi extension professionals in over 100 technical topics through 2007-08, there was a complete lack of training about extension methodology, apart from one reference to participatory plant breeding (Abi-Ghanem, Carpenter-Bloggs et al. 2009). Technical training in agronomy, livestock and soils is an important part of the development process in a country so lacking in agricultural education. However, without balancing this knowledge with learning how to engage farmers at their point of need and building their capacity to embrace new challenges, then it is likely that training was reinforcing the traditional top-down technology transfer from experts.

It appears that little has changed from a report referring to a 1981 survey that found that 46% of Iraqi farmers did not trust extension agents. It is suggested that with better links to university faculty and more technical training, agents could *"show farmers experimental data backing up their claims; increasing both their credibility in the eyes of farmers and their effectiveness as extension agents"* (Abi-Ghanem, Carpenter-Bloggs et al. 2009 , p138). There is no mention of gaining trust through building relationships and working from the ground level up.

In contrast to this, an Iranian analysis (Chizari, Baygi et al. 2006) revealed that the two most important training needs for agricultural agents were firstly, participatory extension, and secondly, participatory techniques in rural development. This article also quotes a 1982 report from northern Iraq indicating that even at that time extension methods and communication were recognised as two main training priorities.

In its more recent strategic plan for Iraq, the United Nations Development Program states that one of its key expected outputs is to achieve improved participatory decentralised basic service delivery, institutional responsiveness and accountability across all sectors of civil society (UNDP 2014). While participatory extension training for agriculture is not specifically mentioned within this document, it is clear that the UN was wanting to support and resource such training within Iraq.

5.2.10 Organisational leadership and resource issues

Some workers complained that projects funded from foreign countries, such as USDA projects, tend to have a large turnover of short term staff who have no knowledge of Iraq's systems and culture. They suggested it would be far better for them to invest time, effort and knowledge into local Iraqi project and extension staff.

It was also expressed by some workers that leadership jobs in agriculture tend to be given to "yes sir" people that are easily controlled from above. Participatory extension is not their priority nor their attitude towards implementing regional development.

The lack of resources and facilities in regional centres was consistently raised as a barrier to achieving good extension. There were few vehicles available to visit farmers in their fields or in other villages or remote locations. Many of the centres lacked finances, computers, reliable internet access, tools, livestock or even fuel. Workers spoke of difficulties in access the best information, networking with colleagues or associates, running activities or maintaining equipment (worker from Table 3-2). Facilities that took years of hard work to build up could be quickly removed or easily destroyed. This was very frustrating for dedicated workers.

The effectiveness of extension activities is often difficult to measure and therefore hard to hold field staff accountable for the quality of their work (Anderson and Feder 2004). Where strong, top-down, autocratic management systems prevail the focus of the extension worker is to best do what they are told to within timeline and budget, so that activities can be accurately accounted for according to bureaucratic indicators. There are no real mechanisms or incentives to make extension services accountable to farmers, who are the ones who should be most affected by the quality and effectiveness of extension services. Swanson (2008) states that leaders within autocratic government agencies generally work to protect their recurrent budgets by allocating too many resources to staff salaries and benefits. They reduce spending by cutting operational and program spending to a minimum (<20%) with very limited funds allocated to travel and other office expenses. It is rare for funds to be made available for field level extension staff to cover specific technical or management training courses to upgrade their skills and knowledge, or to support other services to producer groups based on local needs.

5.2.11 Lack of pluralistic thinking toward extension from government.

When presented with an expanded AKIS model (with many two-way interactions between various groups and information sources all contributing to agricultural extension, Chapter 3 Appendix 1), the majority of government interview participants indicated that this did not currently apply to their situations. However, those from the northern Kurdish areas that had experienced greater political stability, resulting in increased agricultural aid programs, gave more examples of these activities. This suggests that if or when Iraq becomes more stable and moves toward a more market based economy, these more pluralistic extension systems based on building knowledge through shared experiences and support from government and private sources, may have a greater chance of operating successfully.

While interviews with farmers indicated that they were using a range of non-government sources for agricultural information and support, this did not appear to be considered by most government workers as being a part of agricultural extension within the country. Extension is something that is done by the extension department within the Ministry of Agriculture. For AIS to be supported through government initiatives there needs to be a paradigm shift in the Iraqi policy makers to broaden their understanding of what agricultural extension is and how it is best achieved. Klerkx and others (2012) describe AIS as taking a wider view of agricultural extension and development that goes beyond seeing research as the main driver of change and recognising that it now emerges from complex interactions among multiple actors. It involves a combination of technical, social and institutional change, supporting the necessary linkages and interactions between relevant stakeholders, and creating an enabling context for innovation that can be more easily developed and implemented by participants.

5.3 Farmers perspectives on agricultural extension

Eight Iraqi farmers were interviewed within this study to gain some important and insightful perspectives of agricultural extension apart from government workers. These included farmers directly involved in research and extension programs associated with this study, as well as large and small Iraqi farmers that were engaged through other sources. While some farmers clearly supported the activities of the government agricultural workers due to their close association with these projects, others there were keen to share their difficult experiences as Iraqi farmers. These interviews reveal that there is scope and opportunities for AIS approaches to benefit agricultural development.

5.3.1 Understanding the high risks of farming

Some farmers were keen to emphasise the high risks involved in changing and improving farming systems in Iraq and the need for new equipment with financial support of low interest loans to achieve this. However, there are many factors that mean some farmers cannot pay back their 5 year loans, resulting in rising debt. It remains very difficult for a poor farmer to gain enough wealth to support innovative changes.

Many farmers are facing less water availability due to development of dams in Syria and Turkey and increasing salinity, particularly at Arab Gulf end of the river systems. Therefore risks become extremely high to develop new irrigation practices when the availability of quality water is uncertain.

One farmer reported that the government schemes often promote new technologies, but drip irrigation equipment may not be readily available, and the repairs, maintenance and support are often difficult to acquire, again increasing risks. New crops or methods often result in further unforeseen issues such as weed, disease or pest control and solutions are not always easily accessible. Farmers therefore will always look for government subsidies and direct NGO support so that they are not risking their own resources to try something new. Most farmers just do not want to change because of all the risks and insecurities involved. It also explains why it is so difficult to move extension programs from level 4 participation based on material incentive (Pretty and Vododuhe 1997), to level 5 and level 6 participation (functional and interactive) to be able to achieve innovation with farmers. Unfortunately the current methods used lead to increased dependency of farmers, often with only short term outcomes while the benefits persist, but few sustained improvements. This is why extension programs must move from teaching technology to building capacity, which can be achieved by implementing an AIS approach to development.

5.3.2 Lack of appreciation or respect for farmers contribution toward extension

One larger innovative farmer, who is well educated and gets much of his information from the internet, became very frustrated with the inflexibility of the government program supporting No-till farming. From the outset, one of the Agricultural Directors in his Governorate was not supportive of No-till and this meant that every government worker underneath him could not support this concept, and no assistance, subsidies or equipment could be provided. There was no respect afforded to this farmer's opinions, expertise or willingness to develop the technology. Eventually things changed and with the support of NGOs the farmer found ways to modify his existing machine, and No-till turned out to be extremely successful, leading to improved crop establishment (requiring less seed), significantly reducing cultivation and fuel costs, and increased crop production, particularly in dry seasons.

The Iraqi government did eventually join the program and conducted trials on his and other properties using small, narrow, imported No-till machinery. The cost of upgrading to new No-till machinery was a major barrier to the uptake of the technology despite the many production and soil protection benefits. Many farmers had machines that could be modified and there was the possibility of producing suitable machines locally. However, none of these practical solutions were able to be subsidised or supported by the Iraqi government as they only had a policy for importing and supporting the purchase of the machines that were used in the trial sites. Again there appeared to be no ability for the innovative farmers to influence the government policy in ways that would practically benefit the farmers and enhance the

adoption of the technology. When the project came to an end a high percentage of the farmers who had use of the specialised narrow imported machines for that time went back to their traditional farming methods of cultivating the land three times before sowing.

One farmer chose to run his own field day, at his own expense and personally inviting farmers from across the district that he thought would be interested, motivating them to change using his personal influence. He worked on the premise that to sell the concept of No-till it must firstly be inexpensive, and secondly, save money on input costs. Then he could tell them of the benefits of moisture conservation, weed control, etc. He emphasised the need to show them the short term benefits, not long term, and encouraged them in the initial steps that some could take in trialling reduced tillage to help get them started in the right direction. He deliberately did not involve the department staff. The reason he gave for this was "because the farmers don't trust the government. It is because we wanted to do it. The Department of Agriculture have their field days at their plots, and get farmers there. We wanted to do this ourselves, show we can do it, independently, we wanted to be treated like equals - not dependent on them - this is very important. Otherwise, like many of the farmers, they will stop zero tillage as soon as the project ends" (farmer from Table 3-1).

The farmer also spoke of another practical social issue that threatened the advancement of No-till within the community, in that eliminating the need to cultivate farmers' paddocks had the effect of taking work away from a number of contractors and labourers. This resulted in some people opposing the advancement of this new technology, not on the grounds of any technical agricultural issue, but rather because of potential social impacts.

This one example clearly illustrates what is currently lacking in the controlled, top-down Iraqi extension system, and what could be achieved if a more participatory approach was able to function. The farmer showed the vision, motivation, the understanding of the real farmer needs and barriers to adoption, as well as the practical solutions to solve these problems. Yet, this farmer, who should have been supported as the key asset to the promotion of this new technology, was met with stifling government restrictions each step of the way. His final comments about wanting to be treated with respect and as equals is a critical barrier that the government leaders must overcome if it is to change to more successful extension programs.

5.3.3 Poor resourcing of Agricultural Centres, poor information, nepotism and corruption.

One of the smaller farmers interviewed (from Table 3-1) emphasised how difficult it can be to obtain help or information from the extension department because they are always very busy and there may be 100 farmers trying to meet with them. He could keep going back and never see anyone. He did not like going to the farmer field days because they are not usually about the specific things he needs to know. They generally involve bigger farmers who have been given everything for free. He pointed out that the approach of the extension workers using village councils to help determine where trials are conducted often results in influence

or favours being done for relatives or associates. Government loans are also very difficult to obtain without such influence, and the farmers don't like it. His brother attempted to secure a loan for a glasshouse and found that he would have to pay a bribe to the officer to secure the loan. This is evidence of the corruption that is prevalent through all levels of society, and why trust between farmers and government is so difficult to establish.

The farmer spoke of getting his farming information directly from small businesses in the market place, which is something hardly mentioned in any interviews of government workers. These small business people would inform him of what crop to grow to receive the best prices in the market. They were involved in trading produce and often on-selling to markets in the city. He spoke of seed, fertiliser and finance being supplied through these networks, as well as some agronomic advice. These businesses would often send representatives to the extension departments training and field days so that they could pass them on to farmer clients. These small businesses had a direct interest in providing good information because they would benefit from on-selling more valuable produce.

Again, this provides a clear example of how moving to a more pluralistic, market based system of extension can, and is already operating within Iraq, but appears not to be recognised within the extension department. If they were able to strategically embrace this, they could indirectly reach a significant portion of the farming community (the smaller, poor majority that don't have influence and don't trust the government), by supporting the private businesses in the market place that these farmers actually do relate to with greater trust. This may mean finding better ways to communicate with them, supply better market information or even creating easier pathways for these businesses to flourish. This is at the heart of AIS.

If the Iraqi Government became more directly involved in such an AIS process, it is possible they would try and control it, which would prove detrimental to the exercise. A first step would be to meet with these small business people in the market place to find out how the department can best support them to be able to best help these small farmers. This participatory approach may result in the creation of access points for agronomic support, including the provision of finances or resources for these businesses to distribute to these farmers to help them better achieve their production goals.

One example of this happening was in a conservation agriculture project spanning Syria and Iraq. It found that where farmers, machinery manufacturers, researchers, extension specialists and other stakeholders worked as a group to adapt the new technology to local conditions, there was great success in promoting complex No-till technologies. The farmer payments or other incentives to conduct demonstrations proved unnecessary as the technology was of great interest, relevance and benefit for all stakeholders (Stephen Loss and Khalil 2016).

5.4 On-the-Ground (OTG) AusAID funded project experiences and learnings

5.4.1 Background to the project

The AusAID funded Iraq OTG Program (2010-2013) was planned as a pilot strategy to provide support to Iraqi agricultural scientists who are operating at the farmer level. Rural Solutions SA (RSSA) were responsible for its design, management and delivery. The project aimed to clearly employ and demonstrate participatory learning and extension principles in the training of the Iraqi government project workers, and in supporting them to establish and implement the project at seven sites across regional Iraq.

The OTG approach was very different to other foreign aid projects in Iraq, in that it trained selected, highly motivated Iraqi agriculturists, using an intensive training program in technical fields that were identified by the Iraq Government as being skills of high importance. Following the Australian training program, the Iraqis were provided with materials, a modest operating budget, ongoing remote e-mentoring, and periodic (6-monthly) planning, review and technical refresher training at face-to-face meetings in neighbouring Jordan (as Australian trainers were unable to travel to Iraq due to security concerns).

This approach was unique for Iraq, because it recognised that the local agricultural extension workers had a clear understanding of the farmers' situations, limitations and aspirations, and what was capable of being achieved amongst the local communities for best results. They were given responsibilities for equipment and finances to develop the projects, with the new technologies within the farming context which helped build their confidence and capacity to use their initiatives and build their projects.

While previous training programs had involved Iraqi specialists coming to Australia, undergoing intensive training in technical practice and project management, it was felt that this was of limited value as it relied on transferring technologies and skills, without providing any real support for its application on the ground in the very challenging Iraq environments. The training courses were too short to develop the practical skills and confidence of the participants to a level where they could implement them in Iraq. This OTG project was designed to take a more participatory approach with these workers, in building their capacity and helping them to change, meeting their needs at the ground level of implementation and supporting them to develop the required solutions at each phase of development.

The project also took a participatory approach within the government structures, in the hope that this would help to show how they need to apply the same methods to advancing the farming communities in which they were working.

The project management framework consisted of three hierarchies, including:

- *Program Oversight* (to ensure that the program achieved the joint aims of the Iraq-Australia aid program),
- *Program Strategic Management* (overseen by a steering made up of 3 high ranking officials from both the Ministry of Agriculture and Ministry of Water Resources),
- *Operational Management* (supervision of the Irrigation and Horticulture, and Sheep Reproduction Technologies projects enabled consistent management approaches to be adopted across both programs, and coordination of the on the ground activities and communications in Iraq, and between Iraq and Australia).

Rural Solutions SA representation was common across all three levels, which was critically to ensuring continuity throughout the project structure (Rural Solutions SA 2013).

The project design began with pre-planning meetings to build relationships between all the key stakeholders, develop a communication strategy and review the best practice strategies and opportunities for the given fields of operations. It then saw Iraqi field workers undertake extended, intensive, practical training in Australia in the fields of sheep reproduction technologies or irrigation management. The critical equipment was then shipped to Iraq, distributed, assembled and installed at each site. This was used in the setting up breeding centres or demonstration horticultural sites in Iraq, and the training of local staff and farmers in applying the technology within demonstration farms, and farmer sites within local communities.

This whole process was underpinned and supported by project team meetings in Syria and Jordan as well as ongoing e-communication to review training, share ideas, discuss strategies to overcome problems and build their capacity in project management, applying participatory extension approaches, monitoring and evaluation. Participant detail involved within these various activities are identified in Table 3-2.

5.4.2 Project Achievements

The OTG project successfully established seven sites, despite many delays and logistical issues that greatly impeded some developments. Almost all of the problems expressed by Iraqi project members related to difficulties within the Iraqi systems (McDonough 2013). The very large hierarchical system within each government ministry made it very difficult for approvals to be given in all the basic levels required to run a project such as OTG, particularly as it was seeking to operate differently to traditional structures. There appeared to be many issues with various regional middle managers not approving actions or activities as they were not familiar with workers on the ground operating with increased autonomy. It often took time for the project managers in the higher government levels to sort these issues out.

Gaining simple access to basic resources such as transport, livestock, fuel and electricity was very challenging, along with travel approvals for some. Political tensions associated with the Kurdish areas within Iraq, where both the Erbil and Kirkuk sites were situated, meant these sites struggled to gain basic resources and experienced the greatest delays in obtaining their

equipment. There was a significant danger that the equipment could have been stolen and sold on the black market when passing through the various checkpoints across the country, however, by transporting the container to a central site where it was distributed by hand to project personnel overcame this potential problem.

Project activities and processes were also complicated because more than one ministry was involved and at times approvals were required from ministries outside of those directly influenced by leaders on the OTG steering committee. This was particularly evident in the 8 month delay from the time of the equipment container arriving in the port of Basra until its final approval to be unloaded and transported to the majority of sites, despite all the apparent necessary paperwork and documentation being in place. This impacted significantly on the livestock sites, costing a year of reproduction opportunities, as the technology relied on the seasonal breeding cycles of the sheep. There were also critical delays in the receipt of operating funds by the sites due to Iraqi administrative issues. These difficulties were partly due to security issues associated with the war, but mostly due to deficiencies within Iraqi society and basic operating systems.

Despite all the challenges, generally all on-site responses and solutions were developed by the Iraqis, in communication with the Australian project team, to address issues. The project was able to meet its milestones of setting up the steering committee, training the participants, transport and set up equipment, successfully grow and monitor crops with water efficient technology. Livestock reproduction technologies (to improve the genetic qualities of the Awassi sheep across Iraq) were applied which resulted in the first lambs produced from artificial insemination in Iraq. Staff were trained by Iraqi project workers and farmer groups became involved with participants eager to continue these applications beyond the life of the project funding.

The project funding ceased before any long term effects of the application of participatory extension principles on the farming communities could be assessed. Since then, a number of the sites with their personnel have been decimated by war and associated security and operational issues.

A workshop held at the end of the OTG project provided an opportunity to engage directly with the highest management levels in the Iraq Ministry of Agriculture, including the Deputy Technical Minister of Agriculture, and the Ministry of Water Resources. This was held to assist the Iraq Government in aligning the current OTG projects with their own current investment in agricultural programs, and to further explore opportunities for the Iraq Government to adopt the OTG model in support of other capacity building programs. This resulted in the submission of specific project proposals to the Ministry of Agriculture at the request of the Deputy Minister, designed to address agricultural issues of national significance. These developments show that it may be possible to apply participatory principles of project management within the Iraqi Government.

If this happens it is more likely that these attitudes of inclusive, supportive, needs based project management principles will affect the way the departments interact with their rural communities. However, many barriers remain for this to easily be accomplished in Iraq and there would still be a strong need for ongoing outside support and influence to make the right things happen well. Feder and others (1999) state that a country's extension strategy is generally a reflection of the wider government structures and policies. This would explain why Iraq's extension approach has traditionally been very "top down" and directive, as the Ba'ath party under Saddam Hussein was one of autocratic government control, rather than embracing social participation in decision making (Schnepf 2004).

5.4.3 Key Project Learnings

The ability of the Iraq Steering Committee to manage the project within their ministries was substantially beneficial to the project. The lean representation from the Iraq Ministries allowed the project to gain momentum without incurring significant additional expense (time and money) to manage both the day to day activities and management level reporting (upwards in the Iraq Ministries).

Importantly, the three members of the Steering Committee considered themselves to be integral members of the OTG team, and valued the opportunity themselves to participate in training activities delivered by the Australian team during the refresher training workshops and planning meetings held in Syria and Jordan. Their participation and interaction with the other OTG participants resulted in the establishment of a strong team ethos around the project, a sense of pride in the results that it has generated, and the respect that it has achieved within the top levels of the Ministry of Agriculture (Rural Solutions SA 2013).

The Australian team reported significant changes in project participants' capacity to solve problems, manage upwards within and between ministries and to adapt their projects to best match the circumstances they have found themselves in. They grew from being relatively quiet, unsure and reluctant to say anything in front of their superiors on the steering committee, to being quite vocal, passionate and very clear in articulating what they were trying to achieve and what was needed to ensure the success of the project. This is clear evidence that this level of two way interaction that is so vital to participatory activities can be achieved within the Iraqi government.

This project trained Iraqi staff in key technical areas related to irrigation and livestock improvements, as well as built their capacity in project management and extension. They showed remarkable teamwork in interacting and sharing ideas across regions and across different Ministries, and began actively seeking opportunities to further the scope of their project work through strong engagement with senior Ministry personnel. Many of these achievements appear to be unique within the existing government structures and operating environments within Iraq.

The establishment of the Steering Committee, being driven by key senior officials across the Ministries of Agriculture and Water Resources, and being kept to a workable and functional size of dedicated individuals committed to the vision of the project, was crucial to the project's success. Their ability to communicate with the various Ministers and government heads allowed for many of the project activities to proceed, where other projects would have ground to a halt.

Some key participant quotes obtained from the project evaluation include:
"I learnt much about organising projects, basic rules to make things happen, and having many specialists all working as a team together", "The project gave participants great confidence to do things" and "The *hands on* intensive training in Australia was a critical platform for the success of the OTG project. We were not just reliant on foreign experts coming and going like in other projects" (McDonough 2013). This shows a progression towards the principles of participatory approaches and AIS (workers from Table 3-2).

While the OTG project had limited opportunity to apply a fully integrated participatory extension approach within the Iraqi farming communities, it was able to apply participatory principles within levels of government it dealt with. This involved high ranking Ministry policy makers down to the local agricultural field agents working collaboratively under extreme difficulties to bring about successful project outcomes. If this level of co-operation, communication and empowerment could be replicated throughout the government structures, then it would create a participatory culture that could then be expressed in the various departments' approaches to farmer engagement in rural development.

This could not have been achieved without the direct input and guidance from the dedicated Australian project team who facilitated this process. Unless there is strong, competent leadership and direction from outside the Iraqi government was provided to support these processes to happen, it is highly unlikely that this project would have succeeded. For sustainable participatory extension systems to operate successfully within AIS, there must be ownership, empowerment and appropriate support at all levels of activities. This was clearly evidenced within the Iraqi participants, through the support of the Australian project team.

A summary of the monitoring and evaluation of this project conducted by the author is attached as Appendix 2 at the end of this thesis.

5.5 AIS Conceptual Framework Analysis

The results obtained in assessing the Iraqi agricultural advisory systems provide valuable insight into the challenges Iraq faces in relation to the application of AIS. While the scope of this study has not had resources to extensively analyse all of the components of conceptual framework described in Chapter 3 (Figure 3-1), it has generated strong perspectives from those working with first-hand experience in Iraq. Birner and others (2009) state that the

framework can be used to both assess agricultural advisory services, as well as plan for more effective agricultural development into the future.

Observations of the contextual factors (A-D in Figure 3-1) suggest that policy environment (A) within government has been extremely difficult and insecure due to the ongoing upheaval caused by war, internal sectarianism as well as foreign influences. There are also many political, cultural, leadership issues based on centralised control that make the active pursuit of pluralistic ventures very difficult. However, Iraq's National Development Plan contains a policy of decentralisation, to involve the provinces local authorities in the "process of preparing and defining their developmental priorities" (Iraq Ministry of Planning 2010). The plan also describes a six point policy plan for supporting the private sector, including building public private partnerships, improving and diversifying infrastructure to support business production, opening pathways for foreign investment, streamlining and simplifying government procedures, privatising public companies and reforming the financial sector so that small to medium sized business can gain greater access to loans and direct support for projects. While these priorities represent key platforms for AIS to develop, this study found there were clear deficiencies in all of these areas mentioned within government worker interviews and issues experienced firsthand within the OTG project.

Al-Ali (2014) states that while decentralisation is theoretically pursued with provincial elections held every 4 years, these councils have no authority to serve the people as the central government control all decisions. The reality is that the provincial officials are accountable for matters over which they have no ability to control. When decision making is held further away from the clientele that is being affected, then there is less accountability required, because no direct relationship exists (Anderson and Feder 2004).

Moves towards more pluralistic agricultural strategies in Iraq appear highly unlikely to happen, particularly in the case of outsourcing major government programs. If more autonomy and resources are given to the regional areas within government, this would allow them to more efficiently react to the real needs of their communities, and be more accountable to them. If this were achievable it would greatly advance the opportunities to achieve successful participatory extension processes and outcomes. Unfortunately, the poor resourcing of village extension centres and the limited focus on social inclusion or achieving environmental sustainability, make it difficult for staff to adequately engage with farmers to facilitate lasting agricultural development, as there is no suitable base for AIS to operate within.

These factors have greatly compromised the capacities of state, private and non-government organisations to provide critical services and structures to support agricultural innovation (B). While the government engages in many joint ventures with NGOs, with a large contribution from USAID since the Gulf War in 1990, there remains many examples of the inefficiencies of short term aid projects with expertise that has come and gone and installed equipment that

soon failed, inadequate training or lack of ongoing resourcing. Iraqi workers said they were often overlooked to administer and extend USAID projects which instead were being run foreign experts who did not properly understand the culture or the systems within Iraq. It remains very difficult for NGOs to operate well within the very complex environment of Iraq.

Production systems (Figure 3-1, Section C) have great potential for improvement but remain largely under-developed due to both security issues as well as the lack of basic infrastructure and sound operating systems, with many farmers negatively impacted by foreign food imports and resulting commodity price fluctuations. Farming communities (Figure 3-1, Section D) consist mainly of small poor farmers that are often lacking education and have little trust in government workers and administrators, which make for a very difficult environment for sustainable, progressive agricultural development. Peoples' capacity to co-operate well is greatly diminished by all of these factors, particularly where there is a history of underlying fear, corruption and nepotism. There are areas where stronger farmer associations and agribusiness networks exist which can improve market access and information and support farmer decision making, but few farmers are able to utilise internet resources and applications as is happening in other parts of the world.

All of these contextual factors do not make a good fit for AIS to flourish within and through the Agricultural Advisory Services (Sections E-H of Figure 3-1). This study has mainly focussed on exploring the characteristics of the Iraqi government advisory services, highlighting many of the barriers to using participatory extension methods within an AIS framework, as things presently stand.

The agricultural advisory services governance (Figure 3-1, Section E) appear to be strongly controlled by the institutional, hierarchical government structures who administer technical advice, distribution of many of the production inputs, resources and equipment while often governing the direct marketing of some produce. IGOs and other foreign entities need to interact well within the bounds of government departmental guidance to be able to operate within Iraq. However, the UN Development Program in Iraq is already using participatory approaches with the aid of various IGOs to promote community development in many practical social areas. They state that "*Participatory assessment tools and methodologies are important in order to ensure that communities themselves are able to highlight the main threats to their safety and barriers to development and help shape the responses required"* (UNDP 2014, p18). This will ensure interventions are market driven, responding to community needs and will therefore strengthen community ownership. They are already reporting success stories using this approach in key areas such as job creation, womens' small business development and social cohesion (UNDP 2015). This clearly shows that participatory approaches leading to the empowerment of community level groups can be successful within Iraq, but the process appears to be reliant on the project facilitation of NGOs. If a similar approach was able to be applied more broadly to agricultural redevelopment, then it is

possible that Iraq's recovery from the current conflicts may provide an opportunity for new methods to be successful.

There appears to be a strong network of private operators and organisations that support farmers with information, finance and marketing of produce that is not strongly recognised, engaged or utilised by the public extension system. There is little evidence of government decentralisation to provide greater autonomy and resources to workers in the field or private businesses that could assist in achieving increased agricultural innovation. There is however some government programs to encourage grower organisations to develop and help support farmers within various industry sectors.

The capacity (Figure 3-1, Section F) of agricultural staff at the village levels to undertake training, influence the building of infrastructure or obtain basic operation resources appear to be limited without the direct influence of NGO project initiatives and financing. It can also be very dependent on the attitudes and relationships with the managers above them. It remains very difficult for the public agricultural advisory services to engage the needs of many small peasant farmers who are mostly entrenched in simple low risk, low production traditional enterprises.

The management styles (Figure 3-1, Section G) within government are very top-down rather than participatory, and more transactional or task oriented, rather than transformational and empowering people create change. There appears to be little accountability for program outcomes and an unwillingness to apportion blame where things go wrong or targets aren't met. This can lead to missed opportunities to learn from mistakes or to quickly take corrective action. There is also generally a lack of communication and co-operation between government departments in areas that could greatly benefit from joint planning and sharing of ideas and resources.

Advisory methods (Figure 3-1, Section H) tend to reflect the top-down methods of management within government. While there is a strong desire amongst agricultural workers to engage in more participatory extension approaches, there are many barriers to achieving this that come from both the controlling government structures, as well as the rural communities that have little trust in the government. The main activities of extension services appear to focus on the provision of technical information to encourage best management practices, as well as the facilitation and demonstration of projects using research farms or leading farmers' properties to showcase these new technologies and train farmers in their application. Their remains a strong need for incentives to be provided to ensure farmer participation, which may also be important to help offset potential short term costs of farms moving to new methods or enterprises.

The role for agricultural extension workers appears to be strongly entrenched in the application of technology, rather than the building of farmers' capacity to be able to operate

successfully within a market driven economy, while developing the supporting networks and structures to allow this to be more easily accessed. However, such pluralistic and innovation system driven approaches would currently be very risky for the government to pursue while there are such high level of corruption and nepotism evident within and outside of government, unless stronger systems of accountability were able to be employed.

The issues highlighted within both the Contextual Factors (Figure 3-1, Section A-D) and the Agricultural Advisory Service characteristics (Figure 3-1, Section E-H) directly influence the performance and the quality of service provided (Figure 3-1, Section I), the farm household status (Figure 3-1, Section J) and the resultant impacts on productivity, wealth and community development (Figure 3-1, Section K). There is great potential for improvement to be achieved in all of these areas, but not without some fundamental changes to occur within this country, initially through achieving peace, security and optimism, but also in finding ways to implement more participatory processes and AIS.

Birner and others (2009) state that it is not a case of employing a particular "one size fits all" program of reform, but rather develop a strategy that "best fits" the country, culture and context to which it is being applied. There are many issues and barriers within Iraq that will not change quickly if at all, and it is therefore better to recognise this and work towards effectively changing the things that can result in better outcomes for all involved.

5.6 Conclusions

This study has revealed that much of the Iraqi agricultural extension system is based in a top-down model of Technology Transfer, Diffusion of Innovation and focussed on the passing on of predetermined programs and messages from the Government sources. This a long way from participatory approaches that place the farmers in the centre of the extension process, as an active participant in decision making and development of the practical application of new technologies, rather than just receiving technical information.

While policy planning documents speak of decentralisation aims, the reality is that decisions and approvals for activities remain very centrally controlled. This is evidenced in both the communications and operational structures of field workers, as well as the lack of resourcing of field officers to be able to adequately engage with the farming communities. Centralised control places distance between decision makers and clientele, resulting in a lack of accountability required to those being affected at the ground level. This only reinforces the lack of trust that farmers have in the government, which is all very counterproductive to applying participatory principals, pluralism and AIS.

Existing extension programs are highly reliant on incentives to help farmers to attend training or apply new technologies. This is partly due to the high risk of farming, poverty, available resources, environmental impacts, lacking infrastructure, insecurities and the large fluctuations in markets and prices. Providing subsidy incentives will always be important in a country with high risks for poor farmers.

There appears to be a strong culture of corruption and manipulation among all levels of society, both within government officials using bribes, nepotism or protecting their positions of influence, as well as by many farmers who will often sell things the government gifted or subsidied (such as seed, fertiliser, livestock or equipment) on the black market for immediate financial gain.

While there is reasonably well structured agricultural extension branches within the Ministries of Agriculture and Water Resources, and a desire from workers to be operating within a participatory and inclusive approach, there appears to be a lack of resourcing and capacity to engage and affect change within the majority of poor Iraqi farmer communities. There is a high percentage of peasant Iraqi farmers who have little desire to participate in agricultural extension activities involving technology change due to their lack of trust in the government institutions, as well as the high risks they encounter. Many are illiterate, poor, and strongly steeped in the traditions of their forefathers. There remain many challenges for advisory services to support farmers within the current government systems that are greatly constrained by decisions requiring multi-layers of approvals, poor communications between departments and sectarian issues, corruption and officials, and little autonomy given to local staff on the ground.

The application of the OTG project described in this paper does suggest that participatory principals to project management can be achieved within the Iraqi government extension systems to some extent. This required a very different project management structure from the existing government systems. Two key factors were the engagement of key leaders who understand and promote participatory principles to all those project workers beneath them, as well as the strong influence of like-minded NGOs and IGOs who can support this to happen. These key participatory principles need to become an integral part of the government system of managing their programs, projects and most importantly their people, before they will be able to affectively apply these approaches at the farmer level.

When analysing the Iraqi agricultural advisory services within the framework of Birner and others (2009) it was clear that the contextual factors within Iraq provide a very poor fit for the application of participatory extension within AIS. As the world increases in complexity, agricultural development and innovation must become more market and demand driven, and break from these very linear and limited conceptions of extension being the passing on of technical information from government experts to the recipient farmers (World Bank 2012). For participatory approaches to work well within a framework of AIS, there needs to be local, motivated, functional farmer groups and service providers that are well facilitated by extension services. This allows for more farmers to be reached with limited resources, while encouraging local empowerment and ownership (Rivera 2011). However, this will be very hard to achieve when the government's own departments operate under a very autocratic system that does not encourage self-determination at field levels.

Taking a pluralistic approach could address the large disconnect between what the extension staff and farmers. Encouraging more local autonomy empowers farmers into more positive action and innovation. At present it does not appear a natural thing in Iraq for anyone to willingly make themselves accountable to anyone of lower education or community status. Yet one of the strengths and attributes of participatory extension is that it recognises and values indigenous knowledge, which is fundamental for gaining farmers trust, and then build their willingness and capacity to improve their production systems and livelihoods. However, building trust is always based on the development of long term, stable relationships that are capable of evolving to meet new challenges (Rajalahti, Janssen et al. 2008). This may take a very long time to change in Iraq and new alliances to form.

Much of the resourcing for rural development will still need to come from the central government, while providing co-ordination and regulation of activities, but also by endorsing the outsourcing many of the services to key providers. This greatly increases the importance and influence of industry groups and farmer associations (which the Iraqi government already encourage and support) in both representing the farmers and providing services, resources and marketing according to local needs, rather than the previous nation-wide policies that may not target the specific areas required. The public sector at the central national level needs to focus more in providing an enabling environment with conducive policies, strategies

and necessary regulations to allow these industry groups and private service providers at the local levels to make innovation successful (Heemskerk and Davis 2012). In Iraq, this could involve improved government regulation of cheap imported agricultural produce that greatly increases the price risk to the local growers and stifles this industry development.

AIS strategies have potential to help overcome the current advisory systems inability to engage with the majority of small farmers who are generally very sceptical and do not trust the government and re unwilling to become involved within the Government programs. Many of these farmers are operating in a more market driven system, where they talk directly to the small business operators in the market place (discussion with farmer from Table 3-1). These people know what is required and what is commanding a higher price. It is in their interest to promote this as they sell to the city markets.

The small business operators often send representatives to Extension Department training days. They also can have a role in securing some finance for farmers to be able to grow specific produce. These agricultural business people are rarely mentioned within Iraqi extension systems, yet appear to be well placed for providing the services required in pluralistic decentralised extension services. However, in Iraqi society there are many businessmen that may use such an opportunity to exploit both the Government support and the farmers, so any such move toward more pluralistic approaches would require strong governance structures to succeed, and avoid the detrimental consequences of corruption.

Iraq appears to be strongly entrenched within a traditional view of a top-down, information driven centrally controlled agricultural advisory system. This does not fit well with the modern approaches to agricultural development of participatory extension approaches within AIS that are being implemented successfully in many countries across the world. There is evidence that participatory extension can be applied to some extent within Iraq where there are strong supporting external influences to make it happen. While there are policies encouraging pluralistic approaches to be taken, and opportunities identified where this could make important positive changes to the adoption of innovation, there remain strong contextual, political and cultural issues that make this very difficult to be achieved.

6 Barriers to Participatory Extension in Egypt: Agricultural Workers' Perspectives

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Name of Principal Author (Candidate)	Christopher Peter McDonough		
Contribution to the Paper	Identification of research gap, theoretical conceptualisation, fieldwork design and data collection, analysis and interpretation of results, writing of manuscript and acting as corresponding author.		
Overall percentage (%)	80%		
Certification:	This paper reports on original research I conducted during the period of my Higher Degree by Research candidature and is not subject to any obligations or contractual agreements with a third party that would constrain its inclusion in this thesis. I am the primary author of this paper.		
Signature		Date	22/01/2019

Co-Author Contributions

By signing the Statement of Authorship, each author certifies that:

i. the candidate's stated contribution to the publication is accurate (as detailed above);
ii. permission is granted for the candidate in include the publication in the thesis; and
iii. the sum of all co-author contributions is equal to 100% less the candidate's stated contribution.

Name of Co-Author	Dr Ian Nuberg		
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Barriers to Participatory Extension in Egypt: Agricultural Workers' Perspectives

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6.2 Abstract

Purpose: This paper examines extension practices of agricultural workers within the Egyptian government and the perceived barriers they face in implementing participatory approaches, identifying improvements required in research and extension processes to meet the real needs of Egyptian farming communities.

Design/methodology/approach: Key barriers for engaging in participatory extension were identified using content analysis of semi-structured interviews, surveys and focus group discussion of 37 government agricultural workers along with participant observation and review of existing literature.

Findings: The majority of workers surveyed understood basic participatory extension principles and desired to use these approaches. Changing from traditional "top down" extension to systems that engage with farmers' needs at the community level is made difficult due to the aging and poorly functioning Village Extension Worker (VEW) network. Thus, it is far easier for the research driven extension programs to use technology transfer models.

Practical Implications: Participatory extension relies on strong relationship building and open communication between farmers, extension workers, researchers, interest groups and policy makers. The Egyptian Government must properly establish and resource the pivotal role of VEWs within the extension system to meet its strategic aims of modernising agriculture, developing food security and improving the livelihoods of rural inhabitants.

Originality/value: This paper captures the unique perspectives of government research, extension and education workers involved in agricultural development at a time directly after the 2010 revolution, when they were able to more openly reflect on the past and present situations.

Key Words: Participatory Extension, Agricultural Research, Village Extension Workers, Egypt, Transfer of Technology.

6.3 Introduction

Developing countries in North Africa and the Middle East face many challenges as they attempt to modernise their agricultural systems to achieve food security and reduce rural poverty. As Egypt strategically plans improvements to its agricultural sector, the country is experiencing rapid population growth, urbanisation and increasing pressures on its productive land and valuable water resources. Government agricultural workers play a pivotal role in supporting these developments, whether they are researchers, extension workers or program managers, and their success in facilitating lasting change in rural communities will directly depend on the approaches they take.

Modern extension strategies for achieving agricultural development clearly recommend the use of participatory extension methods that take a broad approach to supporting rural people rather than just providing advice or information (FAO and World Bank 2000, Ponniah, Puskur et al. 2008, Christoplos 2010, Swanson and Rajalahti 2010). These approaches involve farmers being consulted about their needs and participating in the development and implementation of new technologies in ways that could best serve their rural communities (Swanson, Singh et al. 2012). The strength of participatory extension is that it empowers people to change, recognising the value of indigenous knowledge, and helps to provide easily accessible pathways for change. Agricultural Innovation Systems (AIS) strategies now encourage new ideas to emerge through a collaboration of stakeholders, and are adapted, adopted and integrated into rural enterprises (Garforth 2013). However, agricultural extension in most countries was founded on the conventional top-down, transfer of technology (TOT) models, as described by Pretty and Chambers (2003) and Rogers (1995). While Egypt is no exception, there have been clear indications over the last 20 years of a desire to move toward more bottom-up participatory methods (Rivera, Kalim Qamar et al. 2005).

The aim of this study is to identify the barriers to achieving participatory extension in Egypt from the perspectives of a key section of government agricultural workers employed in technical research centres, extension research institutes and education systems at various levels. This paper begins by outlining developments in Egyptian agricultural extension over the past 30 years, followed by a description of the survey methods. The results and discussion presented focus on:

- Extension approaches currently being understood and used in Egypt.
- The barriers to achieving participatory extension, and what will be required to overcome these.

Findings from this study will target key areas of reform that need to be considered to help maximise the effectiveness of the Egyptian agricultural sector as it seeks to implement the Sustainable Agricultural Development Strategy of the Ministry for Agriculture and Land Reclamation (MALR), and will have implications for other countries seeking to improve their systems of agricultural development.

6.4 Background of agricultural extension in Egypt

Egypt experienced political upheaval with the fall of the Mubarak regime in 2010. The increased uncertainty had a significant impact on agricultural sector investment, resourcing, governance and security. Despite these political changes, the long term goal of the MALR as outlined in the mission statement of the Sustainable Agricultural Development Strategy Towards 2030, is for *"modernising Egyptian agriculture based on achieving food security and improving the livelihood of the rural inhabitants"* (ARDC 2009). The challenge for Egypt's public sector involved in research, development and extension services must be to support market competitiveness for commercial agriculture operating in a global market, while at the same time addressing poverty in rural areas. The development strategy makes it clear that achieving this will require a shift in the way agricultural development programs are planned, co-ordinated and managed, both within and across government departments and by engaging with all relevant institutions and rural organisations.

Historically, extension services have been set within a very complex structure (Figure 6-1) essentially involving the ministry or nationally managed Agricultural Research Centre (ARC), with various research institutes and Subject Matter Specialists (SMS) providing information and support about new technologies to the many Village Extension Workers (VEWs) managed under the Agricultural Directorates at the Governorate level (Rivera, Elshafie et al. 1997). The role of the VEWs was to take and simplify these technical recommendations for implementation with the farmers in the local villages, convincing farmers to use new methods through using persuasive arguments, recommending what could be applied under the local circumstances and taking farmer issues and problems back to the researchers to find solutions (Wahba 2011). The MALR generally invested heavily in providing answers to solve technical problems, with less energy being directed towards capacity building, support systems for change and meeting farming families' wider needs, and often poor co-ordination and communication between the groups across the agricultural sector (Rivera, Kalim Qamar et al. 2005).

In 1985 the National Agricultural Research Project was established to help boost Egypt's agricultural productivity. However, initially it was so focussed on research that it spent little time on technology transfer and extension. After 3 years, the Technology Transfer Component was added to improve the process of getting the research to the farmers, and to improve the capabilities of the "research and extension system". In 1991 the Agricultural Extension and Rural Development Institute (AERDRI) became responsible for conducting "action studies" for technology transfer. There continued to be lack of communication between researchers, VEWs and farmers and research conducted was often driven by university higher degree study requirements, rather than needs analysis conducted at the farmer level. Hence, much was unused because it was not applicable or did not meet the needs of the intended clients. The various research institutes lacked the staff experienced in social science to conduct interdisciplinary rural development research, which would explain

their focus on technical issues rather than the wider social considerations required to create easier pathways for people to embrace change (Honadle 1994).

There was a lack of communication between various components of the Ministry of Agriculture, in the planning, resourcing and dissemination of research initiatives. The AERDRI needed to build stronger partnerships within and outside the ARC to build on and co-ordinate research, instead of acting in isolation. Poor resourcing was also identified as constraining extension programs through lack of transport for worker to get in to the field, cramped working conditions with poor access to computers and equipment, and administrative delays in reimbursement of travel costs (Honadle 1994).

By the mid-1990s, Egypt's extension system had become a very large, centrally managed bureaucracy that needed to adapt to the new environment of privatisation and market liberalisation (Fleischer, Waibel et al. 2004). Rivera and Elkalla (1997) describe key areas of the Egyptian agricultural extension system that needed reform. Firstly, there was concern over the lack of extension policy on which to base strategies, the lack of co-ordination both within the MALR which was undergoing transition, and other Ministries and related agencies and programs. Secondly, within the MALR, top and middle level staff were said to be poorly qualified and managed, there was a lack of structural clarity between research and extension, and offices were very poorly resourced to carry out basic tasks. Thirdly, a lack of attention was given to farmers' commercial needs. Realising the need for participatory, farmer oriented approaches the Egyptian government introduced pilot programs with facilitator training based on Asian Farmer Field School techniques, with the support of foreign bi-lateral aid agencies. However, the VEWs found it difficult to embrace the participatory methods involved, and were more focussed on lecturing farmers about improved technologies, rather than facilitating interactive discussion, learning and experimentation that would lead farmers to become better decision makers (van de Pol and Awad 2002).

In the early 2000s the public Egyptian agricultural system was still strongly oriented toward scientific disciplines, lacking interdisciplinary exchange among staff, generally using traditional top-down, information driven, technology transfer methods of extension and deficient in addressing farmers actual information needs (Fleischer, Waibel et al. 2002, Rivera, Kalim Qamar et al. 2005). The Egyptian government continued with numerous participatory extension programs, with assistance from bilateral donor agencies to help transform the extension agencies toward capacity building of both extension workers and farmers. There was some evidence of moves toward decentralisation, with agricultural directorates at the governorate level participating in the development of extension plans for local areas. Regional Research and Extension Councils were established to help ensure services were closer to meeting farmer needs and encourage the use of participatory approaches to engage all stakeholders. The role of VEWs through this period has been described by the ARC as being pivotal within the Egyptian agricultural extension system, and the key communication link between the researchers and the farmers (Wahba 2011).

6.5 Methodology

Traditionally agricultural extension models have been based on the premise that pathways to change are relatively simple and linear. A need is perceived, research is conducted, the resulting technology is demonstrated with leading farmers which is observed by other farmers and reproduced, leading to widespread adoption, with extension workers facilitating this process. In contrast to this, Maguire (2011) defines complex systems as featuring many different elements that are richly influencing and impacting one another in non-linear ways. This is clearly more reflective of the task of modernising Egyptian agriculture which includes many varied stakeholders, including farmers, their families, suppliers, marketers, government officials as well as the impacts of regulations, available resources, poverty, education levels, information accessibility, water controls, transport and political uncertainty. To achieve change in complex systems, Checkland and Poulter (2010), Leeuwis (2004) and Cooksey (2011) express the need to gain the perspectives of the problems and solutions of all key stakeholders, if effective shared resolutions are to be found and implemented.

To analyse agricultural advisory services, Birner, Davis and others (2009) describe a conceptual framework based on contextual factors, and how they fit with key characteristics of the agricultural advisory services. This involves gaining a practical understanding of governance structures, capacity, management and advisory methods. This research provides a vital component in constructing the overall rich picture of the Egyptian agricultural development process by focussing on the government agricultural workers directly involved in research and extension. Their perceptions of how they interact with farmers, representative groups, district and village level extension workers, NGOs as well as their managers and policy makers will greatly impact the MALR's capacity to find solutions that can best fit the particular complexities of the Egyptian situation. In the past there has been little information gathered on the challenges facing these workers, particularly through times of the previous government's cutbacks to resources in extension services, and when any perceived criticism was not tolerated. This study provides key insights as to how well participatory extension principles are being implemented in Egypt, from the perspectives of key government workers within this system.

This qualitative research used content analysis with a combination of data collection methods including semi-structured interviews, surveys with open-ended questions, focus groups, and participant observation involving project preparation and presentation, extension training and field visits. Thirty seven leading Egyptian agricultural research and extension workers from various government departments, institutes and locations across Egypt were directly involved. They were selected by the Egyptian government for extension and leadership training programs in both Egypt and Australia in 3 cohorts over the period June 2011 to March 2012. The principal author was a trainer facilitating this program. As such, the sampling method can be described as "purposive snowball sampling" (Patton 2001).

The timing of this research was special in that it followed the downfall of the long standing Mubarak regime in 2010. As such this this leading group of agricultural workers were less inhibited to express their opinions on the issues relating to the previous Government's programs and performance. Of 37 participants, 32 were a part of the MALR (Figure 6-1) involved in Research Institutes (including AERDRI, the Soil, Water and Environment Institute, the Agricultural Engineering Research Institute and the Central Laboratory for Agricultural Climate) and Regional Research Stations, and one from within the Central Administration for Agricultural Extension Services (CAAES). Five participants were employed by various universities. Of these participants, 6 were in higher level management or director roles, 3 also worked as private agricultural consultants, 2 also worked for NGOs and 5 respondents were also directly involved in their own family farms. This group represented a key sector of stakeholders in agricultural development, being directly involved in research, extension, education and administration of agriculture in Egypt, with many having direct linkages with senior MALR managers and policy makers, while also associated with activities at the farmer level. By hearing the stories (Cooksey 2011) and understanding the actual experiences of this group that are central to the governments agricultural programs, important deficiencies in the application of participatory processes were able to be explored. One key weakness that clearly emerged within this action research was the capacity of the VEW network. While it is recognised that directly capturing perspectives from VEWs would add value to the rich picture of the Egyptian extension system, it was not possible under the circumstances of this project.

Twenty semi-structured, in-depth interviews were conducted (using a voice recorder with responses then transposed), along with 13 written response surveys, with all data being coded and grouped into themes and sub-categories using conceptual content analysis (Walter 2010). An interpreter was used where participants preferred to communicate in Arabic. The questioning in both the interviews and surveys were aligned with key classification criteria described by Birner, Davis and others (2009) for assessing advisory methods of extension services. This included the types of training or technology transfer activities, the number of clientele, the extent of client involvement in planning and problem solving, and the types of media used to communicate messages. They followed the structure of establishing participants' perceptions of:

1. The nature of agricultural extension. They were asked for their own definition, who is involved and what roles they play, followed by a description of successful extension activities they have been directly involved in, and unsuccessful programs they were aware of.
2. Which models of extension most reflected the situation in Egypt, and the relationships between the various stakeholders involved. They were presented with a number of extension models ranging from technology transfer "diffusion of innovations" to more participatory designs,
3. Barriers to achieving agricultural extension in Egypt, and what needed to be addressed to improve the situation.

The first of three focus group discussions involved 11 Egyptian workers and explored barriers to achieving agricultural development in Egypt, and what improvements were needed to overcome these. The second focus group involved 10 different Egyptians, and discussion centred on the difficulties they perceived with the VEW network, including how they related to researchers, their abilities to work with farmers and their resourcing needs. This was in direct response to some major issues regarding mistrust of VEWs by one of the interviewees who was also a farmer, which had not clearly arisen in previous interviews, and helped to clarify that these issues were widespread among the areas that the wider group worked in. The final focus group involved a practical exercise in conducting participatory group meetings and discussing how easily these principles were, or could be applied in Egypt and involved 28 participants. Key agreed outcomes and observations from these discussions have been reflected within the results.

Data was also gathered through participant observation of the preparation of 7 extension projects involving 16 workers, another 5 project presentations involving 11 workers, participatory extension training exercises involving 28 workers, and 1 site visit to a major Egyptian extension project involving interactive farmer / government worker discussions. These activities were analysed in terms of how well they involved key participatory principles of building relationships with all key stakeholders, understanding their needs and building their capacity to change, rather than top-down information flow from agricultural experts.

Data gathered from these various means was analysed against existing literature describing the Egyptian agricultural systems and modern extension methods. This triangulation of data sources (McMurray 2006) representing the direct experiences of the participants, observing their approaches to designing and implementing extension activities, along with existing data, has strengthened the findings and conclusions of this study. This has provided information about the governance structures, the capacity, the management and the advisory methods of the Egyptian Agricultural Advisory Services, as well as the contextual framework in which these services fit (Birner, Davis et al. 2009). Faure and others (2011) used a similar approach of combining interviews, project evaluation, and literature sources to characterise these framework components and interactions when analysing the advisory services of Benin and Burkina Faso.

Figure 6-1. Organisation structure of research and extension within the MALR, with shaded areas indicating main employment areas of participants in this research.

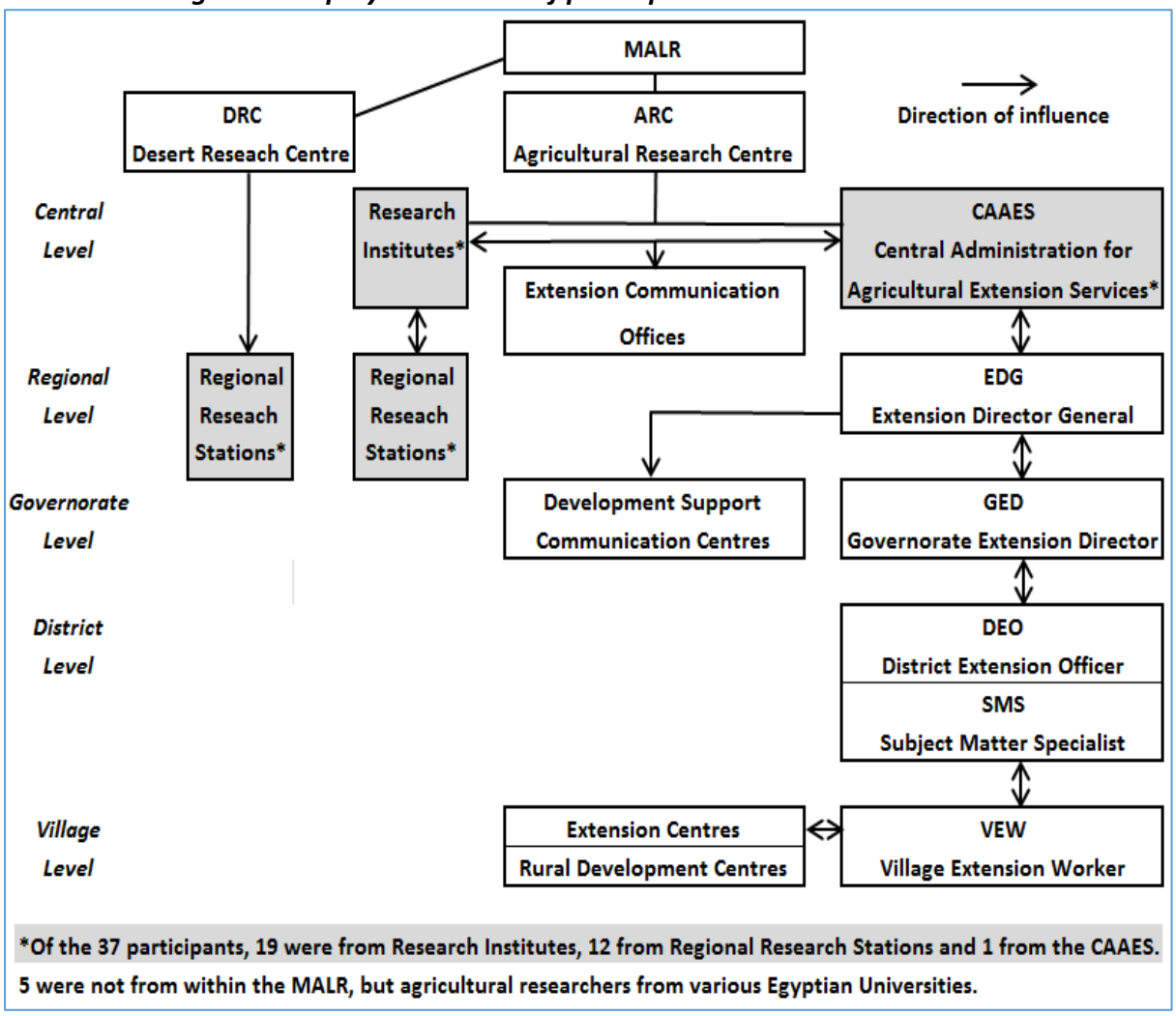

Diagram adapted from 2011 conference presentation of Dr Ahmed Wahba
Vice President for Extension and Training, ARC, (Wahba 2011)

6.6 Results

This presentation of the results of the survey will generally follow the sequence of questions as follows:

6.6.1 Agricultural workers understanding of agricultural extension.

One third of participants essentially described agricultural extension as the passing of technical information or new findings from expert research through the extension officer to the farmer, who was sometimes described as ignorant or uneducated. The flow of information was distinctly "top-down", but occasionally included mention of farmers contacting experts from the MALR to give them answers about specific agronomic problems, such as disease control. This view of extension was generally reflected in examples of activities they described as being involved in. When asked who the people involved in agricultural extension were, this group clearly focussed on the extension staff and researchers

within the MALR as well as university experts. It was generally only after the question was rephrased to "If a farmer wanted to make a change or improvement, where would he go for help to make that change?" that discussion about other farmers, resellers, farmer associations, consultants or community leaders gradually emerged.

Another third of those interviewed defined extension in terms of basic participatory principles, involving farmers and end users being consulted about their needs, and participating in the development and implementation of new technologies, in ways that could best serve their rural communities.

The final third gave a broader description of participatory approaches that included key AKIS (Agricultural Knowledge and Information Systems) concepts of building knowledge and capacity and identifying the many stakeholders contributing to the process other than just government "experts". When describing extension activities, there was clear desire to engage farmers to meet their real needs, and processes where farmers shared in finding practical solutions was evidenced in some instances.

6.6.2 Agricultural extension approaches used in Egypt.

Participants were shown simplified diagrams of extension models, including:

- Transfer of Technology - Diffusion of Innovations, with top down information flow from research and development, through extension agents to innovators, then early adopters, the late majority and finally laggards, based on Rogers (1995),
- Participatory models, ranging from showing a circle of researchers, extension agents and farmers connected with two-way communication, or a triangular diagram showing research, extension and education at each point with the farmers in the centre, based on FAO and World Bank (2000) and (Ponniah, Puskur et al. 2008), as well as a more detailed links between a large number of stakeholders, both public and private.

The majority of respondents thought that the "Technology Transfer – Diffusion of Innovations" model best described the extension processes that were mostly being used in Egypt. The Egyptian researchers gave many examples of successful extension by way of demonstration plots on farmer fields showing greater yields from improved varieties. After seeing these results, early adopting farmers would quickly upgrade, soon followed by the late majority of farmers, once it was clear that the benefits would clearly outweigh any risks of change. "Egyptian farmers will not change unless they see it with their own eyes" was regularly quoted during interviews and focus group discussions. However, when asked for their opinion as to which extension model would be best for Egypt, participatory models were always chosen, with the majority expressing that increased training in participatory extension was needed.

A presentation from the ARC clearly stated that they were “the main source of technical recommendations in all agricultural activities, and the VEW simplifies it and spread out the information to implement in their fields” (Wahba 2011).

6.6.3 Barriers to achieving good agricultural extension.

When asked to describe the barriers they perceived in participatory approaches happening in Egypt, a number of key issues arose, including:

- The majority of traditional farmers in the “old lands” of the Nile Valley and Delta lack trust in government workers and programs and are very wary of government regulations and officials. They often believe that the government just do not care about them, or are trying to keep them poor to maintain control. They are sceptical of their manipulation of things like fertiliser subsidies or certain commodity prices that greatly impact on their livelihoods.
- Farmers’ lack of trust of government led to the suggestion that Transfer of Technology models were often easier for the government workers to operate (working with a few larger farmers), and that participatory approaches were more likely to be embraced when government was less involved.
- Many new agricultural technologies presented by researchers did not adequately match the real needs or capabilities of the farmers. Many researchers were described as being in a technical and economic mindset and could not understand why farmers did not change.
- Extension workers lack autonomy to be responsive to the immediate needs of the farmers.
- There is a lack of communication and co-ordination of activities within MALR and with other government departments, universities, as well as other key stakeholder groups. This issue was also highlighted within focus group discussions. One university engineering researcher complained that he could find no-one to assist him in establishing some field work, and there was no mechanism for him to be able to collaborate with the MALR Engineering Research Institute to further his work toward gaining farmer adoption.
- There is a lack of support for farmers to transport, store or market their produce efficiently, making it difficult for them to embrace new crops, varieties and technologies that the researchers were wanting to promote.
- There is a lack of farmer finance to upgrade their basic infrastructure or machinery.
- Extension workers are unfamiliar and find it difficult to work with farmer discussion groups, as previous contact has been one-on-one as problems arose.

6.6.4 Deteriorating VEW network

A key area of concern raised by nearly all participants related to the functioning of the VEWs. They were often described as being very old and lacking relevance as they had not kept up with technical information and modern farming. They were said to be very poorly resourced

and lacking adequate transportation to be able to engage with local farmers in their fields. Their positions are very low paid, with most requiring other jobs to support their income, leaving little incentive to attract new workers. Numbers had reduced substantially in the last decade, due to many reaching retirement age and the lack of adequate resourcing and staff replacement, often leaving only single workers in local offices that used to operate with an array of specialists. Examples were given where this has left many VEWs in the difficult position of having to perform regulatory roles, such as reporting farmers to authorities for building extra dwellings on their agricultural land. Poor farmers do not have the capacity to purchase homes in residential areas, but can receive large fines or incarceration if prosecuted, and therefore will see VEWs as a serious threat and not to be welcomed and certainly not trusted.

Some participants gave examples of their extension programs that involved VEWs. For example, rice researchers train them to assist in the dissemination of new short season variety technologies to farmers, as well as participate in farmer field school activities in local communities. However, many researchers simply avoid engaging with the VEWs when looking for demonstration sites or even gaining farmer perspectives, and would try and use other means to contact local farmers. This would often result in them working with a few of the larger farmers who had more capacity to apply the technology. In all the discussions there were no examples given of VEWs providing farmer feedback that lead to agricultural programs developing in a participatory nature.

This issue stems back to policies in the 1960s to1980s that guaranteed public employment to university graduates and then even those of secondary vocational schools and training institutes, in a political climate that made staff redundancies impossible. This policy left the MALR with far more employees than it actually needed (World Bank 2009). The vast majority of VEWs were employed between 1978 and 1982 to provide intensive support for the Egypt's "strategic crops", such as cotton (van de Pol and Awad 2002). In 1984, the Government imposed a hiring freeze on the MALR due to a balance of payments crisis in the early 1980s. In 1998 the number of VEWs in Egypt was still estimated to be 30,000 (Fleischer, Waibel et al. 2002), with multiple specialists being available to local farmers at a very high ratio of about 1:200. However, in 2011 the number of VEWs was reported as 3,417, with 31% having a science degree, while 69% had only a secondary school diploma (Agricultural Extension and Advisory Services Worldwide 2009). The MALR has circumvented the hiring freeze by hiring temporary staff that are generally on renewable contracts of up to one year. This presents its own issues such as staff morale and maintaining institutional memory. A survey of 19,909 MALR workers in 2008 revealed they had an average age of 52, with 50% being at least 56 years old, resulting in the likely retirement of half of the work force (age 60) by 2013, and that there were approximately 20,000 temporary employees within the MALR (World Bank 2009). Similar results were found by Gad (2009) in the Menoufiya Governorate. This clearly demonstrates key reasons for the demise in the role of this service that has become a very easy target for government cutbacks (World Bank 2009).

6.6.5 Participatory programs

Despite these barriers there were also good examples of participatory extension both described and observed. The examples were generally by those working with NGO funded programs in which AKIS thinking was fundamental to operations. One example is the International Fund for Agricultural Development project in the "new lands" (areas of reclaimed desert through irrigation for agriculture and resettlement) of West Nubaria, where there was strong evidence of relationship building and inclusive interaction emanating from the leader of the Research Centre and clearly evidenced through the research and extension officers in the way they dealt with the farming families. The project has not only provided technical information for irrigation strategies and agronomic support, but also supported farmers in forming partnerships and grower associations to help market their produce profitably. Rural women and youth have been trained and financial support provided to help develop these rural businesses. The government has also built community facilities in education and health, ensuring a holistic approach is taken to this rural development program (IFAD 2010). When one of the West Nubaria Agricultural Centre participants was asked for a definition of "extension", he thoughtfully paused and then replied "It's helping farmers to change". This statement most clearly reflected the participatory nature of the projects he was involved in, and was in direct contrast to the common responses about passing on new technological information to farmers.

There were also very positive descriptions given of farmer field schools, embracing strong community engagement, including women and youth in training and capacity building funded by that have grown out of Egyptian-German and Egyptian-Dutch Projects (van de Pol and Awad 2002). Workers involved in the RADCON (Rural and Agricultural Development Communication Network) funded by the Government of Italy and supported by the FAO also spoke of using participatory processes to assess farmer needs and finding ways to help communities engage in modern communication systems. Staff from more remote Desert Research Centres (DRC) also told a story of changing initially reluctant local farmers by taking them overseas to convince them of a new technology, helping them to establish it for themselves, and then supporting them to extend this exciting new expertise throughout their regions. "The Bedouins are very smart" was this worker's comment, which was in stark contrast to other references researchers had made to "ignorant farmers".

6.7 Discussion

The Egyptian government aims to achieve comprehensive economic and social development through its agricultural sector and reduce rural poverty, and its workers involved in research centres, extension institutes and universities have an important role to play in achieving this. The results of this study are discussed within the context of the conceptual framework for analysing agricultural advisory services of Birner and others (2009). This is by no means an exhaustive description of the whole system, but rather a contribution of key factors from the perspectives of the sources used.

Egypt's agricultural research and development has previously been described as being too centralised and using top-down technology based extension (Rivera and Elkalla 1997, Fleischer, Waibel et al. 2004, Rivera, Kalim Qamar et al. 2005). This study found that these approaches as described by Chambers and Ghildyal (1985) are still deeply embedded within the Egyptian agricultural sector, encouraging an ongoing structure of centralised knowledge and control, despite a growing understanding and appreciation of more participatory extension approaches among ARC and DRC employees.

The MALR's strategic plan clearly acknowledges the "weak performance, limited capabilities and continual erosion of the agricultural extension system staff structure" (ARDC 2009, p105). It highlights lack of confidence between the extension workers and the farmers, as well as the research institutions, and hardly any co-operation with the universities. The plan seeks to reverse this trend, strengthen reform and modernise the extension system, including extensive training programs for extension workers in specialist areas. It also recognises that staff are poorly paid, needing to find outside work to improve their living standards, and suggests introducing some performance based incentives to address this.

The vast majority of farmers are poor, with very small land holdings, low education levels (Abdel-Maksoud and Abdel-Salam 2012) and limited capacity to change. Many are very sceptical of government motives and do not trust government workers. There are poor levels of infrastructure and support services to enable farmers to easily embrace innovation (Shalaby, Al-Zahrani et al. 2011).

6.7.1 Characteristics of the Agricultural Advisory Services

Modern participatory approaches to agricultural development have farmers collaborating within research, extension and education systems to bring about changes that meet their real needs. This is situated within the sphere of Agricultural Innovation Systems involving two-way relationships with all other stakeholders, and this being supported by government policy and regulatory framework (Rivera 2011, Chowdhury, Odame et al. 2013), moving from centralised information based extension on production systems, to a more pluralistic market based focus (Benson and Jafry 2013, Garforth 2013). This study shows a number of major impediments for such a system to be working in Egypt.

1. The role of the village extension workers is becoming increasingly dysfunctional, being under-resourced, poorly trained, lacking transport and other basic facilities, underpaid and rapidly decreasing in numbers as a very high percentage rapidly reach retirement age. VEWs should be ideally placed to be working with the indigenous expertise of the farmers and using this in the application of new technologies, with the help of relevant technical experts, but instead appear to be losing contact with their farmers. This was confirmed in a recent survey report conducted for the Australian Government using a number of VEWs to interview farmers, after which they reported that they were surprised about how much the farmers knew (particularly the "uneducated women"),

the levels of technology that some farmers were using, and their lack of trust in the government to their solve problems (Fortune 2012). Those VEWs that remain in village centres are often laden with regulatory responsibilities, adding to their difficulties in establishing trusting relationships with farmers.

2. While the dysfunctional VEWs network presents a large impediment to improving participatory agricultural development, it would appear that changes are needed higher up. Argyris and Herbane (2005) describe single loop learning as when basic changes in an organisations action strategies can bring about new consequences for the desired results. However, in double loop learning there needs to be a deeper transformation to the governing values of the organisation that will provide the right framework to support new action strategies to bring about reform. The fact that these key roles of the VEWs have been allowed to diminish over many years and that this research showed little evidence of key information flowing from the farmers, through the VEWs to impact development activities, suggests that the "top-down" culture within the organisation is still dominant. While a participatory and pluralistic approach is encouraged in strategic plans, it would appear that this has rarely become an institutional reality within the MALR. Achieving institutional change within such Government bureaucracies that will allow for AIS to operate effectively is very difficult. In a study from Bangladesh, Chowdhury and others (2013) found that workers struggled to break free from government control structures, and lacked understanding of the motivations and needs of all stakeholders involvement (including farmers, NGOs and private organisations), reflecting poor human resource skills for facilitating innovation processes (including the co-production of knowledge, technology and adaptation). They found public sector thinking insisting on "what must be done, by whom and by when", was unhelpful in encouraging the critical innovative collaboration with the many stakeholders who may be more concerned with questions of why things should be done, and how they can creatively be achieved together. It is expected that similar challenges would need to be overcome in reforming the Egyptian government's approaches to innovation and change.

3. There remains very poor interaction between researchers and other agricultural workers from different departmental programs, ministries, universities and other organisations. Ideally the ARC and university researchers should be working closely together with the VEWs to be able achieve the best outcomes as most researchers are not able to easily engage with rural communities, to gain their trust and more fully understand their needs, without living amongst them. However, because this system is not functioning well, it is far easier for researchers (who themselves are under pressures of time, resources and need to report tangible results) to bypass the local VEWs and work with a few key farmers that have a larger capacity to easily establish and demonstrate the new technologies through strategically timed local field days. This has only reinforced the technology transfer approach to extension by the

research community. It takes far more time, commitment and energy to build ongoing relationships within communities to enable AKIS thinking that focuses more on the often complex linkages of ideas, associations, priorities and systems components involved in achieving the goals of sustainable agriculture (Röling 1988). Technology transfer models can lead to significant changes where there are relatively uncomplicated issues that can be solved by simple solutions that are easy to be visually demonstrated and adopted, without major changes to a farmer's operation. However, there is a danger that this may push extension activities to overly focus on demonstration, so that Egyptian farmers will be convinced by seeing the new technology, at the expense of helping to build the capacity of the rural poor to change by practically addressing their many other physical, social and economic needs.

4. There appears a high awareness and desire for participatory approaches amongst the agricultural research and extension workers, but a lack of capacity to embrace these, unless driven and resourced by outside influences such as NGOs which hold strongly to these principles. Breaking from traditional extension approaches is made difficult amid an inherent culture of centralised control, a lack of structures or networking forums to encourage collaboration with key stakeholder groups both within and outside government, and the lack of opportunity to engage farmers in meaningful discussion based on strong and trusting relationships.

The World Bank (2009) report reviewing Egypt's agriculture funding outputs suggested that the MALR's plan to place the extension services (including VEWs) under the ARC should be beneficial in strengthening the research extension linkages. It also cautioned about the risk of an ARC led extension service becoming too top-down, science driven and inward looking, rather than being driven by socio-economics and responsive to farmer driven demands, unless the ARC changed its organisational culture. However, this culture is unlikely to change without an extension service that has the capacity to engage farmers at the village level to bring them in as partners to the agricultural knowledge and information system. While researchers may endeavour to embrace participatory approaches, they will be unable to achieve this until they can be partnering with well trained, resourced and motivated VEWs who bring the needs and aspirations of their local farmers to the planning and development table.

There are, however, some examples where strong participatory extension approaches have been successful, usually driven by strong partnerships with NGOs and strong team leaders that have practical understanding of applying participatory principles, such as at West Nubaria with the International Fund for Agricultural Development (IFAD 2010). While Benson and Jafry (2013) highlight some issues of mistrust and control that can occur between NGOs and Governments, as well as their potential for stifling private sector extension services, the NGO activities experienced in this study were a significant catalyst in breaking from the traditional Government extension models. While these activities were less common it

certainly shows that development based on building farmers capacity to change can work in Egypt.

6.7.2 A new focus for extension services required by Government

It appears that the government lack of resourcing, replenishing and training of VEWs as required to meet the changing needs of the farming community has greatly diminished the quality of service provided for rural development. Where a history of mistrust exists, VEWs could attempt to build relationships by meeting farmers' needs through understanding issues from the farmers perspectives and working with them to find practical solutions (Benson and Jafry 2013). This approach involves far more than just supplying farmers with technical information. Workers on the ground will need more autonomy and support to respond to these demands and to affect change for local farmers. This process is what Cooksey (2011) describes as 'out of house story telling' leading to innovation that is more driven from the context of the potential adopters, rather than from the top-down, linear approaches taken by research and development organisations. This will require training in group facilitation, adult learning and social skills, rather than just technical knowledge. As farmers in developing countries become more integrated into an open market economy, there is a growing need for advisory support services to focus on the management of the farm (Faure and Kleene 2004).

For VEWs to move into this role it would require substantial training in how to strengthen farmers' capacity to assess their business and opportunities and make well planned decisions in farm management, rather than just provide technical advice. However, with such an aging workforce within the extension service, it is hard to see this as an attractive investment by the MALR, unless it is able to replenish it with younger, energetic and well qualified workers. Separating regulatory functions from the roles of the VEWs is seen as one of the key strategies required help turn this problem around.

Many Egyptian farmers are unable to embrace change due to impediments such as a lack of establishment finances, increased costs of inputs, wages and land, a lack of secure water, poor market prices and infrastructure support, family needs and personal problems (El-Ahmar 2007). Agricultural extension must seek to address these issues with farmers and communities to help them find pathways to change, rather than just demonstrate better production methods (Shalaby, Al-Zahrani et al. 2011). The MALR could achieve this using more participatory approaches where researchers, specialists, village extension workers and farmers work together empowering the rural people for change and recognising the value of their indigenous knowledge, viewing them as partners within the knowledge systems and not just recipients (Röling 1990, Chambers 1995, Pretty 1995, FAO and World Bank 2000, Swanson and Rajalahti 2010, Rivera 2011).

6.8 Conclusion

Egyptian agricultural systems are very complex in nature, involving many stakeholders and interactions that make rural development difficult. For farmers to be empowered to change using participatory extension approaches, their perceptions of the problems must be understood and valued, leading to actions that practically support them to change. The function of VEWs is paramount to building trusting relationships with farmers and other key stakeholders as they are designed to be the local service providers living amongst the farmers while having access to the researchers and policy makers in agricultural development. Without a properly functioning network of VEWs, achieving the necessary farmer participation for AKIS research and development becomes extremely difficult.

It is clear that the dominant view within the management of the MALR is that extension is essentially about the "transferring of technical knowledge from the expert researchers to the farmers". It is the author's view that if this could be changed to a broader understanding of "building farmers capacity to change" then this would lead to a greater appreciation of the value of village extension worker in facilitating agricultural development through truly participatory approaches. This would require adequate resourcing and training of the VEW network to one that is able to engage with the farmers, researchers and a wider group of stakeholders to bring about lasting change. However, with the present lack of trust by farmers of government workers, and with the aging VEWs nearing retirement and requiring a significantly new set of skills to meet these challenges, it could be a strategic time for the MALR to introduce a new group of such extension workers for this task, breaking from the old ways of the Mubarak era, with a new hope and enthusiasm for change.

Stronger networks of collaboration must be encouraged between, researchers, VEWs, Universities, NGOs, industry bodies, and other stakeholders to maximise effective shared outcomes and changes on the ground. A strong VEW network that is fully engaging farming communities would encourage more researchers to utilise VEWs when seeking to engage farmers in activities and establish research agendas. Without changes in these it will be difficult to see how the Egyptian research and extension system can move from "Transfer of Technology" models to truly participatory approaches.

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7 The challenges of applying participatory extension and AIS within Middle Eastern culture

7.1 Introduction

This thesis has demonstrated that there are clear barriers to successfully applying Participatory Extension and AIS within Middle Eastern countries. It is therefore worth exploring whether the principles that underpin these modern methods that are widely endorsed for achieving rural development are universally applicable and can be readily applied within areas such as Middle Eastern cultures. Alternatively, is it possible that these strategies that were developed from a Western culture and world view, and have successfully been applied in many developed and developing nations around the world, may have limited applicability within certain cultures or governance structures and leadership styles, such as those found within the Middle East?

Agricultural development in the Middle East is strongly controlled through government institutions. Leadership styles within government structures and associated organisational structures is fundamental to how programs are developed and implemented. Chapter 2 establishes that having leaders who build trusting relationships, understand and listen to the needs of all stakeholders and empower people towards positive action are critical to the successful application of participatory extension and AIS.

It is therefore necessary to examine leadership styles and management cultures within the Middle East to then be able to answer Research Question 2, "*What are the key characteristics of the Middle Eastern culture that impact on this region's ability to embrace participatory extension approaches and AIS?"* and Research Question 4, "*What are the barriers to achieving participatory extension and AIS within Middle Eastern countries, and can they be overcome?"*

This chapter begins by exploring numerous examples where Western management styles have been introduced within Middle Eastern organisations, highlighting many of the cultural difficulties that were encountered. It then focuses on specific cultural leadership styles and cultural characteristics that predominate the region, through both literary sources as well as evidenced within this research, that greatly impact on the capacity of participatory extension and AIS to function as expected. This chapter concludes with a summary of the critical cultural elements that need to be addressed for these strategies to be successfully adapted and applied in the future.

7.2 The challenges of transferring Western organisational management principles into Middle Eastern cultures.

There are numerous studies that examine issues where Western organisational and human resource management systems have attempted to be applied within Middle Eastern/Islamic societies, with varying degrees of success. The results from many of these studies have strongly resonated with issues experienced in trying to apply Participatory Extension approaches within the agricultural development settings highlighted within this thesis.

When assessing leadership theory and practice in the Arab Gulf states, Abdalla and Al-Homoud (2001) recognised that scholars had previously paid little attention to leadership or organised values, but were beginning to advocate the use of Islamic principles and traditions in conducting business affairs. This was partly due to dissatisfaction of many organisations when adopting Western approaches. However, they also attribute many of the failures in ethical standards, such as corruption, abuse of power and increasing material orientation, to the results of Western influences.

Shahin and Wright (2004) emphasise that there are many differences in leadership styles preferred by people in different cultures. They analysed leaders within the Egyptian banking sector, concluding that adjustment and modification needed to be made when utilising models of "Transactional and Transformational" leadership (originating in North America, (Bass and Avolio 1993)) within different cultures. Transactional leadership happens when one person initiates with others for the purpose of exchanging valued things. Leaders get agreement of tasks to be done and reward people for satisfactorily carrying out assignments. They monitor any deviances from standards and take corrective action as required. Transformational leadership engages with others in ways that raises them to higher levels of motivation, activity and improved productivity in a shared process which results in colleagues and subordinates being empowered within organisations or as individuals (AlSarhi, Salleh et al. 2014).

Shahin and Wright (2004) report that Egyptian leadership exhibited far stronger elements of transactional leadership, which has led to people being dependent on directions from those with authority. However, the authors also state that there is a danger in only measuring leadership parameters by North American standards. In Middle Eastern countries, they found the value of the leader is also reflected in key cultural values, such as creating social integration, co-operation, co-ordination and creating harmony amongst group members, as this plays a pivotal role in job satisfaction, but is not well reflected in Bass and Avolio's (1993) model of leadership styles analysis. For example, Egypt exhibited a high degree of authoritarian *bureaucratic leadership* that tends to wait for something to go wrong before taking action, and then attributing blame to someone who made a mistake or failed to follow the rules, while implicitly absolving oneself of any responsibility. However, the leadership style shown to be most satisfying and effective by the workers and managers studied was one

of benevolent paternalism. They found it necessary to modify the original leadership model to more reflect the Middle Eastern leadership culture and value systems.

AlSarhi and others (2014) propose that Islam does not really look at leadership from this perspective. It should not support a transactional leadership approach because it focusses solely on motivating followers through both intrinsic and extrinsic rewards, and a Muslim leader should not wait to be rewarded for his performance, but has to do well to serve his followers out of his moral commitment to Allah. They state that Mohammad described leadership like a shepherd looking after sheep, and that Islamic believers are instructed to practice teamwork, co-operation and to work in unity. However, while there is a strong sense of pure leadership shown in the Islamic teachings, Ali (1995) suggested that there were no good examples around to speak of at that time because all had been corrupted by western influences of poor values and accountability.

AlSarhi and others (2014) further describe the important differences between Western and Islamic leadership perspectives. While often influenced by the West through the twentieth century, Muslim leaders are primarily obliged to consider the guidelines from the revealed sources, being the Qur'an, the Holy Prophet and His Caliphs, as they symbolise both political and moral power. Leadership theory, however, has been distinctly formulated and analysed from a Western perspective, stressing attributes that are individualistic and rational, while making a clear distinction between individual and professional life. Western leaders are generally valued for their experience, expertise and decision making skills to achieve tasks and goals, ensuring self-interest. These authors emphasise the importance of recognising these key cultural differences in leadership approaches, as this would help Westerners better understand the rational for many leadership and management decisions made within Islamic cultures.

Mellahi and Frynas (2003) explored how well Western management ideals and practices were able to be applied within automotive industry in the North African Islamic country of Algeria, which in many ways is very similar to Arabic Middle Eastern countries. The industry originally enjoyed market protection from foreign competition, with mostly large state owned firms that provided only standardised products and services with customers having virtually no choice. Attempts were made in the 1990s to modernise into the global economy and apply management practices originating from a Western Europe and North American world view, into the Algerian culture. Management asked workers to leave their cultural baggage at the entry point, so that the Western management productive reform style could be implemented. This was very difficult as Muslim culture dominates ones whole life and cannot easily be divorced from work practices. When the new systems failed in implementation, the response of management (still influenced by Muslim tradition) was to place a higher level of control to ensure compliance with the new policy, but in the process, destroyed their ability to provide an effective environment for the creative, strategic and more self-managing reform, which

was the very thing they were hoping to achieve. This resulted in workers becoming less likely to report any issues, more resentful, fearful and far less efficient.

The study found that the Western individualistic cultural ideals (including reward systems, selection and promotion) were often diametrically opposed to the collectivist practices within the Algerian cultural practices (based more on nepotism, social connections of regional, family and social ties or values). The Algerian managers lacked the understanding of potential problems created when trying to apply Western cultural practices to program management and the real benefits could never be achieved. It was a clear case of managers trying to implement unrealistic agendas without first understanding the intrinsic culture. The subordinates were always going to struggle to share their voice to be heard and create change (Mellahi and Frynas 2003). Their study challenged the assumption that there should be a universal or generic approach to best practice human resource management. They concluded that HRM practices need to be adapted to fit the national cultures within which they operate. They suggested that collectivist cultures (implying North African/Middle Eastern) needed a different emphasis in job design and expectations to those of an individualistic (Western) culture.

When comparing the Western and Islamic perspectives of leadership, AlSarhi and others (2014) found the Muslim populations generally desire similar traits as the West, such as fairness and justice in their leaders, but these must be rooted from the Qur'an, Sunnah and the religion's hierarchy of references. Many leaders tended to adopt and adapt strategies and actions from the West because of their education exposure (due to colonisation or many having studied and trained in the West). However, many leaders receive heavy support from the West and its media, resulting in suspicion and lack of support from the Muslim masses if they failed to portray characteristics that have been identified in Islamic teaching. So while the West may perceive that its leadership approaches (endorsing more democratic values) should bring greater benefit to, and support from the Islamic populations that appear to be under authoritarian control, it must be understood that this is not always the perception experienced within the Islamic communities.

In assessing human resource management issues across the Middle East, however, Budhwar and Mellahi (2007) found that while there are many similarities in work management practices across the Middle East, there are also a number of differences that are cannot be just explained by cultural differences. They describe how since the mid-1990s numerous economies have changed from high State ownership to massive privatisation. Countries such as Algeria, Egypt, Jordan, Tunisia, Turkey and Iran have shifted more in the direction of market driven forces rather than government sponsored and protected initiatives, and this has altered each governments control over human relation management practices.

Interactive leadership and human resource management are critical to the successful implementing participatory extension approaches and AIS. These examples clearly show that

cultural differences must be taken into account when applying these strategies, and may help to explain reasons for the many barriers to achieving agricultural development innovation that have been highlighted within this research. It also suggests that these cultural constraints will vary between Middle Eastern states, depending on their openness and integration with more Western influences. It is therefore important to explore the key cultural religious aspects that impact greatly on leadership styles, societal relationships and community life, if approaches to agricultural development are to be improved.

7.3 Key cultural factors that can negatively impact on Participatory Extension and AIS principles

There are many factors that make the achievement of participatory extension principles (as described in Chapter 2) extremely difficult in many Middle Eastern countries. Some of these difficulties stem from historical factors and religious culture formed across much of the Middle Eastern region. There are other factors that would be considered to be problematic within many countries across the world, but have been particularly identified within this study as strongly influential, creating significant barriers to achieving participatory outcomes.

7.3.1 Centralised Islamic authoritarian control

Historically, as described in Chapter 4, pre-Islamic Arabia consisted of many local communities and tribes with varied religious traditions that provided a focus for social organisation. The shift in Arabia to a universal and monotheistic Islam in the 1400s overriding tribal boundaries and creating an Islamic state led to a centralised public authority, asserting control through violence and fear (Tibi 1990).

The spread of the Ottoman Empire across the southern Mediterranean coastline and Horn of Africa, the Persian Gulf and Balkan areas in the 16th and 17th centuries, accompanied the spread of Islam throughout the wider region. The Ottoman imperial system existed as the power of Muslim control, with many leaders claiming the status as Islamic caliphate (Khoury and Kostiner 1990). Since the break-up of the Ottoman Empire during the First World War, followed by the creation and establishment of many Middle Eastern countries, they generally are governed by authoritarian Muslim regimes which impose strong centralised control over their people. However, Tibi (1990) explains that despite this, tribal identity and loyalties still remain very strong within these societies, while Islam essentially remains an urban culture directed against the tribes.

Islam, by definition literally means *commitment and obedience*, and stands for belief in one God and in all prophets of God, with submission to the divine will of Allah in all aspects of life, as revealed through his prophets. This revelation is found in the Qur'an and the Sunnah (Ahmad 2010). Islam makes no distinction between the religious and secular, but sees the whole life of man in all its spheres should be an expression of complete submission to Allah. Ahmad's book on the meaning and message of Islam states that this religion is a complete

way of life that integrates man with God and awakens him to a moral new consciousness to deal with all the problems of life. This encompasses individual and social, economic and political, national and international, all in accordance with his commitment to God.

Traditionally, Islamic leadership was seen as someone placed in authority over political, economic and social fields, and it was vital that the positions were occupied by competent people, responsible for the welfare of the groups beneath them before God. They were called Caliph, Amir of Believers or Ruler (El-Wali). The followers should, according to the Qur'an *"O ye who believe! Obey Allah, and obey the Messenger, and those charged with authority over you"* (Abdalla and Al-Homoud 2001, p508), but this obedience extends only to leaders' orders that are in line with God's will. Leaders should be religious role models and seek to develop leaders from among their people. A leader should ensure justice and provide a decent livelihood for his people. His personal qualities should include being moderate, consultative, forgiving, honourable, truthful, patient, honest and humble.

To live within a Muslim culture there is a hierarchy of authority, from Allah, the supreme God, the Qur'an (word of God), the prophets and the Sunnah (the writings of the prophets). Islamic administrative theory is based on principles of hierarchical organisational structure, with a chain and unity of command. There should be obedience and compliance to formal authority, with good work planning, clear roles, consultation among members and the development of employees (Abdalla and Al-Homoud 2001).

According to AlSarhi and others (2014) Islam rejects all worldly superiority and cautions the believers against using spiritual values and moral superiority for personal advantage. It demands a life in conformity with the law, the *shari'ah*, (Islamic law) the enactment of which should eliminate injustice and abolish *zulm* (oppression) from culture. According to Islam, the leader and the followers should both surrender to the same *shari'ah*, but those placed in authority should act as shepherds, and be responsible to those underneath them.

Abdalla and Al-Homoud (2001) state that most Arab societies are very power-stratified and work through very hierarchical relations. They suggest that power flows smoothly when subordinates obey or seek guidance from their superiors, who in return protect and care for their subordinates. This structure was strongly identified within sections 5.3-5.6 and 6.6-6.7 of this current study, as participants were very subservient to their authorities above and appeared to have very little autonomy to develop management strategies with those on the ground, particularly in Iraq. In farming communities there are a multitude of poor, peasant farmers who are considered to be toward the bottom of the hierarchy. However, some farmers are larger and influential, and may also have positions in local communities and councils, or through family standings or connections, and may be considered higher in society.

It is therefore understandable that the most recognised and practiced model of agricultural extension found amongst the participants in this study was that of "Technology Transfer, Diffusion of Innovations" as described by Rogers (1983). It is very "top down" in its approach,

with farmers who are seen at the lower levels set to benefit as they adhere to the directions from above, rather than participatory, where farmers actively engage with the decision makers to help direct and resource their future innovation and development.

The "bottom-up" engagement principles of participatory extension, where farmers are consulted about their needs and play a central role in the development of agricultural programs, are essentially opposed to the centralised, authoritarian control structures that the majority of Middle Eastern countries operate under. While this study found indications of community councils being used to help decide which farmers are chosen for program assistance or for demonstration sites, and to provide some feedback of specific technical problems that the government needed to fix, there were almost no examples given of using any techniques such as Rapid Rural Appraisal (Pretty and Vododuhe 1997) in seeking to engage with rural communities' issues.

This research identified that government leaders and agricultural researchers in Iraq and Egypt were often not acting from a position of understanding the farmers' actual needs, issues and capacity, as this can only be achieved by taking a participatory approach, which by very nature is allowing someone below you to give you wisdom. There was little evidence of engaging the principles of soft systems methodology (Checkland and Poulter 2010) that seeks to understand the perspectives of all stakeholders in the planning process, recognising that people will only ever operate out of their own world view when working toward developmental change. While this could be embraced under the Islamic principles of consultation, planning and humanity, this study found very few examples of this in practice (sections 5.5.3 and 6.6.5). One Iraqi village extension officer spoke of being forced to promote the sowing of 5000 hectares of sunflowers to his many growers on small land holdings, even though he knew that the market price had dropped and it was no longer profitable, compared to growing wheat. His superiors were completely inflexible, because they had to use the available seed, despite the fact that this bad advice destroyed the extension worker's trusted relationship with his farmers.

Khoury and Kostiner (1990) argue that there is constant tension in Arabic communities between the traditional tribal societies and the autocratic state control, describing this as two opposed models of organisation that form a single system. The tribe represents a basis for identity, political allegiance, and behaviour, kinship and patrilineal descent. The state insists on the loyalty of all persons to a central authority and is heterogeneous, stratified, and hierarchical. Tribe represents personal and moral, and is socially homogeneous and egalitarian. The state, by contrast is thought to be impersonal and external, focusing more on contract, transaction and achievement. Given that within these countries, agricultural advisory and extension services are controlled by the departments of the state, this represents significant challenges for participatory approaches that are more relationship based than merely transactional, dealing directly with expressed needs of stakeholders at the ground level.

This study identified a desire from many workers and farmers for more participatory approaches involving greater co-operation, self-determination and resourcing at the community level, which may be considered more reflective of decision making at the tribal level. However, this did not easily fit within the centrally controlled and directed extension programs, where planning and decisions are far removed from the intended recipients, and there was little accountability to the local rural communities. AIS also essentially relies on government or state support to create and underpin the pathways to innovation and change at the community (and more tribal) level. When one Iraqi village extension worker was asked why he could not help design and develop the extension programs that were being run by researchers from the central institutes, his response was "I do not have the authority to do that". He said that his main role was to try and interpret the scientific language of the presenters into something the farmers could understand (worker from July 2011 training, Table 3-1).

Many writers, (eg. Huntington, 1991) describe how Islamic political institutions are incompatible with the openness, competition, pluralism and tolerance of diversity that is required by democracy. Alsoudi (2003) asserts that no Arab leader is elected in free elections and they consider their actions and deeds to be above the law. Kedourie (2013) describes how classic Muslim philosophers regarded democracy as a *"low and degraded regime in which the masses, moved by their passions and appetites, sought to exercise unrestrained power" (p2)*, and that democratic fundamentals such as popular sovereignty, representation, elections, government regulation by laws established by a parliamentary assembly, and society being composed of many self-activated groups, as being profoundly alien to Muslim political traditions.

Yet many of these same democratic principles are at the heart of achieving success with participatory extension programs and AIS, because they rely on people at the community level having the rights and capacity to better control their individual and collective destinies, rather than being ignored by ruling parties or told what to do. Participants are more motivated into positive action because they have increasing control over their future and believe in what they are doing and achieving, rather than having actions imposed on them.

7.3.2 Cultural leadership styles

Leadership can mean many different things to different people and successful leaders can use their position, personality, responsibilities and ability to organise activities to achieve a goal and influence behaviour. The most common feature of the many definitions of leadership is that of directing a group towards a common goal (Limsila and Ogunlana 2008). In Islam, leadership is viewed as an honourable moral activity and a process of taking initiative with followers to communicate the achievement of a goal, which is always viewed within the context of actualising *tawid* (the belief in the Oneness of Allah, the sole source of power and authority), following and enforcing *shari'ah* (the teachings of the Qur'an and the Prophet), and achieving justice both socially and politically (AlSarhi, Salleh et al. 2014). However, for

leadership goals set on achieving change through participatory extension and AIS, leadership styles that strongly support social interaction, capacity building, empowerment and decentralisation are required. This raises questions as to the compatibility of leadership approaches.

Transformational leadership, as described by Bass and Avolio (1993) is strongly aligned with these participatory principles in that it assumes that *"people are trustworthy and purposeful; everyone has a unique contribution to make; and complex problems are handled at the lowest possible level… they align others around the vision and empower others to take greater responsibility for achieving the vision" (p113)*. Transformational leaders facilitate, teach and encourage creative change and seek to develop followers to their full potential.

By contrast, Bass and Avolio (1993) describe transactional leaders working within their organisational cultures of following existing rules, procedures and norms. They are characterised by *"contingent reward and management-by-exception styles of leadership. Essentially, transactional leaders develop exchanges or agreements with their followers, pointing out what the followers will receive if they do something right as well as wrong" (p112)*. They focus on everything in terms of explicit and implicit contractual relationships, with short term commitments and a strong emphasis of self-interest. The leadership styles that were described and observed within the agricultural ministries within Iraq and Egypt in this study were more reflective of transactional leadership styles and expectations. Examples were given where village workers who tried to use their initiative to set up services required by needy farmers were quickly reprimanded by middle level regional managers who threatened to diminish the operations (workers referred to in Table 3-2). Workers within Egyptian training were observed in practice and as well as identified within interviews as having little autonomy to initiate anything without the gaining the approval of their immediate managers (workers referred to in Table 3-3).

Limsila and Ogunlana (2008) analysed and compared leadership studies conducted in different countries and regions. They found that the Middle Eastern leadership style within the construction industry was most effective when managers were friendly, accessible and understanding of the subordinates needs, but they needed to be extremely task orientated (transactional style) in order to maintain control over the projects and to achieve the work targets. They reviewed similar studies amongst construction managers in Hong Kong and found them to be far more relationship orientated (transformational) using a more supportive style in the feasibility study and post-contract phase, and a more directive style in the work stages, with less concern on task accomplishment.

Shahin and Wright (2004) compared multiple leadership studies from across the Middle East. They reported that that Arab countries score highly on uncertainty avoidance. In Egypt there was a tendency toward a *personalised* charismatic leadership style that is very authoritarian, and one which required unquestioning trust, obedience and submission. This creates attitudes of dependency and conformity, rather than the greater empowerment and

autonomy of followers that a *socialised* charismatic leader might promote. They found that this type of transactional leadership did not motivate people to perform beyond their expectations, but rather led people to be dependent on directions from those in authority.

Kabasakal and Dastmalchian (2001) studied the leadership attributes within the culture of the four Middle Eastern countries of Iran, Kuwait, Qatar and Turkey. The first three countries have dominant religious laws running the states, while Turkey is secular, separating the state from religious governance. They concluded that the strong concept of fate in Islam and the acceptance that deeds past and future are prearranged or ordained by God, as a negative factor influencing orientation of futuristic outlooks of society. However, they did find Turkish organisations, particularly in respect to the value of education in the workforce, were more future oriented than in the broader Turkish society. Encouraging more visionary leaders was seen as an important attribute in lifting performance in all four countries, as well as being supportive and charismatic.

Kabasakal and Dastmalchian (2001) further suggested that while participation and consultation were recognised as desirable for leadership actions, the meanings of these terms differed from their more western understandings. Participation was more a feeling of belonging to the group, rather than getting consensus towards improved decision making. The concept of consultation was more attuned to satisfying the egos of the parties involved rather than a dynamic discussion of options and decisions. Again, the more tribal attitudes were evident among those surveyed, suggesting that the traditional work environment would improve if leadership style in the spirit of Islam was embraced, which they believed opposed autocratic rule, but was strongly recommended by the Qur'an and emphasised within Bedouin traditions. They called for organisational leaders to be more sensitive to the local cultures and traditions while still becoming purposeful initiators of change.

Numerous writers have analysed deficiencies within Arabic armies and why they have been largely ineffective in the modern era, including Egypt, Iraq, Jordan, Libya, Saudi Arabia and Syria. Pollack (1996) stated that cultural leadership traits must not be overlooked in these matters, including over-centralisation, discouraging initiative (particularly at lower management levels), a lack of flexibility and information manipulation. He argued that the ineffectiveness of Arab militaries could be summarised in the key areas of tactical leadership, information management, weapons handling and maintenance. De Atkine (1999) expanded on this and argued that these specific issues stem from cultural and societal attributes, as well as Arabic political systems. These include:

1. **Poor gathering, management and sharing of information**. Having information was seen as a powerful thing to an individual. Arab officers tended not to pass information along the chain of command as would be expected in Western armies, restricting the information flows from the top levels down to those in the field. Sole knowledge of a complex task was extremely valuable and so they tended not to share information, even if it compromised the operation. Iraqi company commanders regathered US training

manuals from their Iraqi units being trained, because they didn't want enlisted men to have an independent source of knowledge. Many dictators who gained power by means of a military coup preferred communications to be very restricted and even the smallest decisions had to be approved by the government.

2. **Poor education and training perspectives**. The military training was being unimaginative, clear cut and not challenging. This was due to Arabic education systems being mainly based on rote memorisation. This discourages lateral thinking, and doing so in public could damage one's career.

   Direct competition between individuals was avoided and a loser is seen as being humiliated. This was particularly pertinent where social class or rank is involved. No question should ever be directed to anyone in a classroom unless the instructor knows that the student already possessed the correct answer, particularly if they were someone of importance. This made interactive learning exercises very difficult.

   Junior officers were not trained in leadership, only in weaponry and tactical knowhow. They were not trained to seize the initiative or volunteer new ideas or original concepts. The class system meant that most Arab officers treated enlisted soldiers like sub-humans and the concept of caring for one's men was only seen amongst the elite troops. Discipline was generally enforced by fear, which was seen as a prime motivator, particularly within elite egalitarian societies such as Saudi Arabia. There was a lack of hands-on training from superior officers who considered it beneath their social standing. This led to a lack of trust and respect throughout military organisations.

3. **Lack of decision making or taking of responsibility**. *"Decisions are made and delivered from on high, with very little lateral communication. This leads to a highly centralised system, with authority hardly ever delegated"* (De Atkine 1999 p5). Officers preferred to be seen as industrious, intelligent, loyal and compliant rather than making decisions on their own. It would be detrimental to be seen as an innovator or prone to making unilateral decisions. Conformism was a social norm, and orders flowed from top to bottom, not to be re-interpreted, amended or modified. US military trainers were not only frustrated by this lack of authority of Arab officers to make decisions, but also their reluctance to admit to it. The politicised nature of Arab militaries mean that political factors often override military concerns, and strong willed military officers showing initiative could pose a threat to a regime.

   It was rare that anyone took responsibility for policy, operations or training programs that were unsuccessful. It was much easier to blame poor equipment or foreign interference, all of which made it very difficult to apply an action learning cycle that constructively assessed and modified programs based on the actual mistakes made, particularly when any criticism was seen to be coming from a foreign advisor.

4. **A lack of encouragement or co-operation towards combined arms operations**. Arab leaders were very cautious of combined military operations becoming routine because they feared being overthrown by their own military. As a result, there was a distinct lack of co-ordination between arms operations, artillery, air support and logistics. Almost every aspect of human endeavour in Arab culture revolved around one's own family, including business, personal and even military operations in the heat of battle, particularly where sectarian loyalties exist. Assignment of officers were often based on sectarian considerations, rather than based on merit.

   There was a lack of willingness of small military formations to stick together and fight as a team under fire. When pressure came they were known to disband rather than fight for each other. Leaders were very distant from the troops they commanded, rarely leading from the front, and often having goals that were less compelling to the troops. This came from a lack of trust for anyone outside their own division. Middle Eastern leaders consistently relied on "balance of power" techniques to maintain their authority, using competing organisations, duplicate agencies and a course of structures that relied on the ruler's whim. This made military co-ordination almost impossible, keeping the leadership off balance and less of a threat to the ruler.

5. **Poor use of equipment and maintenance**. Middle Eastern weapons were very sophisticated, but often not utilised to full advantage. Arab technicians were not educated enough to use the equipment as intended and had to rely on outside help and guidance. Training was very staged, unimaginative and not challenging because their education system was more based on rote learning rather than imaginative problem solving. Officers were very good at remembering vast amounts of information, but thinking outside the box was not encouraged and could damage ones career.

This current study found many of the above mentioned attitudes and characteristics were also affecting agricultural development operations, more strongly in Iraq, but also within Egypt. Many program leaders and managers did not readily engage in ways that might threaten their positions, and there was found to be little co-operation or collaboration between different groups and departments. There was a very strong sense of workers focused on obeying directions from superiors, and in the OTG project it took some time before they became confident in strategic thinking and problem solving, leading to upward management to try and influence managers for better outcomes (workers referred to in Table 3-2). Once learning this they then experience great frustration in trying to still operate under regional middle managers outside of the OTG project that were not familiar with participatory management approaches, but still entrenched with hierarchical control. Where these attributes are strongly engrained within leadership culture, participatory extension and AIS will not be successful as they require very well coordinated, trusting, supportive and empowering strategies that encourage imaginative lateral thinking and problem solving at the ground level by a numerous interactive stakeholders.

7.3.3 Decentralisation and pluralism

Abdalla and Al-Homoud (2001) state that Islamic administrative theory is based on the principles of hierarchical organisation structure with a chain and unity of command involving obedience and compliance to formal authority, the planning of work, consultation among members, clarification of roles, and the training and development of employees. This is completely aligned within the agricultural extension model of Technology Transfer, Diffusion of Innovations (Rogers 1983), and why this was almost always described by the agricultural workers interviewed in this study as the model that most reflected agricultural extension in their areas, and not more participatory extension models.

Current models of participatory extension encourage more autonomy at the grass roots levels, and a pluralistic approach that gives more influence, interaction and reliance on multiple key stakeholders. The relationship between various participants in Islamic organisations is generally seen as one involving superiors and subordinates, which can be based on either fear or admiration. Participatory approaches value indigenous knowledge, and the sharing of ideas and issues with farmers being viewed as equally important in the process, and not as subordinates. Leaders facilitating these approaches engage with all stakeholders to gain their views on the issues and potential solutions from their understanding or world view, to gain a rich picture of all the influencing factors. Again, this is in line with soft systems modelling, which becomes more important as the development issues become more complex (Checkland and Poulter 2010).

Consultation is said to be one of the core values and important Islamic principles governing administration and management for public interest, and a key characteristic of a Muslim manager (Mellahi and Budhwar 2010). This is expressed in terms of leaders communicating ideas and truths to subordinates (in mercy and dealing with them gently), but also as having discussions about the affairs of the moment before making decisions, and putting trust in God for the outcomes (Abuznaid 2006). This will encourage solidarity and diminish suspicion between various parties, and is endorsed by the Arab saying “When you consult others, you share their minds.” However, Abdalla and Al-Homoud (2001) state that in many cases, consultation is often used just to satisfy the egos of those involved rather to improve the quality of the decision making, and is not taken very seriously.

In Islamic societies there is a much stronger focus on political authority than on process or teaching management skills. This is opposite to participatory processes and transformational leadership styles. One of the key focusses to achieving a participatory approach is not the establishment of the clear authoritarian structure, but rather the process of engagement, which means that all the stakeholders, from the lowest to the highest feel that they are heard and valued, and that they can take some ownership in the development of the future, because they are a part of it.

This study identified Egyptian agricultural officers who, while thinking they understood and operated under participatory extension approaches, were still behaving within a technology transfer mindset. This became evident on field visits with farmers, where they were more comfortable being an expert trying to convince farmers of their technical knowledge and information, rather than seeking to engage with the farmers' real needs and capabilities by actively listening to the farmers' points of view. For these particular officers it was a challenge to their position of trained professionals to really listen and understand the farmers' issues and come up with shared solutions with them. This appeared to be partly due to the expectations of the farming community as well, as they feel the agricultural professionals should know all the answers to their questions. This was also evident when the Egyptian MALR attempted to replicate the highly participatory Farmer Field Schools programs that had been so successful in Asia. It was reported by van de Pol and Awad (2002) that while the process fundamentally involves farm family engagement, discussion, sharing and working together at ground level, in Egypt it tended to quickly revert back to the expert government technician lecturing the community participants.

There were no negative sentiments expressed toward participatory extension methods from the agricultural workers involved in this study. However, it is possible that their perceptions of the application of these approaches may still fit within their own paradigm of operating within a system of centralised control, and therefore may not be envisaging the implications of pursuing programs of decentralisation and power sharing with the private sector as proposed by market driven AIS.

7.3.4 Attitudes to peasant farmers and willingness to empower subordinates

It was also found that Iraqi farmers were often viewed as uneducated peasant farmers with little to contribute to improving agriculture (section 5.4.2). University education of department workers and researchers gave them a clear sense of superiority and expectation that they must be the experts in their fields who could supply all the answers required. It was often said that research scientists (often from the Universities) who generally decided on trials and investigations to be done, always wore suits and would never sit in the dirt with the farmers and share a cup of tea (section 5.3.1). One participant said "I went to see a farmer once and he instructed me to sit on the ground with him, but I could not do it. I am not used to that and it would take a big effort. But for "N" (another participant) it is much easier because he is also a farmer, and can sit and talk with him in a more appropriate way" (from July 2011 training, Table 3-1).

Further examples were given where leading farmers were not listened to or supported in promoting new technologies in practical ways for their local farming communities, as government officials insisted on adhering to their own ideas. Village extension workers did speak of experiencing farmer engagement and meaningful relationships with local landholders through village council meetings and individual contact, but this was often within the framework of implementing programs and initiatives coming from above (sections 5.4.2).

This study found that the leadership provided throughout the various hierarchical levels within agricultural development programs rarely resulted in the empowerment of farmers for self-determination to improve their livelihoods, as promoted within participatory extension (section 5.4.3). There were instances identified where a decentralised, pluralistic AIS approach could be accomplished if direct support was able to be given to local private entities to improve farmers' knowledge of and access to changing markets (and 6.6.5).

The hierarchical structures within government departments meant village extension workers were not encouraged to take initiative, create new programs or upward manage. With resources becoming scarce and fewer regional workers employed, it was much safer to do what was determined from above and not risk ones position by advocating for greater farmer autonomy. In Egypt many extension workers also had to enforce regulatory responsibilities over the farmers, which made it difficult to establish trusting relationships. This again makes it very difficult to implement a participatory approach to agricultural extension with farmers, when they are being run by government departments and management systems that sees farmers as end users of their programs and expertise, rather than key stakeholders in helping to develop the most useful, practical and efficient outcomes for all concerned. However, numerous examples were given (sections 5.4.2, 6.6.3 & 6.6.4) in both Egypt and Iraq by leading farmers who were trying to help and support their fellow farmers in spite of the actions of the government officials.

While Islamic tradition allowed for the integration of non-Muslim ethnic groups to gain state recognition within the Ottoman empire (İçduygu, Toktas et al. 2008) there was a strong establishment of centralised authoritarian control. Payments and incentives provided key tribal or regional leaders was often used as the most efficient and effective method of ensuring loyalty and control. Khoury and Kostiner (1990) presented many cases where the state resembles an empire in conceding a certain recognition to semi-autonomous tribal groups and minorities. They reported that while modern transportation, communication, urbanisation and economic development had greatly diminished the Arabic populations of nomadic tribes, there remained a strong degree of cultural tribal identity. This sense of more traditional localised autonomy should help to strengthen the case for the implementation of participatory extension approaches. However, Abdalla and Al-Homoud (2001) report that in the Gulf states, like Kuwait and Qatar, there is a mixture of bureaucratic methods and tribal traditions within the leaderships styles and hierarchy. Tribal leaders (Sheiks) shoulder the responsibility of dealing with the centralised authority, while practicing an intense loyalty to protect and care for their communities or employees beneath them. One issue with this is that there tends to be strong in-group collective values, which leads to favouritism and nepotism. The results of their own study of leadership styles found that Traditional-Tribalistic styles were often less participatory and more influenced by higher "face-saving" tendencies. These cultural expectations were often seen to inhibit the leaders' success. So while bringing key decision making and autonomy closer to ground level by focusing more on tribalism rather than state central control (which should lead to a system where more localised issues are

heard and needs are met), key concerns may still remain as to the validity of participatory management approaches attempted by the tribal leadership.

Western human resource management systems are strongly built around delegation, empowerment and power sharing, which are similar values with participatory extension. However, Mellahi and Frynas (2003) gave examples of how Western management principles that were introduced within an Islamic culture were unable to work because the management was used a control based value system with centralised decision making by management while decreasing employee discretion. This resulted in a highly top-down one-way system that was zealously applied. Examples were given of employees suggesting practical improvements that were totally ignored by managers, because this was seen as threatening their management positions. One Iraqi extension officer said quite boldly, "those who are appointed to the higher positions are the ones who have the ability to say 'yes sir' *(to just follow orders)*, and this is why *(participatory)* extension was not on the priority list, or taken into consideration when implementing any projects. …I do not fear anyone because I am telling you the truth" (participant from Table 3-1).

These characteristics appear to be deeply ingrained in Arabic Islamic leadership patterns, and will not easily change. In practice, across many fields of activity and different Islamic countries, managers expect subordinates to show respect and obedience to superiors, and are happy to maintain unequal status between them. This results in many managers wanting to maintain a strong hierarchy, and being unwilling to mix with and directly communicate and discuss issues with those workers on the ground (Pollack 1996, Abdalla and Al-Homoud 2001, Mellahi and Frynas 2003). Again, what happens in practice is fundamentally opposed to the principles of participatory extension.

7.3.5 Strategic planning and problem solving

Arab countries rate vary highly in areas of uncertainty avoidance. However, a participatory approach to agricultural development empowers people below to have more skills and autonomy to creatively problem solve and manage uncertainty. Muslims tend not to question events and are more likely to accept uncertainties of life, often quoting the phrase "Inshallah" meaning "it is Allah's will". While Egyptian leaders were at times found to be charismatic, they built this on the need for unquestioning trust, obedience and submission that created dependency and conformity, rather than more a socialised transformational style that provided greater empowerment and autonomy for those underneath. This makes constructive leadership at lower levels very difficult as workers are very reluctant to make decisions without approval, delaying progress and creating an attitude of not rushing in to solve problems without having certainty of outcomes (Shahin and Wright 2004).

This fatalistic or externalist thinking of the Islamic Arabic culture which believes that whatever happens is accepted as God's will, is also linked to a diminished value placed on time, long term planning, deadlines and goal setting. Performance evaluation is not held strongly with

deviations from expected plans, and when goals are not met it is more likely that compassion is shown rather than penalties given (Abdalla and Al-Homoud 2001). This is said to be engrained in their proud history and culture. It is therefore only leaders with excellent qualities that are able to be successful in actually achieving good long term plans.

The concept of fate in Islamic culture is balanced between the acceptance of all deeds and actions, past and future being pre-arranged within God's ordaining, and the many verses in the Qur'an that explain the importance of humans being responsible for making the right choices in life to achieve the best moral outcomes. Kabasakal and Dastmalchian (2001) state that the deeply rooted culture of pre-ordained fate manifests itself in low future orientation or thinking in the Middle East. The authors do, however, show evidence of more progressive orientations within some Turkish organisations than was found within the society at large. A participatory extension and AIS approach is intrinsically founded on, and motivated by, a desire to improve one's livelihood, and creating the capacity to have more control over outcomes, rather than just a fatalistic acceptance of one's own circumstances.

In the area of farmers making improvements to their farming systems, this study reported a strong and regularly repeated statement by interviewees across Iraq and Egypt, that "farmers will only do it when they have seen it with their own eyes". This comes partly from the fact they are generally poor, with few resources, and any change or chance of failure will greatly increase the risks greater poverty. However, it is also due to the fact that their learning styles do not generally encourage innovation, lateral thinking and experimentation. Hashim and Jemali (2017) describe the traditional Islamic education system as strongly emphasising memorisation and recitation to teach children high moral Islamic values, with little attention paid to the critical thinking of analysing and discussing the meaning of texts. Rote learning and authoritative teaching rather than problem solving, debate and critical enquiry is practiced. However, Tan (2014) reports on changes taking place in Islamic Education systems in the South East Asian region of Indonesia which are reforming to encourage more critical thinking and problem solving. This may take time, however, to influence the ways in which the older generations approach innovation and change, particularly in the field of agricultural reform. This shows that it is possible to introduce changes within Islamic cultures that are more supportive of participatory principles.

Participatory agricultural programs essentially encourage participants to have a go at making things work for themselves, even if it required much trial and error, rather than just applying completed technologies in an already standardised form, whether it is locally functional or not. Middle Eastern farmers are used to being the receivers of information, rather than the pioneers of adaptive change, and this all contributes to the difficulties of applying participatory extension approaches. Ali (1995) stated that an Arab individual operating within an authoritarian environment is dependent, apathetic, conforming and conservative and will generally refrain from debate and discussion. However, when placed in a democratic environment he is thoughtful, takes risks, and is courageous and creative. Ali further asserted

that a democratic environment leads to a gradual disappearance of corrupt leaders, to economic progress and prosperity, and would help bring about a renaissance of Arab culture and creativity.

Within organisations, peers and superiors are less likely to confront, criticise or provide negative performance feedback, and situations that may be perceived as shaming or lowering the estimation of an individual are avoided (Abdalla and Al-Homoud (2001). This also contrasts with Western (more task oriented) management styles where the individual is encouraged to take responsibility and move forward to achieve the greater good. Exposing poor performance and potentially shaming someone, and by implication, their family, is not acceptable in Middle East cultural practices. As participatory extension is a process more attuned to problem solving at the ground level, strategic thinking, learning from mistakes and having the autonomy to be able to change things where they are needed for the better, the avoidance of perceived criticism to protect someone's honour is therefore likely to impede this process.

7.3.6 Motivation and empowerment

It is recognised that Islam is a broad and diverse entity, but at its core it is based on the fundamental idea that one must be good and submit to the higher authority. The ethical guidelines outlined within the Qur'an and the Sunna traditions as a code of conduct for all Muslims include being truthful and honest, to love Allah more than your trade, to be consultative, patient, fair, just and humble, and to be complacent with what Allah has allocated to you. One must also be generous, dignified, trustful, friendly and equitable, and to not be involved in fraud or to bribe (Abuznaid 2009). Any personal advancement should only come through adherence to Islamic code of ethics of behaviour. Governing bodies have a noble function to perform in organising communities in ways through morality and spirituality so that piety and goodness thrive and wickedness is weeded out. All action should be sanctioned by Allah (Ahmad 2010). A Muslim has a strong social responsibility that should assist in ensuring that good things are brought to the maximum number of people. Abuznaid (2006) states that Islamic doctrine provides a delicate balance between rights and duties of both the individual and the State. People have the God given right to live, have basic amenities and to feel safe and secure. However, these individual rights and responsibilites are inextricably entwined with those of the larger society, and vice versa.

Modern Western ideals tend to focus on empowering individuals by giving them the capacity for improving their livelihoods. This is aligned to the principles underlying participatory extension which gives all stakeholders (including those small landholders) a voice to express their needs and collaborate with others, gives them a greater enabling for self determination and a strong motivation into positive action. This does not easily fit with the Islamic ethical principle of being complacent, but Abuznaid (2009) states that this may not be the enemy to progress that the West would assume. For an individual to improve his life in Islam he must submit his life to Allah, the Islamic teachings and Islamic leadership. This will inform him of

his purpose in creation and provide him with guidance to live a fulfilling and rewarding life, at peace with himself, the whole of creation and with the Creator (Ahmad 2010).

For participatory approaches to succeed in Middle Eastern Islamic countries it would appear that the core motivation for activities may need to driven from a religious moral and ethical standpoint, rather than individualistic empowerment perpectives. Islamic leadership, according to AlSarhi and others (2014) encompasses trusting social and psychological contracts, doing good deeds for the sake of Allah, the Muslim community and humankind.

7.3.7 Lack of trust between farmers and government officials

Findings from this study within two representative Middle Eastern countries indicated almost a complete lack of trust between smaller farmers and the government (sections 5.3.4, 5.4 & 6.6.3). This was sometimes based in historical issues such as previous land acquisitions and land reform, state controlled marketing of produce, lack of access to fundamental inputs or other such grievances. There were also strong opinions expressed (both real and perceived) about the many of the government workers lack of real knowledge or abilities to understand the farmers' needs or pay respect to their indigenous expertise. Farmers also complained about nepotism and corruption within the government departments, even though these practices are against Islamic teaching according to Ali (1995). In Egypt concerns were expressed that the Village Extension Workers also had regulator responsibilities that could result in farmers being reported for illegal activities, locked in jail or fined. Participatory extension takes a relationship based approach to the facilitation of desired outcomes, and is most effective where farmers feel that the government agents have their best interests at heart, and not just trying to control their behaviour with manipulative government agendas.

Some of the government agricultural advisors interviewed within this study, operating within villages in regional areas, shared experiences of personally gaining trust with farmers they worked with, particularly within larger projects and demonstration farm sites. However, they were also often frustrated in trying to achieve the necessary activities at the ground level with farmers, due to the many layers of approval required at levels above, from superiors who did not understand participatory principles, or were more strictly compliant with top-down operating systems they were used to operating under. One Egyptian extension worker told of disconnect created when a researchers came to offer sound technical but totally impractical, inappropriate advice. The farmers wanted to grow rice to feed their families, but were flippantly told to grow sesame seed instead due to water shortages. "The farmers just become more set in their ways and don't want anyone else telling them what to do". The extension officer who wanted to engage with the farmers just became sidelined as someone from the government who didn't understand their real needs (worker from Table 3-3).

7.3.8 Incentives, Corruption and Nepotism

Farmers in Iraq in particular, would not participate in government extension activities or programs unless there was a clear incentive offered (section 5.3.7). This could range from free transport and meals provided for local field days, commodities such as grain, fertiliser or livestock, major equipment such as tractors or glasshouses, or very cheap finance to purchase necessary items. Historically, Khoury and Kostiner (1990) report that when the Ottoman Empire was expanding throughout this region, there were many tribal areas that were considered too difficult to conquer militarily or rule with direct bureaucracy. Their strategy was to co-opt local tribal leaders to keep their people under control by offering them substantial payments or rewards. It would appear that a similar expectation of purchased participation and loyalty to programs of the governing powers is still in existence. However, Pretty and Vododuhe (1997) rate "participation for material incentive", where farmers get involved in agricultural extension programs mainly to benefit from the incentives offered, as not achieving the best levels of motivation, collaboration and interaction sort after in true participatory extension approaches.

While financial and material support can be a vital component of building farmers capacity to adopt changes to their farming systems, it is ineffectual when it becomes the sole motivation. This was made evident in Iraqi interviews, where many described farmers quickly on-selling the various materials meant for agricultural programs to then buy a new car or house. There was generally very little accountability required by farmers to produce evidence of what was done with the incentives given. It is therefore difficult to build relationships of mutual trust and shared responsibilities within participatory programs where such corruption is clearly evident. There is no ownership of the processes involved in attempting to bring improvements to agricultural practices.

There are many key principles of Islamic teaching that support the development of participatory extension, in the areas of both ethical behaviour and social responsibility. But, as in all cultures, there are often large gaps between these principles and reality. Mellahi and Budhwar (2010) state that there is a large body of evidence describing how the Islamic core values of honesty, trust, justice and fairness are often very far from the reality in the workplaces of Islamic countries. Abuznaid (2009) describes a glaring gap between the business ethics in Islam and what happens in practice. Muslims must act ethically towards Allah, as well as towards others, and it is their individual responsibility to do so. They should not try and justify unethical behaviour or blame it on others. Abuznaid links unethical behaviour of Muslims to stages of moral development, personal values and personality, family and peer influence, life experiences and situational societal factors, which is the case in all cultures. He does however state, that a Muslim businessman will be more concerned about what others might think of his decision than what he thinks of himself.

Abdalla and Al-Homoud (2001) also discuss that the ability of an employee to gain benefit from a boss in recognition for willingness to co-operate, competence, or relevance to work

task still comes down to the whim of the employer, which can lead to discontent. While consultation in leadership is held as an Islamic tradition that would improve the traditional work environments, and is described as a counterpoise to autocratic rule, the reality is that the advisors/managers often use their power to freeze or shut down the activities of unfavourable high ranking employees who may pose any threat to them. This can result in very one way information flow within the consultation phase. This study found that in Iraq, any attempt to upward manage to help achieve better on the ground results was very rare and not well supported within government department ranks where the officers worked.

Tribalistic attitudes to organisational management has been reported to lead to favouritism, nepotism and a greater allegiance to personal, rather than contractual relationships and obligations (Abdalla and Al-Homoud 2001). This leads to subordinates defying their task-orientated managers or performance based systems in order to maintain their "in-group" relationships or traditions. This also presents more issues for participatory approaches, because while tribalism encourages more localised autonomy in the face of centralised control, it may also become very insular and self-preservationist, and in some ways counterproductive to the principles of AKIS and pluralism. It is suggested that program managers use diplomacy to manoeuvre their way through a path of least resistance. Successful leaders also have to increase their connections with influential social networks to give them the necessary power to overcome any resistance. However, performance orientated superiors will often find it necessary to compromise their direction in order to accommodate cultural expectations and values. Social relationships are generally a higher motivational goal than the task at hand. Individually one must be seen to be doing Allah's will, as well as meeting all the expectations of family and social peers.

Most other workers interviewed and observed within this study had forms of participatory practices, in that they would respond to farmers' enquiries on technical issues, but this was far from a full participatory approach to agricultural development. It was also observed that the majority of poor farmers are not at all used to being treated as important or knowledgeable or in a position to contribute. They didn't feel empowered or trust the government, so the problem of trying to create a participatory environment for action is significant at both ends of the perceived hierarchical structures.

7.4 Conclusion

There are many barriers to achieving participatory extension and AIS within Middle Eastern societies which emanate from religious and cultural factors. This chapter has shown evidence that management styles and operating systems that have essentially been developed within Western cultures cannot always be universally applied within Arabic and North African Islamic countries. These cultural constraints vary between Middle Eastern states, depending on their openness and integration with more Western influences.

Key cultural religious characteristics that impact greatly on participatory extension approaches and the application of AIS include:

- centralised authoritarian control rather than more community bases autonomy;
- a predominance for transactional leadership styles over transformational leaders;
- workers primarily operating with low risk obedience to superiors rather than critical thinking and problem solving action taken at ground level;
- the hierarchical societal structures;
- more fatalistic attitudes of conformity towards circumstances rather than empowerment of individuals to better control their outcomes;
- the lack of trust between farmers and government;
- nepotism; and,
- the reliance on incentives to achieve participation.

At the heart of the transformational leadership styles required for the successful application of participatory extension approaches within a framework of AIS based on a more Western world view, is capacity building and empowerment of all participants and stakeholders within the process to gain more autonomy to fulfil their roles and determine their futures, both individually and in community. The Arab/Islamic culture that dominates the leadership of the majority of Middle Eastern countries is far more transactional, being authoritarian in nature and top-down in structure, emanating from a fundamental submission to the divine will of Allah in all aspects of life, as revealed through his prophets. The motivation of governing bodies appears more aligned to fulfilling the directions of superiors, rather than decentralisation, pluralism and encouraging the self-determination of subordinates.

Many of these traits will not change and should not be expected to. For participatory approaches and AIS principles to be successfully applied within Middle Eastern Islamic countries there needs to be a clear recognition that cultural differences create barriers for their application. Adaptations need to be made that better conform to cultural conditions and expectations modified if these modern approaches to agricultural advisory systems and rural development are to be more successful and sustainable across this region, expanding the operations of their rural sector within the rapidly changing world economy.

8 Taking a new approach to applying participatory extension and AIS successfully in Middle Eastern Islamic countries

8.1 Introduction

It is clear from this research that a universal "one size fits all" approach to agricultural extension and development model does not work, and that all models need to be adapted to best fit the cultural situations to which they are to be applied.

When reviewing Agricultural Advisory Services for the World Development Report, Anderson (2008) states that "Understanding of what works well in the diverse circumstances of the developing world is still far from complete and there is thus a clear need for continuing research effort to fill these voids". This relates to the diversity of services including governance structures, capacity, management and organisation as well as advisory methods, and analysing these within the frameworks of the policy environment, potential service providers, farming systems, market access and the culture of local communities, as outlined by Birner, Davis and others (2006).

By articulating the many barriers to applying participatory extension approaches within an AIS framework within Middle Eastern Islamic countries, this study makes an important contribution toward filling one of these major voids, which will assist in sustainable agricultural development across the region and raise the living standards of the rural communities therein.

Engaging with all stakeholders at their point of need and providing practical support to help community development has been proven to be a far more successful approach to achieving sustainable development than the traditional top-down technology transfer models that dominate Middle Eastern agricultural extension systems. Taking a market driven approach to promote innovation and empowering multiple stakeholders through decentralisation of government services has become even more important in recent times as agricultural pursuits become more complex within rapidly changing environments. Strong cultural traditions and beliefs will not change. The challenge is therefore to design agricultural development models that allow for the essential principles of participatory extension and AIS to flourish within the top-down authoritarian cultural structures that are at the core of Middle Eastern Islamic societies.

This chapter builds on the findings of Chapter 7 by highlighting key motivating factors within Islamic thinking that influence peoples' behaviour and management strategies. This is followed by exploring cultural factors that are seen to be supportive of participatory approaches, and key Islamic leadership traits that should be encouraged in the promotion of participatory extension. This is followed describing successful participatory and AIS projects

that were observed in both Egypt and Iraq within this study, emphasising the fundamental features that made this possible. The chapter continues with clear recommendations for NGOs and other organisations to apply when undertaking agricultural development projects in the region to support the establishment of participatory and AIS practices.

The chapter concludes with a call for Middle Eastern countries to bring all stakeholders together to develop their own "best fit" strategies that effective, culturally sensitive and appropriate as they seek to increase innovation and agricultural production, while raising the living standard their rural communities, within the rapidly changing global environment.

8.2 Key understandings and strategies for achieving change

8.2.1 The motivation for achieving change

One of the key driving forces in taking participatory approaches for agricultural innovation within Western thinking is to empower people at the ground level, whether it be farmers, community industry representatives and even village extension workers, to have a voice that can directly influence decisions, resource allocation and support. This helps people to work collaboratively together at the point of real need, with a shared vision and in ways that will actually make a difference. People having autonomy to control their own destinies and improve outcomes for themselves and for their future generations is key to motivating people into action. While much of the initial resourcing for the change may be supplied by the state, the decision making for specific actions and resource allocation happens much closer to the community level.

Within Middle Eastern Islamic countries there is a very clear hierarchy of control from above, requiring obedience to Allah, the teachings of the Qur'an and prophets – the Sunnah and various writings, the religious and state leaders, working their way down to those below. The motivation for action, resource allocation and change does not come from within the paradigm of individual self-determination, self-interest and fulfilment to primarily achieving one's future goals. Instead, it comes from the religious and moral motivation of fulfilling Allah's will and that of the holy teachings. This includes the individual right to live and have the basic amenities of life and the right to be safe and secure. However, these rights as individuals are intertwined with their duties and responsibilities toward society and the community at large (Abuznaid 2006).

Abuznaid (2009) writes that while many ethical principles are universal across various religions, there are also many differences with Christianity and other eastern religions that emphasise the transience of this life, the value of meditation and the retirement from this world. Islam is said to be all about actively struggling through life, fighting against evil to prove oneself within Islam. Any material enhancement that an individual receives (from Allah) must be used to build social justice and the spiritual uplifting of the nation (ummah) and oneself. When approaching Islamic countries with the prospects of using a participatory

approach to rural development projects, it may therefore be important not to focus on the empowerment of people on the ground to forge their own destinies, but rather on seeking to be operating within the basic teachings of Islam, to enhance individual and families rights to improve their basic living standards, their communities and that of Muslim society. Managers should be encouraged to fulfil their responsibilities to assist those below them to make better decisions in obedience to Allah.

The use of consultation should be strongly encouraged in support of taking participatory approaches toward rural development as it is one of the key teachings within the Qur'an (Ali 1995, Abuznaid 2006, Mellahi and Budhwar 2010). This consultation is to be done with sub-ordinates, gently and with mercy, before making a decision and trusting it to God. Consultation is said to enhance a spirit of solidarity within organisations, diminishing any mutual suspicions and lack of confidence between various parties. One should never regret consulting, because according to an Arab proverb "When you consult others, you share their minds" (Abuznaid 2006). While consultation is often used for superiors to tell subordinates of impending actions, two way discussion is also promoted as an opportunity to show those below that their thoughts and opinions are valued.

Muslim leadership is also encouraged to seek and acquire knowledge and impart it to others (Ahmad 2010). Islam urges managers to plan in advance, and then and only then, put their trust in God who knows all things, their consequences and runs things in his own way and wisdom (Abuznaid 2006). In the context of participatory extension with rapid rural appraisal, Islamic program leaders can be encouraged to seek to improve their knowledge of the problems and potential solutions from the standpoint of all the stakeholders, including those workers on the ground and poor farmers, to then make the best and most informed decisions, in line with the core tenets of Islam.

This study has found that in reality the leaders and decision makers are not acting from a position of truly understanding the actual needs, issues or capacity of the farmers from their perspective, which can only be discovered and achieved by taking a participatory approach. While there are difficulties in dealing with very large numbers of small peasant farmers, there appears to be a reluctance in allowing someone who is seen to be far below you to be giving you wisdom, as this does not naturally fit with the well-entrenched hierarchical style of government. If the focus of participatory extension is moved from one of self-determination and empowerment, more to a process of achieving enlightenment from above to promote community good will and humanity, it can still be applied well within a top-down governance structure, as long as this approach is endorsed and promoted by higher management authorities.

Further attention should be given to emphasising the key particaptory extension principles within organisations and programs that are supported by the intrinsic Arabic cultural and societal qualities, as outlined by Ali (1995) in his article discribing cultural discontinuity and Arab management thought. These include:

- Egalitarianism, implying that equity is encouraged within organisations and that flat structures with fewer levels of hierarchy is preferred;
- Consultation/Participation, encouraging shared decision making within groups and using teamwork to advance change;
- Sensitivity to rituals and other peoples beliefs, to avoid dysfunctional conflict, and to negotiate with and accept some intangible motivational systems, taking into account emotions, feelings and building long term relationships;
- Hopefulness, in that organisational development can happen without serious resentment;
- Infatuation with ideal forms, suggesting that new and modern concepts of management are pursued in search for the best outcomes;
- Intuitiveness, allowing for speedy decision making, while tolerating some ambiguity and flexibility;
- Avoidance of public conflict and criticism, encouraging mediation, compromise and concessions, using personal performance evaluation rather than impersonal procedures;
- Self and social censorship, ensuring group cohesive strategies can be implemented, and clear organisational goals can be met; and.
- Being generous by sharing gladly with individuals and helping society when they are in need, and being equitable, making sure all are being treated justly and fairly.

Many of these Arabic cultural qualities were clearly evident within the individuals involved the projects and training programs who were interviewed within this study, but their ability to utilise these qualities in their agricultural development work was often diminished due to the government structures and management systems around them. The fact that these cultural qualities are strongly inherent within the Arabic cultures means that given the right framework, participatory processes can be naturally advanced.

Another key motivation force behind Middle Eastern countries pursuing modern participatory extension and AIS principles is that, if implemented well, have great potential to benefit a country's economy. Anderson (2008) states that governments should be able to increase the chance of reaping high returns from their investment, as well as through fostering external investors that successfully assist farmers to boost their productivity and income. This will strongly contribute to economic growth, poverty reduction and sustainable agricultural development.

8.2.2 Participatory minded leadership within Islam

According to Abdalla and Al-Homoud (2001), Islamic leadership positions should only be occupied by competent people who are responsible for the welfare of the followers, before God. The followers should obey the orders of their leaders. It is also stated that the loftiest goal is for leaders to develop more leaders from among wise people and provide a good livelihood for their people. This appears to support a transformational leadership style that inspires those delegates working within a program team to be actively involved in learning

and leading in the same manner. Islamic believers are to practice teamwork and co-operation and to work and act in unity.

Leaders within Muslim countries should always be attentive of accountability to God and to fellow beings for all deeds and actions. They should always take decisions on the foundation of communal discussion while establishing a peak level of trust and support among the followers, always being submissive to the cause of pleasing Allah and serving the humanity. Leaders are required to guide, protect and treat the followers fairly with justice. Mohammad described leadership like a shepherd looking after sheep (AlSarhi, Salleh et al. 2014). Leaders are expected to be responsible for workers work life and concerns for their families and surrounding societies.

The role of a Muslim manager, according to Abuznaid (2006) involves a strong commitment to supervision and follow-up of his subordinates. It does not end at giving orders and instructions, but continues along the entire operation. An effective control throughout all the stages of operations is a clear expectation. He states that the life of the prophet Mohammed is rich with examples of effective leadership of men involving supervision as well as management.

Islamic leadership is often seen and perceived as highly autocratic and in stark contrast to the principles of taking a participatory approach to agricultural development. One Iraqi extension officer was interviewed after training sessions and practical farm visits in Australia and remarked “the Australian way is to encourage people to discover their potential, so he can say to his employer ‘I need to try this new thing and update my skills’. I don’t think there is a lot of place for you (the interviewer) in my Department, but I know this is the Australian way”. He went on to express that his employment was more based on reward or punishment, and obedience to directions from above, but he was finding ways to work with increased freedom and autonomy (worker from July 2011 training group, Table 3-1).

Abuznaid (2006) goes on to explain that are many facets in Islamic management such as compromise leadership, humanitarian leadership, group leadership, leadership that focuses on objectives, and politically skilled leadership. All of these Islamic leadership characteristics can be well aligned to leaders who understand and operate participatory extension programs. Therefore, where an Islamic program leader chooses to run their development programs within strong participatory principles, and with the expectation that their team underneath them will operate in the same way, then a collaborating, engaging, empowering and even pluralistic strategy can operate within a top-down governance structure.

The key is in finding a strong leader who has both the capability and enough support networks (internal and external) to be able to break from the many structural, cultural and societal barriers to achieving participatory extension programs.

8.2.3 Observations of successful participatory development programs

This study identified two clear examples in both Egypt and Iraq where participatory extension processes were working or establishing well. The first was the West Nubaria Rural Development Project (WNRDP) in Egypt funded through the International Fund for Agricultural Development (IFAD) where a highly successful participatory development program appears to have been employing many of the key holistic strategies of AIS (IFAD 2010, Koriemli 2013). When visiting the project on June 15, 2011, it became very clear that the Egyptian program leader Mr. Mostafa El Sayad, Executive Director of WNRDP, had a very relationship based participatory approach to his leadership and management style. Instead of immediately focusing on showing off his facilities and impressing the visiting delegation with all his work achievements, he spent a considerable time interviewing all the visitors, making them feel important and valued, followed by introducing all his staff in a similar way, right down to the cleaners passing by, expressing their value within the team.

His presentation then began with the clear Top-down structure of the project under the Ministry of Agriculture and Land Reclamation (MALR), the Co-ordination Committee, himself as Executive Manager, with his Technical and Administrative Support and various components underneath. He then showed a slide of over 100 of these support staff, referring to them as "Our team" not as his staff or workers. While the visiting delegation consisted mainly of agricultural scientists and extension workers, he began by showing that providing reasonable housing was the cornerstone to the project settlement. This was followed by slides showing the children's education and schools with the heading "Knowledge is Power". This lead to slides on how the project had set up health clinics and vaccination programs under the slogan of "Health can make Wealth". This moved on to the provision of training programs for farmers, women and youth, including statement that "Women Development is the Base for Community Development".

The following slides showed how the project took a marketing approach to production systems, and how they had networked with many stakeholders, including farmers, chambers of commerce, overseas and local suppliers and specialists, with exchange visits organised and markets associations established. He then presented how the project had facilitated valued added enterprises, emphasising that "Egypt is our Farm, the World is Our Market". There was reference to how the project contributed to solving farmers' finance problems, under the heading "Credit can Support Ambitions". It was only at this stage that Mr Sayad talked about some of the agricultural technical support for a number of successful agricultural production projects (which is where many other such presentations would start). His key message at this stage was that "Technical Support Empowers Farmers". This led to slides on how their technical team were working to teach farmers and build their capacity, stating "Capacity Building is the base of Development". His concluding slides followed the statement "Our Mission is based on Our Vision" showing many people, from farmers, women, children and agricultural industry workers happily displaying what they themselves had achieved.

A final slide said in reflection of the whole project philosophy that "The Leader of Our Team is Our Team, the Sky is Our Limit", which was a very different approach to what was normally presented from other programs by senior officials of the Ministry of Agriculture and Land Reclamation (MALR).

It was not insignificant that when Egyptian agricultural workers were interviewed within this study and asked for their definition of Agricultural Extension, that almost all of them answered along the lines of "passing new research or technical information on to farmers". Yet it was one of the extension officers in Mr Sayad's team that answered "It is helping farmers to change", which encapsulates the essence of participatory extension and AIS, and what was clearly being practiced and achieved in the WNRDP.

One key to its success has been the participatory management approach that has been taken by the projects strong and very well respected leader, which has allowed and inspired his whole team to operate with a totally participatory extension approach, valuing and engaging with all stakeholders, right down to the smallest child in the community. This meant that the officers and technicians on the ground were able to work in submission to their immediate authorities by fulfilling their manager's directions to empower the farmers to improve their society. Having this trust and respect permeating within the team meant that workers could operate creatively and intuitively to address the real needs at hand, with less of the restrictive forces from above that were more evident in other more controlling hierarchical structures within MALR.

Another key to the success of the WNRDP was the strong insistence of the main NGO funding body IFAD that the project must take a participatory extension approach, clearly employing holistic principles of AIS since its inception. It began with the goal that "Livelihoods of the target population in the new settlement areas be enhanced with increased and sustainable economic activity and greater social self-reliance" (IFAD 2002, p5). The project consisted of five main components: (i) community organisation and development; (ii) technical operations (crop and livestock production and development, and water management); (iii) marketing operations support; (iv) credit facilitation and enterprise development, and (v) project management (IFAD 2002). In 2013 the project reported extensive successful achievements within all these areas (IFAD 2013), covering an area of 23,529 ha, with the number of direct household beneficiaries estimated at 30,000. Despite the political upheaval that enveloped the country as a result of the Arab Spring in 2010 the project continued well because of its participatory and AIS approach to lift people's capacity in all levels of community life.

In Iraq, the "On the Ground" project funded by AusAID (Rural Solutions SA 2013) was strongly based on training Iraqi Agricultural workers in establishing a participatory approach livestock and horticultural projects at seven locations within the country. While the project experienced many difficulties in trying to implement these strategies with a country damaged from a history of autocratic rule, war and instability, it was still able to show that, to a limited extent, participatory extension could be achieved. This was mainly due to the efforts of key

high ranking project leaders from both the Ministry of Agriculture (MOA) and the Ministry of Water Resources (MOWR), who were willing to engage, listen and plan project activities around the advice of the farmers and workers on the ground. This was said to have been one of the few active projects in the country where these two Iraqi Ministries were actively collaborating together in program development and operation (comments made by OTG Steering Committee, Table 3-2).

The project was also strongly committed to a training systems that empowered the Iraqi project participants to develop and enact the project within the Iraqi rural communities. It established modern and highly efficient irrigation systems across sites, as well as the first successful artificial insemination and embryo transfer of Awassi sheep in the country by the Iraqi project trainees, engaging with hundreds of farmers and industry personnel (see Appendix 2 for OTG 2010-2013 Monitoring and Evaluation Report). However, the main project achievements came from within the direct project participants who changed from just specialists passing on technical information on to farmers, to leaders who were able to improve project management, governance, monitoring, evaluation and reporting, engagement with farmers, farming groups, NGOs and other Government entities. They were able to begin to upward manage within their strongly hierarchical and autocratic Ministry structures (despite strong resistance at times), due to the commitment to a participatory approach taken by the senior Ministry officials that were overseeing the project.

Findings from this study have shown that governing structures and systems within Iraq fell well short of being able to embrace a more pluralistic approach to agricultural development, as there was still a high degree of centralised control over all activities, a general lack of trust between farmers, government and the private sector, as well as difficulties with inefficiencies, corruption and nepotism to overcome. As Iraq has continued to experience conflict and instability it has become extremely difficult to develop or establish meaningful and sustainable changes toward a more participatory style of extension and AIS.

In both of these examples, it was fundamentally important to have key leaders in high government levels that clearly understood the benefits of operating with a participatory approach to extension, and were proactively practicing these principles with their staff and with all stakeholders within the projects. So while they maintained their strong positions of authority at the top, leaders both demonstrated and authorised their staff below them to operate with a participatory approach to the tasks they were given. This meant there was a clear hierarchical structure maintained, promoting all Islamic fundamentals of *tawid* and *shari'ah,* while still allowing for engagement and consultation with all stakeholders, including the village extension workers and farmers, before critical decisions were made. These leaders were certainly acting like the shepherds of their sheep. Leaders that strive to take a "Bottom-up" as opposed to a "Top-down" management style do exist within these Middle Eastern countries, despite many of the cultural challenges to achieving this.

There is evidence to suggest that the Egyptian Government has made positive steps towards more pluralistic policies. In 2006 the Ministry of Finance adopted a new policy of promoting private sector partnerships to increase infrastructure investments. By 2016 it was announced that 12 government projects worth a total of $2.3 billion (USD) would be presented for international bidding in the areas of water desalinisation, sanitation and recycling (FAO 2017). While this remains a long way from the reform required within the MALR for establishing successful AIS, it does represent a willingness to engage with a range of non-government organisations to potentially achieve the best results.

8.2.4 NGO support committed to participatory principles

NGOs and other funding bodies spend large amounts of money in supporting agricultural development and innovation within the Middle East. They are committed to achieving the most efficient and beneficial results for both their monetary and humanitarian investments, and can play an instrumental role in achieving participatory outcomes through AIS.

Firstly, NGOs should be strong in their stance on having the projects that they are funding to be based on participatory extension approaches and AIS. When applied well these have been proven to be highly successful in achieve relevant, profitable and sustainable benefits to lifting the living standards of the rural poor and improving the prosperity of their lands. Islamic managers are familiar with operating under the clear guidance from authority, and NGOs should therefore be clear about the way they expect projects and programs to operate.

Secondly, finding strong leaders from within the countries, often within government positions, that truly understand and operate from a participatory mindset or world view, is key to the successful implementation of participatory projects within AIS. If these leaders can support their workers beneath to also apply these principles, then this helps to overcome many of the barriers and allow for the important activities to flourish within these programs.

Thirdly, NGOs should promote and partake in more pluralistic AIS activities to create capacity to promote promising new and flexible opportunities at the farm level, engaging more private stakeholders and service providers for resources, market information and expertise within our rapidly changing global internet facilities. However, this can greatly increase the risks involved, particularly where corruption, nepotism and lack of trust are strong. To counterbalance these risks involved in such flexibility, Anderson (2008) believes that strong governance and accountability should receive more careful attention than has typically been devoted in the past.

8.2.5 Applying a participatory approach to develop culturally sensitive and effective participatory AIS.

This chapter has made clear references to the areas of Islamic ideology tribal traditions within the culture that should be emphasised when promoting participatory extension programs and

AIS approaches. However, it is acknowledged that the author of this study is not a Muslim, an Islamic scholar or a resident within a Middle Eastern culture. While conclusions have been made based on research, literature (sourcing many Islamic research authors) and observation, it is important to recognise that each Islamic country is different in its resources, government structures, population dynamics, market access and ways of operating. Each country or region needs to work out its own ways to best apply participatory approaches and AIS for themselves. This requires them to first apply a participatory approach to developing their own extension system strategies, rather than just having an external model applied to them from expert outsiders that may have limited understanding of their particular environment and cultural values. Otherwise the application of intended participatory programs may fail due to not following the basic principles that participatory extension promotes.

There needs to be a clear education of all stakeholders (particularly government workers at all levels) as to what a participatory approach is and can achieve. Gaps in understanding within the middle levels of the Iraqi government structures of the participatory approach of the "On the Ground" project led to huge delays and impediments created by the ingrained hierarchical, authoritarian management. There were also clear indications in both Egypt and Iraq that peasant farmers are not used having any ability to influence government policy whom they greatly mistrust. In both countries this study found a strong desire from agricultural workers to embrace participatory extension, while the majority were operating out of a framework of technology transfer through field demonstrations. Such a shift in organisational thinking and expectations will not happen overnight, and will require a major marketing campaign to highlight the benefits of successful participatory programs like the West Nubaria Rural Development Project in the Nile Delta.

The second step needed is to explore how participatory extension and AIS approaches may look like and function best within each country's government and cultural structures and activities. This would need to involve many stakeholders, including politicians, departmental leaders, technical experts, researchers, universities and extension workers, farming organisations, farmers, private agricultural suppliers, marketers, consultants and even religious leaders. This would have to be very well facilitated by those who well understand Islamic ideology and the local governing culture, as well as the key essential principles of participatory extension and AIS. If this could be achieved with some level of ownership and commitment from all of the stakeholders involved, then this would greatly increase the chances of these approaches being successfully implemented in culturally sensitive ways within Middle Eastern Islamic countries.

8.3 Conclusion

This chapter has shown that while there are many intrinsic barriers to achieving participatory extension and AIS within Middle Eastern cultures, there are also many core beliefs and traditions that support these approaches for developing agriculture and enhancing rural societies. Any attempt to apply participatory and AIS approaches within this region should seek to emphasise these core beliefs and cultural traditions to achieve desired outcomes.

Examples of successful programs have been shown to occur where there has been:

(1) a strong commitment from NGOs to ensure large projects are operated under participatory extension and AIS principles; and

(2) key high ranking program leaders that well understand and operate with transformational, relationship based leadership styles. When these leaders instruct their support staff that a participatory approach must be adhered to, then they can submit to their cultural hierarchical management structures and systems, while still engaging with the real needs of all stakeholders and empowering them to improve their livelihoods and their communities.

These two factors are critical to achieving participatory and AIS outcomes within this region.

There is a clear need for these Middle Eastern communities (key government, farmer and industry representatives) to work together to forge their own “best fit” approaches to applying participatory and AIS principal within their cultural settings. While this presents many challenges, as they are strongly entrenched within more traditional “top-down” management structures and technology transfer extension models, it is vital that Middle Eastern agricultural advisory services and rural communities modernise so they can more fully embrace the agricultural innovations and opportunities available within the increasingly complex and rapidly changing global environment.

It is therefore concluded that while it is not easy for participatory extension approaches within AIS frameworks to be applied within the context of Middle Eastern Islamic countries, culturally sensitive modifications should be pursued and developed that will enhance their acceptance and application, so that all the advantages of improving the livelihoods of the rural poor and their communities can be achieved in an increasingly effective way.

9 Conclusions

This chapter provides a summary of the findings of this research and how they have addressed the research aims. This is followed by a discussion of the implications, significance and the need for further work in this field to develop and successfully apply participatory extension approaches and AIS within the Middle East.

9.1 How can participatory extension approaches within AIS be effective in the Middle East?

Each research question, as stated in the Introduction of this thesis, is answered as follows:

1. **What institutional elements have been necessary to promote the emergence of participatory extension and AIS in other regions of the world?**

Chapter 2 explained how more traditional top-down, research and information driven "Technology Transfer" models and T&V schemes were characterised by agricultural specialists delivered standardised predetermined information to farmer clients. However, participatory extension approaches involve farmer and end users being central to the consultation process, and sharing in the development and implementation of new technologies. AKIS/RD followed, integrating agricultural education, farmers, researchers and extension agents to promote mutual learning, empowering farming communities and building their motivation and capacity to change. AIS has broadened the focus to be more market driven, partnering with other service providers and agencies, building knowledge and innovation within the whole market chain.

For AIS to thrive it relies on governments being prepared to decentralise and take a pluralistic approach to effective and efficient service provision, while creating a more enabling environment for innovation to happen. Chapter 8 highlights that these approaches are underpinned by self-motivation and the empowerment of individuals, groups and stakeholders at all levels of the value chain to be given the capacity and support to achieve this for themselves, as well as their communities. This has been successful in many countries where government agricultural advisory services change their approaches from trying to be the main source of knowledge and innovation, to seeing themselves more as facilitators of change, and creating the best supportive environment for innovation to occur. This requires being prepared to out-source key services while addressing areas of market failure and encouraging sound networking relationships with all stakeholders.

2. What are the key characteristics of the Middle Eastern culture that impact on this region's ability to embrace the more Western ideals within participatory extension approaches and AIS?

As described in Chapter 4, the majority of Middle Eastern countries, with the exception of Israel and Lebanon, are over 85% Muslim which permeates all levels of society, from government laws and traditions to the thinking and behaviour of individuals. The people of the Middle East have a culture that is centred around family structures, loyalties and religion. There has always been a strong tension in the Middle East communities between conformity to powerful centralised government, and identity with local tribal or family traditions.

Chapter 7 highlighted many key Middle Eastern cultural and religious characteristics that impact greatly on participatory extension approaches and the application of AIS. These include centralised authoritarian control rather than more community based autonomy; a predominance for transactional leadership styles over transformational leaders; workers primarily operating with low risk obedience to superiors rather than critical thinking and problem solving action taken at ground level; the hierarchical societal structures; more fatalistic attitudes of conformity towards circumstances rather than empowerment of individuals to better control their outcomes; the lack of trust between farmers and government; nepotism; and, the reliance on incentives to achieve participation.

A core difference from a more Western World view is the Islamic belief in one God and in all prophets of God, and submission to the divine will of Allah in all aspects of life, as revealed through his prophets. Most Arab Islamic societies are very power-stratified and work through hierarchical relations. Power flows smoothly when subordinates obey or seek guidance from their superiors, who in return protect and care for their subordinates. Islam makes no distinction between the religious and secular, but sees the whole life of man in all its spheres should be an expression of complete submission to Allah.

In contrast, participatory approaches are built more on empowerment of those at the ground level, and for them to be central within the decision making and development as equals, rather than sub-ordinates. Its strength is that it applies the shared creative thinking and strategic problem solving of people at all levels where the problems are truly understood and experienced, rather than waiting for the decisions and approval from a more distant superior. Keys to AIS include encouraging decentralisation and pluralism, which is difficult to achieve where there is strong centralised control and less accountability required.

There are also many Islamic teachings and cultural traits that appear supportive of participatory approaches, as outlined in Chapter 8. These include, upholding social justice; consultation/participation; acquiring knowledge and imparting it to others; egalitarianism, hopefulness; intuitiveness; and being generous and sharing with those in need. More attention should be paid to these qualities when endorsing participatory extension, particularly when seeking to implement programs amongst the rural poor.

3. What is the nature of extension and the extent to which participatory methods and AIS are understood and implemented in two case study Middle Eastern countries of Egypt and Iraq?

Agricultural advisory services within Iraq and Egypt are strongly characterised by Top-down Technology Transfer Diffusion of Innovations approaches, being essentially research and information driven, according to agricultural workers engaged within this study in Chapters 5 and 6. A strong emphasis was placed on demonstrating innovations, as farmers *"will not change unless they see it with their own eyes"*, but little evidence expressed of programs that were driven by trying to improve farmers capacity to make significant changes. There was a strong suggestion that farmers required incentives to participate in government programs.

While most workers embraced participatory extension approaches, there were many barriers expressed in trying to achieve this, both within the broad context of government and society, as well as the internal workings of their agricultural advisory services. There were, however, a number of examples given where participatory approaches and AIS were being applied successfully to varying degrees. These were mainly evident where there was strong outside influences supporting these approaches along with key leaders who operated from a participatory mindset and encouraged their workers to do the same.

There is an expressed need for further training to be done on participatory extension approaches. There is a further need for a greater understanding and application of the AIS, and how the principles of decentralisation can be made affective within such centrally controlled government structures and societies influenced by corruption and nepotism.

4. What are the barriers to achieving participatory extension and AIS within Middle Eastern countries, and can they be overcome?

In addition to the above mentioned cultural barriers to achieving participatory extension and AIS, agricultural workers from Iraq and Egypt revealed the following:

- A lack of trust between famers and government workers;
- A lack of communication and co-operation between government entities;
- A lack of understanding of real farmer needs;
- Poor resourcing of workers, including transport, computers, equipment;
- Lack of training in participatory processes;
- Top-down approach to government organisation with little local autonomy;
- Lack of pluralistic approaches to running of programs;
- The high risk of farming and unwillingness to change;
- Nepotism and corruption;
- Lack of respect for farmers indigenous knowledge and networking;
- Deteriorating VEW network, with few long-term relationships built with farmers;
- VEWs with regulatory responsibilities making them enemies of farmers; and
- The enormous task of engaging with many small, poor, traditional farmers.

There needs to be a great deal of educational change within the higher leadership of government departments and policy makers, as well as researchers and VEWS, so that can see for themselves and promote the use of participatory approaches and AIS. It is vital that more resources are applied toward the village based extension centres, as this is where long term trusting relationships can be forged between farmers and government workers, which becomes the catalyst for the application effective rural development and agricultural innovation.

There is also a fundamental change in attitude and approach that needs to be made by those seeking to promote participatory extension principles within AIS frameworks to those within Middle Eastern cultures. It must be recognised that there are many intrinsic barriers to achieving participatory extension and AIS due to that are not well understood from a more Western mindset and management styles. There are also many core beliefs and traditions that support these approaches for developing agriculture and enhancing rural societies and should be emphasised when seeking these desired outcomes.

If the focus of participatory extension is moved from one of self-determination and empowerment, more to a process of achieving enlightenment from above to promote community good will and humanity, it can still be applied well within a top-down governance structure, as long as this approach is endorsed and promoted by higher management authorities, and is in keeping with Muslim teaching.

5. How do governments and NGOs need to change their expectations or modify their approaches to achieve appropriate and successful agricultural development outcomes in ways that better suit Middle Eastern cultures?

For participatory approaches and AIS principles to be successfully applied within Middle Eastern Islamic countries there needs to be a clear recognition that cultural differences create barriers for their application. Chapter 7 and 8 shows expectations need to be modified and adaptations made to better conform to cultural conditions as afore mentioned, if these modern approaches to agricultural advisory systems and rural development are to be more successful and sustainable across this region, expanding the operations of their rural sector within the rapidly changing world economy.

While it is not easy for participatory extension approaches within AIS frameworks to be applied within the Middle Eastern Islamic context, it can be successful where there is:

a. a strong influence from outside program funding sources that both requires and supports participatory extension processes within a framework of AIS, and

b. strong departmental and project leaders (with relationship based transformational leadership styles) who both understand and implement participatory approaches to

program development, and actively encourage their staff to operate in the same way. This way they can act submissively to their "top-down" leadership structures while still fulfilling the "bottom up" capacity building of participatory extension, and benefit from the multi-stakeholder, pluralistic advantages of AIS.

NGOs and government managers need to find the right balance between the strong accountability to overcome any detrimental influences caused through corruption and nepotism within much of Middle Eastern society, while still encouraging a creative environment through decentralisation and pluralism, allowing for more empowerment and autonomy to those at ground level, which is the key seeing communities thrive through AIS.

This has been shown to be possible through successful programs within Middle Eastern countries, such as within the West Nubaria Rural Development Project funded by IFAD. However, this will require significant paradigm shifts throughout the current agricultural advisory service structures for significant improvements like this to be embraced and realised more consistently, within our increasingly complex and rapidly changing global environment.

9.2 Significance of this research

Rural poverty is extremely high across the Middle East and countries must modernise their agricultural practices to raise living standards and feed their rapidly expanding populations. This study has provided important insight into both the barriers and opportunities for improving the application of participatory extension and AIS across this region. This thesis captures the unique perspectives of government research, extension and education workers involved in agricultural development between 2011 and 2014, directly after the Arab Spring, and at a time when they were able to more openly reflect on previous governments and their present situations with less fear of speaking out.

By identifying the many challenges and barriers for organisations to be able to successfully apply participatory extension and AIS (based on more Western ideals) into Middle Eastern cultures, it is hoped that new, more effective approaches can be developed in the future that will provide a better return on the investment of international Aid, and most importantly, increase the living standards of the rural poor across this region.

9.3 Future work required

There is a clear need for these Middle Eastern communities (key government, farmer and industry representatives) to work together to forge their own "best fit" approaches to applying participatory and AIS principal within their cultural settings. While this presents many challenges, as they are strongly entrenched within more traditional Top-down management structures and technology transfer extension models, it is vital that Middle Eastern agricultural advisory services and rural communities modernise, so they can more

fully embrace the agricultural innovations and opportunities available within the increasingly complex and rapidly changing global environment.

Islamic Middle Eastern cultures will by nature always need to operate within Top-down management structures that are ultimately submissive to strong leadership and the will of Allah. They are not essentially driven by the individualistic self-determination and empowerment to create one's future, which permeates much of Western thinking. It is therefore necessary for key Arabic people to find the most appropriate ways to achieve the best outcomes of participatory approaches within AIS in the most culturally sensitive ways, and by building on the many religious and cultural principles that encourage this.

Each country or region needs to work out its own ways to best apply participatory approaches and AIS for themselves, as it is not a case of "one size fits all". This requires them to first apply a participatory approach to developing their own extension system strategies, rather than just having an external model applied to them from expert outsiders that may have limited understanding of their particular environment and cultural values. Otherwise the application of intended participatory programs may fail due to not following the basic principles that participatory extension promotes.

Importantly, agricultural advisory services must first learn to be able to apply these principles within their own agricultural Ministries, before they will be able to apply them well amongst rural communities. This will remain the greatest challenge!

10 Appendix 1. Survey / Interviews and related forms used in research.

Attachment 1 Extension Interview/Survey form

This survey questions are aimed at capturing the following information from the Egyptian perspective.

1. **What Agricultural Extension systems are operating in various regions of Egypt/Iraq.**
2. **How effective are these approaches.**
3. **What needs to happen to improve Agricultural Extension in Egypt/Iraq.**

Contributors will not be identified in final report.

"Extension in Egypt/Iraq" Interview Survey 2010 - 2014

Name:
General Position of Employment:
Ministry of:
Area (Governorate or Sphere of Influence):

Question 1. Establishing an understanding of Egyptian/Iraqi Agricultural Extension.

1.1 Please describe your understanding of what Agricultural Extension is?

1.2 Who are the people involved in Agricultural Extension in Egypt/Iraq and what are their roles?

1.2.1 Are groups such as private companies (agri-businesses), NGO's, Farmer or Industry Associations that are involved in extension?

1.2.2 What role does the media (print, radio and TV) and the internet play?

1.3 Describe one good Extension project you have been involved in or are aware of.

1.3.1 What was the issue or need?

1.3.2 How was the issue addressed to achieve a change in activities?

1.3.4 How successful do you think this has been?

1.3.5 Can you describe some of the impacts or outcomes this program has had:

a) Direct impacts to farmers operations or project situation.

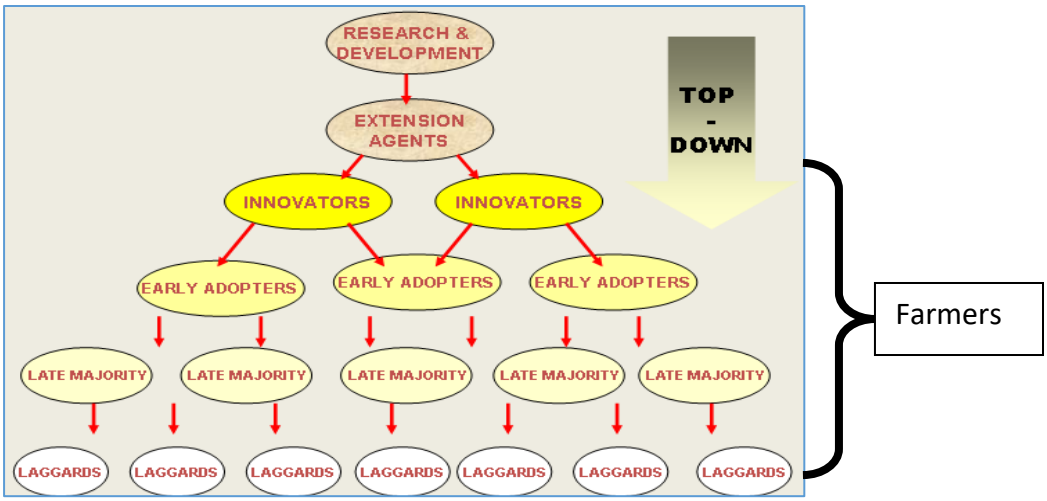
b) Indirect or flow-on affects

1.4 Can you give an example of a less successful agricultural program, and why didn't it work?

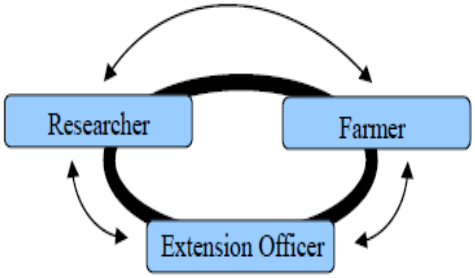
2 Extension methods and flows of information

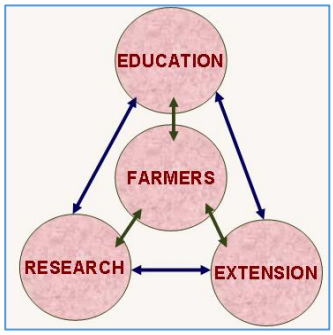
The following diagrams represent 3 models of "information flow" in agricultural extension.

a) Technology Transfer - Diffusion of Innovations Path

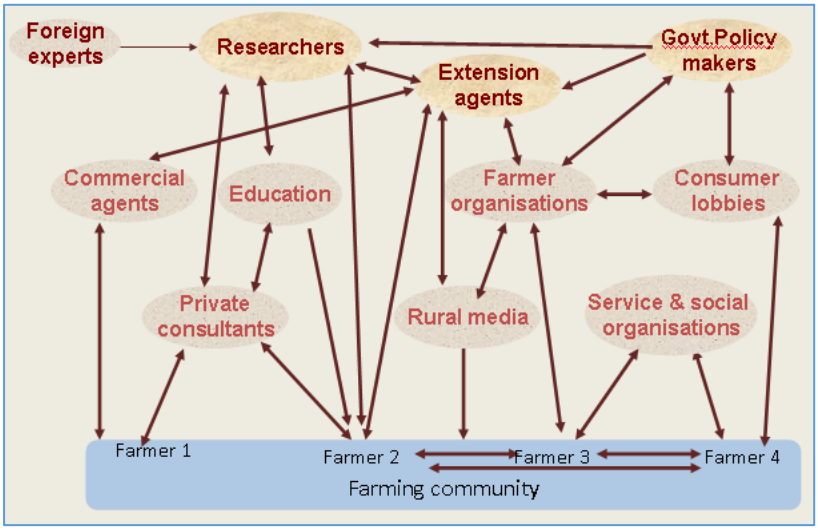


b) Participatory (1) or (2)





c) Agricultural Knowledge and Information Systems (AKIS)



2.1 Which diagram, if any, could best describe "information flow" within various in Egypt/Iraq extension processes?

2.2 Is this generally what happens, or is there a range of approaches taken for different situations?

2.3 Would you prefer to draw your model of "information flow" in your experience in Egypt, or at least comment on modifications you would like to make to a particular diagram that would better reflect Egyptian/Iraqi approaches?

2.4 How has methods of Agricultural Extension been changing in Egypt?

2.5 What roles do you think farmers / producers should play in the extension processes, and why?

2.6 How would you describe the relationships between Government workers (officials, researchers and extension staff) and farmers? (What do they think of each other?)

<u>Question 3 The Farmers Perspective</u>

3.1 What are the main barriers for Egyptian farmers to achieving lasting change?

3.2 Do you or your immediate family have your own farm. Yes / No

If "Yes" please answer the following. If "No" could you please ask a farmer (or multiple farmers) these questions and record their responses. If this is not possible, please ignore the rest of section 3.

3.3 What changes have been made to improve this farms operations in the last 10 years?

3.4 Why were these changes made?

3.5 What were some of the key factors that helped make these changes possible?

3.6 What has been the results or benefits of these changes?

3.7 Describe some of the risks involved in making these changes.

3.8 What sort of changes would the farmer still like to make to their farm?

3.9 Do you think this is likely to happen in the next 5 years?

3.10 What are the critical things needed to help make those changes?

3.11 When changes lead to increased profits, what are the first few things that the farmer will use this money for?

(this response need not be restricted to the agricultural business, eg. New land, equipment, house, family health and education etc…)

Question 4 Improving Agricultural Extension in Egypt/Iraq.

4.0 List the major barriers to achieving improvements in the Egyptian/Iraqi agricultural sector.

1. .
2. .
3. .
4. .
5. .

4.1 What needs to happen to improve Agricultural Extension in Egypt/Iraq, in the areas of:

a) **Extension approaches**

b) **Resources**

c) **Extension Officer Skills**

d) **Government Policy**

4.2 What other factors do you think need to be addressed to improve extension in Egypt/Iraq?

4.3 Who needs to be responsible for making these improvements?

Thankyou from Chris McDonough, Adelaide University Student and Rural Solutions SA Consultant.
Ph: +61408085393, email: chris.mcdonough@sa.gov.au

Attachment 2 Project Information Sheet

Middle East Extension Research Project Information Sheet

Original Project Title. **"Determining the transferability of Australian participatory extension approaches to agricultural development programs in the Middle East"**

This study, using an Action Research framework, aims to:

- explore and analyse the agricultural extension in the Middle East,
- analyse what are the critical factors that will influence the success of participatory extension methods within these cultures, and
- propose "best practice" guidelines for achieving adoption of improved agricultural programs within the Middle Eastern region.

This survey forms a vital part of this research in establishing background information as to the type and the effectiveness of agricultural extension currently occurring within the Middle East.

Participants are asked to complete this survey with the assistance of an interpreter if required. It should take about 30-40 minutes. Responses may be both as a written survey or a recorded interview for transcribing at a later date. Many interview questions will be open in nature, allowing for deeper probing in certain areas, or to allow participants to express more detail into their own personal experiences. Social research methodology allowing assessment of such qualitative data will be used to interpret results and draw conclusions.

Participants involved in surveys conducted as a part of this research project should be aware that the results from this study are expected to be published. However, participant details will not be identified and any personal responses will not be divulged. There may be some grouping of information gained based on broad area of work or region (eg. Extension, Kurdistan).

All transcribed survey document computer files will only be identified using a number code. Files identifying codes to individuals will be kept separately and treated with the strictest confidence and in accordance with the University of Adelaide's ethics guidelines. Reports from these surveys can be made available to participants on request via email. Participants should understand that they are free to withdraw from the project at any time, and their information provided will not be included in this research.

Anyone requiring more information about this survey and project, or wishing to withdraw their information from publication should contact Chris McDonough, Rural Solutions SA, University of Adelaide, via email: *christopher.mcdonough@adelaide.edu.au* or phone: +61 408 085 393

Attachment 3 Participant Consent Form

THE UNIVERSITY OF ADELAIDE HUMAN RESEARCH ETHICS COMMITTEE

STANDARD CONSENT FORM

FOR PEOPLE WHO ARE PARTICIPANTS IN A RESEARCH PROJECT

1. I, …… *(please print name)* consent to take part in the research project entitled: **Determining the transferability of Australian participatory extension approaches to agricultural development approaches in the Middle East.**
2. I acknowledge that I have read the attached Information Sheet entitled: **Middle East Extension Research Project Information Sheet.**
3. I have had the project, so far as it affects me, fully explained to my satisfaction by the research worker. My consent is given freely.
4. Although I understand that the purpose of this research project is to make a positive contribution to agricultural extension in the Middle East, it has also been explained that my involvement may not be of any benefit to me.
5. I have been given the opportunity to have a member of my family or a friend present while the project was explained to me.
6. I have been informed that, while information gained during the study may be published, I will not be identified and my personal results will not be divulged.
7. I understand that I am free to withdraw from the project at any time.
8. I am aware that I should retain a copy of this Consent Form, when completed, and the attached Information Sheet.

……..

(signature) *(date)*

WITNESS

I have described to …….. *(name of subject)* the nature of the research to be carried out. In my opinion she/he understood the explanation.

Status in Project**:** ……

Name: ……

……..

(signature) *(date)*

Attachment 4 Ethics Form for Human Research

THE UNIVERSITY OF ADELAIDE

HUMAN RESEARCH ETHICS COMMITTEE

Document for people who are participants in a research project

CONTACTS FOR INFORMATION ON PROJECT AND INDEPENDENT COMPLAINTS PROCEDURE

The Human Research Ethics Committee is obliged to monitor approved research projects. In conjunction with other forms of monitoring it is necessary to provide an independent and confidential reporting mechanism to assure quality assurance of the institutional ethics committee system. This is done by providing research participants with an additional avenue for raising concerns regarding the conduct of any research in which they are involved.

The following study has been reviewed and approved by the University of Adelaide Human Research Ethics Committee:

Project title: **Determining the transferability of Australian participatory extension approaches to agricultural development programs in the Middle East.**

1. If you have questions or problems associated with the practical aspects of your participation in the project, or wish to raise a concern or complaint about the project, then you should consult the project co-ordinator:

   Name: **Christopher McDonough**.....

   telephone: +61 408085393.

2. If you wish to discuss with an independent person matters related to

   - making a complaint, or
   - raising concerns on the conduct of the project, or
   - the University policy on research involving human participants, or
   - your rights as a participant

contact the Human Research Ethics Committee's Secretary on phone (08) 8303 6028

Attachment 5 Middle East Extension Research Project Information Sheet in Arabic

ملحق رقم 2

صحيفة معلومات مشروع بحث الارشاد الزراعي في الشرق الاوسط

عنوان المشروع الاصلي : **"تحديد امكانية نقل اساليب الارشاد الزراعي التشاركي الاسترالية الى برامج التنمية الزراعية في الشرق الاوسط "**

ان هذه الدراسة ومن خلال استخدام اطار بحث عملي تهدف الى :

- استكشاف وتحليل الإرشاد الزراعي في الشرق الاوسط
- تحليل العوامل الحرجة التي ستؤثر على نجاح طرق الارشاد التشاركي ضمن هذه الثقافات
- اقتراح خطوط ارشادية لـ "افضل ممارسة" لأجل تحقيق تبني البرامج الزراعية المحسنة في منطقة الشرق الاوسط

يشكل هذا الاستبيان جزء حيويا من هذا البحث في تأسيس خلفية معلومات حول نوع الارشاد الزراعي المتبع حاليا في الشرق الاوسط ومدى فاعليته .

سيطلب من المشاركين اتمام هذا الاستبيان بمساعدة مترجم ان اقتضى الامر . سيستغرق ذلك حوالي 30 الى 40 دقيقة . سيتم تدوين الاجوبة او تسجيل الصوت لأجل كتابة الكلام في وقت لاحق . ستكون اسئلة عديدة اسئلة مفتوحة بطبيعتها ، مما يتيح للمقابلة سبر اغوار اعمق في مجالات معينة ، او تتيح للمشاركين التعبير بتفاصيل اكثر عن تجاربهم الشخصية . سيتم استخدام طرائق البحث الاجتماعي ، التي تتيح تقييم مثل هذه البيانات النوعية ، لتفسير النتائج واستخلاص الاستنتاجات .

ان المشاركين في الاستبيانات التي يتم اجراؤها كجزء من مشروع البحث هذا يتوجب عليهم ان يعلموا ان نتائج هذه الدراسة من المتوقع نشرها . مع ذلك ، فأنه لن يتم الافصاح عن تفاصيل المشاركين ولن يتم الكشف عن أي اجابات شخصية . ربما سيتم تصنيف بعض المعلومات على اساس مجالات واسعة من الاعمال او المناطق (مثلا الارشاد في صعيد مصر) .

سيتم تعريف كل وثائق الاستبيان المنقولة عن الكلام الشفوي والمكتوبة في ملفات كومبيوتر بأرقام مشفرة فقط ، وسيتم الاحتفاظ بالملفات التي تربط بين كل شفرة واسم الشخص المعني في مكان منفصل ، حيث سيتم التعامل معها بأقصى درجات السرية وفقا للخطوط الارشادية لآداب العمل لجامعة أديلايد .

ان التقارير المعدة عن هذه الاستبيانات ستكون متاحة للمشاركين عند الطلب وبواسطة البريد الالكتروني .

يتوجب على المشاركين ان يفهموا ان لهم كامل الحرية في الانسحاب من المشروع في أي وقت يشاءون ، وان المعلومات التي يقدمونها في هذه الحالة لن يتم وضعها ضمن البحث .

ان أي شخص يحتاج للمزيد من المعلومات عن هذا الاستبيان وهذا المشروع او يرغب في سحب معلوماته من النشر يتوجب عليه الاتصال بمستر كريس ماكدونا في مؤسسة الحلول الريفية ، جامعة أديلايد على البريد الالكتروني :

christopher.mcdonough@adelaide.edu.au

او على الهاتف رقم +61 408 085 393

11 Appendix 2. OTG Monitoring and Evaluation Report

Iraq On-the-Ground (OTG) Program 2010-2013

Irrigation and Horticultural Production
Sheep Reproduction Technologies

Monitoring and Evaluation Report of the OTG Project against MERI Plan Objectives and Milestones

Chris McDonough,
The University of Adelaide, Faculty of Sciences
13 Oct 2013

THE UNIVERSITY of ADELAIDE

CONTENTS

1 INTRODUCTION

The AusAID funded Iraq OTG Program was planned as a pilot strategy to provide support to Iraqi agricultural scientists who are operating at the farmer level. Rural Solutions SA (RSSA) were responsible for its design, management and delivery. The programs details, objectives, management and logic were all clearly presented in the projects Monitoring, Evaluation, Reporting and Improvement (MERI) Plan.

The Iraq OTG Program selected and brought Iraqi agriculturists to Australia to develop their skills in advanced agricultural technologies, given the limited opportunities currently available to Australian agriculturists to work in Iraq, and in acknowledgement that capacity building is heavily reliant upon learning from demonstration and practice.

Following a period of intensive training with specialists in Australia, the trainees returned to Iraq to practice their new skills and to pass these skills on to others via participatory extension processes.

To test the OTG concept, two 'projects' were selected, based on information provided by the Iraq Government, that had high priorities in the reconstruction of Iraq's agricultural industries. These two projects were;

- Irrigation and Horticultural Production
- Sheep Reproduction Technologies

It should be noted that there have been many delays to the original project timelines, mainly due to circumstances beyond the control of RSSA which have been well communicated and accepted throughout the life of the project with AusAID. The issues that caused delays were identified as risks within the original project MERI Plan, and led to an extension of the original project and planned milestone dates.

The Iraq OTG Program was extended to be funded until Dec 2013, with mainly E-mentoring support being provided to the OTG since the last project team meeting in Jordan in December 2012. Monitoring and evaluation has formed an important element of both of the OTG projects. Specific outcomes from the projects are viewed from short, medium and long term perspectives.

This Monitoring and Evaluation Report is based on the program logic outlined in the MERI Plan and has been compiled independently of the project management and operation teams, and with their cooperation. It includes direct references to the agreed project milestones in Section 6, Appendix 2 of the OTG MERI Plan, by stating the dates when these milestones were achieved and the evidence of accomplishment. Evaluation was also captured through interviews with all direct project participants from both the Iraqi and Australian teams, as well as some site farmers. Analysis was also made of project and trainee activities as well as communication data such as emails, reports and other correspondence, including many site photos, to support both the monitoring and evaluation of the OTG program.

While this original evaluation report was made in Feb 2013, some supplementary updated comments have been added in Sept 2013 to highlight key achievements to meet milestones in areas that had experienced initial delays (highlighted in blue).

This report also features evidences of short term to intermediate outcomes of this project that are being revealed as the project has progressed, as a direct result of the capacity that has been built within the Iraqi project team. It concludes with a summary of the key characteristics of OTG that are believed to have most contributed to the success of this project.

2 IRRIGATION AND HORTICULTURAL PROJECT ACHIEVEMENTS BASED ON MERI PLAN.

Activity	Outputs	Due date of output/ milestone	Date Achieved	Evidence of accomplishment
1. Pre Planning meeting at ICARDA Syria 2. Develop communications strategy 3. Review best practice irrigation systems for Iraq 4. Review horticultural crop opportunities	1. Formal relationships confirmed for project implementation team 2. Communications Strategy shared with Iraqi and Australian specialists & formal partners 3. Selection of irrigation system type and annual crop confirmed.	1-3. April 2010	Sept 2010 April 2011	1-2. Meeting of initial Iraqi project delegation in Syria, where project plan, operations and personnel required were further communicated and sorted out. The minutes of this meeting are a part of the "On The Ground (OTG) Report for 2010-11" May 2011 presented to AusAID. 3. Meeting OTG Steering Committee and Irrigation Group Trainees from 3 sites, each with MOA and MOWR representatives. The minutes of this meeting are also included in the "On The Ground (OTG) Report for 2010-11" May 2011. *This 12 month delay in achieving this target was mainly due to internal issues working within and across the various Iraqi Ministries, both with sufficiently understanding the OTG project as well as arriving at the right personnel for project management and on ground operations. However, these problems were addressed and eventually overcome. This process required much persistence and patience but has proved critical in securing the success of this project within the difficult Iraqi context, where many other projects would fail.*

5. Conduct five week intensive irrigation and horticultural management training course and field visit to Australia.	4. Seven Iraqi specialists trained in site selection, irrigation systems design, installation and Irrigation scheduling. 5. Whole farm planning assessment and review of key crop growth parameters for selected crop at each of the three sites developed 6. Risk assessment of cropping and irrigation constraints conducted. Including- sources of irrigation water, water quality, water treatment and filtration. Soil factors which influence irrigation system and crop type. Weather conditions and pest and disease management. 7. Economic and market assessment of chosen crop including analysis of price, gross margin costs, international competition, timing of market shortages or over supply, identification of product specifications desired by the market. 8. Communications plan advanced to support the establishment of the OTG irrigation project developed. 9. Strategies and learning approaches identified for Iraqi farmer engagement. Establish Iraqi train the trainer approaches.	4-9. May 2010	July 2011	4-9. Training of six Iraqi specialists completed in Australia over a 5 week period in June-July 2011 in all output areas, including drip irrigation systems design, management, installation, operation and horticultural agronomy, whole farm planning, risk assessment economics, communications and extension strategies. This was reported in November 2011 "On The Ground (OTG) Report for 2010-11". Attendees of the December 2012 OTG meeting in Jordan, including all trainees, were interviewed and asked questions specifically about the value of the Australian based training. The results of these interviews are summarised in a report presented in Section 4 of this document. This showed that the Australian training was highly valued, being both technically advanced and very "hands on", giving them both the skills and the confidence to implement in Iraq.

Activity	Outputs	Due date of output/ milestone	Date Achieved	Evidence of accomplishment
6. Shipping of irrigation and crop monitoring equipment to 4 Iraqi Governorates.	10. Three trial sites established at three locations in Iraq	10. July 2010	Dec 2011 Jan 2012 April 2012	10. Shipping container sent from Australia after all required documentation and approval obtained. Container arrives at Basra port, but is held for 3 months whilst further Iraqi internal administration and approval processes occur. Container is released from Basra and taken to the Karbala research station where it sat for 4 months, while internal Iraqi approval to be able to unload and distribute the container was sought (even though everything had been originally approved). In Late August the majority of equipment is able to be distributed to farmer sites at Karbala and Wassit and assembled. Unfortunately there were difficulties between the departments of Water and Agriculture in allowing the irrigation equipment to flow to Kirkuk in Kurdistan, and they did not receive their equipment until January 2013. These difficulties highlighted the importance of purchasing a container to house all the equipment from Australia through this process. Had this not happened it is very unsure how the items would have been maintained, protected and finally successfully distributed to all sites throughout this ordeal. This process also highlighted the growth in the capacity of the Iraqi project team as they persisted in managing upward to finally obtain access to the equipment.
7. Installation of Irrigation system and planting of crop.	11. Conduct training needs analysis for Iraqi irrigation farmers (one group at each of the three sites) and identify approaches for the engagement of families and women into the farming system.	11. August 2010	Oct 2012	11. Training sessions and field days were held at both Karbala and Wassit to demonstrate technologies potato crops planted and grown under drip irrigation from September 2012, and Kirkuk by Sept 2013. Photo evidence of training sessions and farmer field days at these sites is provided in Section 5 of this document. Project officers and farmers were able to modify and adapt equipment where necessary to suit the local situation, again showing their increase in problem solving capacity.

Activity	Outputs	Due date of output/ milestone	Date Achieved	Evidence of accomplishment
8. Project Management and coordination meeting ICARDA Syria.	12. OTG irrigation and horticulture project review.	12-15. Oct 2010	Oct 2011 Apr 2012	12. Team Meeting Completed in Jordan involving full horticulture and livestock teams as well as steering committee, for training, project management and review. Minutes are recorded in On The Ground (OTG) Report for 2010-11, November 2011. Team Meeting Completed in Jordan involving full horticulture and livestock teams as well as steering committee, for training, project management and review. Minutes are recorded in On The Ground (OTG) Report for 2010-11, August 2012.
	13. Review benchmarking data relating to current irrigation and crop production systems 14. Needs analysis completed and shared with stakeholders		Ongoing Dec 2012	13-14. Delays in arrival of container and equipment to sites meant not all items were met (eg. benchmarking data on crop production was not commenced until first crop establishment at the end of 2012. However, regular communications for system changes in Iraq continued, along with engagement of local organisations and producers to a limited extent. Training and development programs were actively utilised within the project sites Delays in establishing first crop and various initial issues in down loading monitoring and weather station data has meant there has limited opportunity for benchmarking data on crop production issues. While key weather station monitoring data has been recently sent through to the Australian team, there have been some key elements missing to allow for full analysis. This is a normal process in getting this equipment operational, but is made more difficult with the distances involved. Negotiations are continuing to overcome these issues. While there has been clear anecdotal evidence from farmers of substantial reductions on water use, the full crop and soils data is still being processed and evaluated at the Karbala & Wassit sites. *Project presentations to the Australian Team at Erbil in June, 2013 showed weather station & soil monitoring data had been collected, interpreted & utilised for improved irrigation scheduling using IRIS software for all 3 sites, allowing site farmers to determine when to irrigate and how much water to apply.*

Activity	Outputs	Due date of output/ milestone	Date Achieved	Evidence of accomplishment
9. E- Mentoring and support	15. Evaluation and Review of Iraqi train the trainer delivered by Iraqi project team. 16. On-going e-support and problem solving of Iraqi participants	15. Ongoing	Ongoing	15. Evaluation of train the trainer program was carried out at each Project Team meeting at Jordan. Project team interviews in Amman in December 2012 (Section 4) highlight both the success and the numbers of local staff trained in OTG principles. 16. All of the 17 project participants were supplied with laptop computers, with the ability to run project programs and communicate with each other and the Australian team effectively. E-Mentoring to support to Iraqi horticulture project participants has mainly been via email, mostly through Rafat (site manager Wassit who has excellent English and has been established as the key contact for issues and communication within the horticulture group). Over 400 direct emails from Rafat over 18 months up to Feb 2013 were recorded, along with another 80 from other team members that were all responded to by the Australian team as required. This is on top of 80 emails directly with the project steering committee. The group have also sent through many photos highlighting successful activities on the ground in Iraq, some of which are included in Section 5. This support has been critical to the projects' success, providing technical advice for the operation of the equipment and procedures (particularly after delays in receiving equipment), project management advice, approvals, follow up, administration, event planning and other capacity building support. The aim of this support has always been to build their capacity to be able to function independently, so rather than just supplying answers, the Australian team has been (as appropriate) been directing them in ways to find the solutions they need. This capacity was clearly evidenced in their ability to deal with site specific issues such as overcoming wildlife damage to equipment. It is very clear that without his E- mentoring support the project would have become completely stalled due to both large and small problems that have arisen, but have been largely overcome through this personal support on technical, managerial and personal levels.

Activity	Outputs	Due date of output/ milestone	Date Achieved	Evidence of accomplishment
10. Project Management and coordination meeting ICARDA Syria. 11. Review of project impact	17. Monitoring and evaluation activities reviewed 18. Plan, partnerships & Communications strategy reviewed 19. Review of project farmer training activities 20. Project impact reviewed, with indicators identified.	17-20. Mar 2011	Dec 2012	17. A 5 question Monitoring & Evaluation Survey was conducted with each participant, exploring all aspects of the OTG program. A summary of these responses is provided in Section 4. 18-20. Project delays resulted in the first crop at 2 sites only getting to harvest in Jan 2013, with data collected still being reviewed. While there were farmer field days and farmer reports of significantly less water use at these sites, the project is just getting to the stage of partnerships, communication and farmer training activities from which these project impacts could then be reviewed. *Project presentations to the Australian Team at Erbil in June, 2013 showed that ongoing farmer field days were being conducted at all sites, with farmers interacting with new technologies.* *Emails from workers indicate that they are better understanding plant/soil/water relationships, rather than just focussing on equipment.*

Activity	Outputs	Due date of output/ milestone	Date Achieved	Evidence of accomplishment
12. E- Mentoring and support 13. Project Management and coordination meeting ICARDA Syria. 14. Review and consolidate benchmark data for current plant production systems 15. Review input cost profiles for improved production goals for irrigation and cropping system 16. Final Report and recommendations	21. Economic benchmarks reviewed and finalised.	21. Sept 2011	Jan 2013	21. There has been limited benchmarking data obtained to date due to project delays and the incomplete site data that has been sent back at present. However, one farmer reported that the amount of water he used on 1ha he can now use on 8ha using the new technologies. The potato harvest at Wassit was reported to be bigger, with larger potatoes than is normally grown in the area. Final data to contribute to campaign to change irrigation management. *Project presentations to the Australian Team at Erbil in June, 2013 showed graphs of weather station & soil monitoring data, which had been collected, interpreted & utilised for improved irrigation scheduling using IRIS software for all 3 sites, allowing site farmers to determine when to irrigate and how much water to apply.*
	22. Adoption of plan undertaken that supports modern irrigation establishment and expansion.	22. February 2012	Dec 2012	22. Training and Development Activities to wider Iraqi community are yet to take place, however, the influential project farmers reported that they were to report the successes of this project technologies of increased yields, water use efficiency and profits, throughout their extensive farmer association meetings (30 associations with 1000 farmers in each). This is expected to generate much interest in the extension of this projects technologies and use.
	23. Final report from pilot phase with recommendations provide to AusAID for future project extension / support	23. March 2012	March 2013	23. Final OTG Project Report provided to AusAID.

3 SHEEP REPRODUCTION TECHNOLOGY PROJECT ACHEIVEMENTS BASED ON MERI PLAN

Project Stage	Activity	Outputs/ milestones	Due date of output/ milestone	Date achieved	Evidence of Accomplishment
Phase 1: OTG Sheep Repro Tech Management	1. Prepare and present full project proposal	1. Iraq OTG-Sheep reproduction Technologies Project Proposal	1.Mar 2010	Sept 2010	1-2. As previously discussed, the meeting of initial Iraqi project delegation in Syria, where project plan, operations and personnel required were further communicated and sorted out. The minutes of this meeting are included in the "On The Ground (OTG) Report for 2010-11" May 2011.
	2. Establish partnerships in Iraq	2. Formal relationships confirmed	2.April 2010		
	3. Pre-Planning Mtg in Syria / Jordan	3. Pre-Plan Meeting ID appropriate attendees	3.April 2010	April 2011	3-6. Meeting OTG Steering Committee and MOA Livestock Group Trainees from 4 sites. This included development of workplans and communication strategies. The minutes of this meeting are included in the "On The Ground (OTG) Report for 2010-11" May 2011.
	4. Develop Workplan	4. 2 year Workplan	4.April 2010		*This 12 month delay in achieving this target due to internal Iraqi issues has been previously discussed.*
	5. Develop participatory planning approach	5. Participatory Planning Plan	5.May 2010		
	6. Develop communications strategy	6. Communications Strategy shared with Iraq Partners	6.May 2010		
	7. Develop monitoring and evaluation processes to capture economic, social and environmental impacts.	7. Monitoring & evaluation framework developed	7.June 2010	Nov 2010	7. The initial Monitoring, Evaluation, Reporting and Improvement (MERI) Plan was developed after the Sept 2010 meeting in Syria, and was used as the basis for planning at the April 2011 meeting. Being a 'living document" it has undergone minor upgrades to better represent personnel, sites and revised timelines.

Project Stage	Activity	Outputs/ milestones	Due date of output/ milestone	Date achieved	Evidence of Accomplishment
Phase 1: …	8. E-Mentoring support to Iraqi Scientist	8. E-mentoring working	8. May 2010 – Nov 2011	**Ongoing**	8. The Livestock team have had regular email contact with Australian project staff, with approx. 360 emails received over an 18 month period (ave 20/month), which were all appropriately responded to. The majority of this correspondence has come through Hussein Al-Moadhen and Rozh Muhammad, who have the best English skill, and co-ordinate and redistribute information amongst the rest of the group. E-mentoring support has been critical to the projects' success, providing technical advice for the operation of the equipment and procedures (particularly after delays in receiving equipment), project management advice, approvals, follow up, administration, event planning and other capacity building support.
	9. Half Yearly Reports provided to AusAID	9. Half year reports on outputs / milestones	9. June 2010, Feb 2011, June 2011 10. Mar 2012	May 2011 Nov 2011 Aug 2012	9. This group along with Australian staff have successfully used "Dropbox" for exchange of relevant data, including folders for each of the 4 sites containing a total of 16 site reports, 442 activity photos, 2 videos and 28 specific documents. Other general group folders contain 8 progress reports, 7 meeting presentations, 13 resource documents, 30 equipment photos, 23 training manual chapters, 3 veterinary chemical lists & 4 meeting documents. On The Ground (OTG) Reports submitted to AusAID in May 201, Nov 2011 and Aug 2012.
	10. Final report and recommendations	10. Final report from pilot phase with recommendations provide to AusAID		Oct 2013	10. Final Report presented to AusAID Oct 2013

Phase 2: 12 week intensive training course in Australia	11. Develop training program with SARDI 12. Select / confirm trainees 13. Select / confirm Repro Centre sites 14. Training Program	11. Detailed Training Program developed 12. 4 trainees confirmed 13. 4 sites selected for support in Iraq. 14. Program Complete - Import protocols - Embryos & semen selected - Manual developed - "trained the trainers"	11. May 2010 12. May 2010 13. May 2010 14. June 2010 - Feb 2011	Sept 2010 Sept 2011 Oct 2011 Apr 2012 Dec 2012	11-13. All planning, sites and personnel confirmed and training course detailed. This is recorded in the Minutes of "On The Ground (OTG) Report for 2010-11" May 2011. 14. 12 week training in Australia completed by 4 Iraqi trainees. The "Assisted Reproductive Technologies" Manual was developed by SARDI covering all aspects of training, translated into Arabic, given to trainees and used by them to train their colleagues in Iraq. An electronic version was also made available to the trainees through "Dropbox". The cover and contents page of this manual is displayed in Appendix 2. In Oct 2011follow up pregnancy scanning was conducted in Amman with all 4 trainees as well as their 4 colleagues they had trained in Iraq. Further laproscopic AI training was conducted in April 2012 and embryo transfer in Dec 2012, all in Jordan. Import protocols were established for semen in July 2012 after much negotiation and effort from the Australian team, with paperwork from Biosecurity Australia shown in Appendix 1. While this has been technically achieved, there are still significant issues to overcome within the Iraq Ministry to facilitate this to happen. They still have a strong desire not to destroy, dilute or disrupt their local Iraqi breeds and resist bringing in outside genetics. They need to evaluate other breeds at their research centres to more clearly define what they are looking for. While our team can see clear advantages to certain courses of action, as this the OTG project is encouraging a participatory framework, it is important that the Iraqi Ministry works through these issues to decide their best way forward. Them agreeing to the importation protocol is a huge step forward, but has come with restrictions to certain breeds, of which there is either limited capacity for Australia to supply, or there would be limitations to their ability to manage the requirements for one breed requested. Negotiations for the importation of more breeds and genetics with proper evaluation within the 4 OTG livestock research centres, is underway. This will provide a potential way forward for progress. Import protocol has not been able to be established for embryos, as the request must come from Iraq, and initial efforts have been concentrated on the higher priority of semen transfer. *The OTG team is facilitating the importation of semen straw into Iraq as detailed in letters sent in Aug & Oct 2013 (Appendix 3 and 6).*

Project Stage	Activity	Outputs/ milestones	Due date of output/ milestone	Date achieved	Evidence of Accomplishment
					24. Iraq AI & ET program planned 25. All required resources identified 26. Embryos & semen selected 27. 4 Competent trainees. 28. Manual valued Phase 2 is underway report from sheep group

Project Stage	Activity	Outputs/ milestones	Due date of output/ milestone	Date achieved	Evidence of Accomplishment
Phase 3: Establish Sheep Reproduction Technology Centres (1) Major (2) Minor	15. ID Centre locations	15. 4 Centres ID	15. May 2010	Sept 2010	15. Sites at Karbala, Diyala, Erbil and Salahaldin confirmed and recorded in the Minutes of "On The Ground (OTG) Report for 2010-11" May 2011.
	16. ID equipment list. - Laboratory - Animal Measurement	16. Procure equip and export to Iraq.	16. July 2010	Dec 2011	16. Shipping container sent from Australia after all required documentation and approval obtained.
				Jan 2012	Container arrived at Basra port, but is held for 3 months whilst further Iraqi internal administration and approval processes occur.
				May 2012	Container released from Basra, taken to Karbala research station.
				Aug 2012	Container contents were able to be accessed and distributed to other research stations at Karbala, Diyala, Erbil and Salahaldin. Sites still have not been able to obtain their full detail of consumables and veterinary medicines, which has been hampered by difficulties in transmission of funds into Iraq. The Australian team have overcome this by freighting materials directly to Erbil, where it has then been distributed to the other sites. At least 5 sets of packages have been transported by this method. Some anaesthetic drugs cannot be sent into Iraq, so other means have been sort to meet these needs.
	17. Centres in Iraq	17. Centres operational	17. Jan 2011	Dec 2012	17. Each site has had its own issues in becoming fully operational. Karbala and Diyala have had access to their own Awassi sheep flock. Both Salahaldin and Erbil have only recently obtained access to sheep flocks. All have been able to operate with OTG project equipment and procedures, running various workshops and training days. Karbala has been the most functional centre, but the other sites are becoming more operational as their access to livestock, equipment and consumables increases.
	18. Embryos & semen	18. Procure embryos & semen and export to Iraq.	18. April 2011	Dec 2012	18. Covered under section 14 of Phase 2.

Project Stage	Activity	Outputs/ milestones	Due date of output/ milestone	Date achieved	Evidence of Accomplishment
Phase 4: OTG Work plan	19. Train staff (TtT)	19. 80 Staff trained	19. May 2011	Dec 2012	19. 4 staff trained by trainees were all shown to be effectively proficient in OTG project technical procedures and actively participating in work on the ground in Iraq at Amman training sessions. It is estimated that another 16 staff have received hands on training to various levels in the practical use of the OTG techniques on site. Another 72 Ministry staff are reported to have attended at 6 meetings held with presentations and practical demonstrations of the project. This is clearly evidenced in the many photos depicting staff training in Section 5.
	20. Prepare Donor ewes 21. AI & ET program (Awassi) 22. Monitor & Evaluate	20. Donor ewes ready 21. Do AI & ET 22. M&E	20. Jan 2011 21. Jan 2011 22. Dec 2011	Expected April 2013	20-22. Due to equipment delays, site issues, access to sheep and availability of required veterinary chemicals gradually being overcome, it is expected that the first embryo transfer will be completed at the Karbala site. All other sites are expected to be operational for these procedures.
	23. AI & ET program (Australian meat sheep)	23. Do AI & ET	23. Jan 2012	Still to be achieved	23. As previously discussed in Phase 2.14 at present this is out of the Australian teams hands. It is hoped that some of the limitations on semen transfer will be lifted and suitable material be available for export. *All of the 4 Iraqi livestock trainees met recently in Karbala to perform an embryo transfer in an Awassi sheep (the first in Iraq) and were partially successful (in embryo extraction), but were unable to complete due to some unforseen complications with the receiving ewe. They aim to attempt this again before the end of 2013.* *The OTG team is facilitating the importation of semen straw into Iraq which is well underway and is detailed in letters sent in Aug & Oct 2013 (Appendix 3 and 6).*

Project Stage	Activity	Outputs/ milestones	Due date of output/ milestone	Date achieved	Evidence of Accomplishment
Phase 5: Participatory Research & Extension	24. Participatory Approach 25. Participatory "Progeny Test Project" Commenced with local producers. 26. Monitor & Evaluate	24. Instigated - workshops 25. "Progeny test project" operational 26. M&E	24. Oct 2010 25. Oct 2010 26. Dec 2010	Ongoing Still to be achieved through 2014	24-26. When left trainees left Australia there was unexpected 12 month gap between equipment arriving, so they did not have any ability to carry out these technical processes on flocks at this time. In this period, however, they did manage to initiate workshop about informing and educating both staff and farmers about the technologies, using limited equipment (eg CIDRs and synchronising sponges) as an engagement tool with producers, demonstrate some useful advanced management tools and strategies. The AI and ET programs have only recently been able to commence, and therefore the Progeny Test program will only be able to happen once the lambs from these procedures have been produced in Dec 2013 or early 2014. While everything is in place for this "Participatory Progeny Test Project" to happen at this time, it would be highly beneficial if mentoring support from the Australian team could be provided, even though it will be beyond the timeframe of the current project. Trainees demonstrating that they are monitoring was evident in various reports they sent through on email or placed on Dropbox.
Phase 6: Project review & training meetings	27. 6 monthly Project Review & training meetings in Syria / Jordan. 28. Process for identifying and supporting potential trainees	27. 10 Iraq MoA staff attend mtg/ workshop - Oct 2010 - April 2011 - Oct 2011	27. Oct 2010 April 2011 Oct 2011	Oct 2011 April 2012 Dec 2012	27. In Oct 2011follow up pregnancy scanning training was conducted in Amman with all 4 trainees as well as their 4 Iraqi colleagues. Similarly, further laproscopic AI training was conducted in April 2012. Embryo transfer training in Dec 2012, all in Amman Jordan. These sessions conducted by Australian technicians allowed trainees to update skills (particularly after equipment delays), sort out issues ask questions and share experiences. It was clear that their technical skills and their problem solving abilities are increasing. 28. At the conclusion of each meeting processes for providing ongoing support for trainees was discussed and reported in meeting minutes. This was mainly provided though E-mentoring and follow up of training requests at following training meetings.

4 SUMMARY OF INTERVIEW RESPONSES OF THE IRAQI OTG PROJECT TEAM IN DEC 2012, JORDAN, AND COMMENTS BY THE AUSTRALIAN TEAM.

Iraqi team interviews were conducted with each of the three Iraqi OTG groups separately (Horticulture, Livestock and Steering Committee) with individual responses recorded for each of the 5 questions. The dot points generally summarise shared issues by numerous respondents, although some points relate to specific sites or circumstances, but may not be a reflection of other sites.

The "General assessment" relating to each question gives a broader overview of the issue, including observations of activities and thoughts expressed by the Australian management team.

1. Training in Australia

Evaluation objective
a. Was the OTG Training Program in Australia effective?

Q1. Tell us about your experience with the training program in Australia. How do you think it helped start the OTG project at home?

- Generally all very good and helpful.
- Focused, intensive, practical hands on experience, with follow up of issues.
- Unique to Iraq
  - *many projects in Iraq have equipment, but no-one knows how to use it properly*
  - *many university graduates do not know as much as the trainees in project.*
- Gave participants great confidence to do things.
- Took lots of videos that have been watched repeatedly, and used to train others.
- Learnt much about organising projects, basic rules to make things happen, and having many specialists all working as a team together.
- Gave participants great confidence to do things.
- Needed more technical training in some areas such as weather stations and irrigation network design.
- Some wished for more support material form the training.
- Generally a great program that should be repeated in other projects.

General assessment

The "hands on" intensive training in Australia was a critical platform for the success of the OTG project. Mixing the theory with practical application, as well as experiencing this technology working in Australia and interacting with farmers and industry personnel about its benefits and efficiencies to farming businesses and production was vital in lifting the trainees abilities and confidence to apply it back in Iraq. Each training module was not complete until trainees could clearly demonstrate their ability to do it themselves. Having the equipment, site resources and dedicated technical experts available for the time required in Australia,

particularly at both Turretfield and Loxton Research Centres, allowed the trainees to successfully grow their knowledge and skills. It had the added benefit of building relationship, trust and teamwork amongst the participants who were from different areas and often different ministries, and would not usually work together, apart from this project, which has been clearly evident in the way they have continued to build the project through often difficult circumstances back in Iraq.

Many trainees showed clear evidence of using videos they had taken and training material they had used to both refresh their own memories as well as train others in Iraq about these new technologies. The application of methods in both horticulture and livestock once equipment became available in Iraq by the Iraqi trainees has given them an important standing within their farming, technical and academic networks because they are the ones applying the expertise, not reliant on foreign experts coming and going to make things happen.

The project would have clearly benefitted from the equipment being available on site soon after training, so that all trainees could have practically applied their skills and knowledge immediately, instead of waiting 12 months. However, ongoing training at team meetings in Amman, Jordan helped refresh and expand practical knowledge in all areas. The irrigation in particular did reflect that they would have preferred more written instruction material to assist them in constructing and applying the technology at their sites. This may have been due to the greater demands of setting up weather stations, irrigation equipment and getting programs to function properly. However, this has mainly been addressed through E-mentoring and training update in Amman.

2. Implementation in Iraq

Evaluation objectives

b. Engagement with the Ministry … did they, how well, will it enable program longevity (is OTG embedded)
c. Engagement with Producers … did they, how well, are producers involved for the future (is OTG capable of initiating practice change)
d. Train-the Trainer … did they, how well, are the trained competent and able to extend the influence of OTG (can OTG transfer skills +/- remote support)

Q2. How have you obtained the information and skills required to help you throughout the project, and how has this helped you?

- Videos and technical notes, website info, other team members.
- Practical help from farmers, ie pump set up, etc
- It was excellent when the equipment arrived, then we could use it in real life.
- Farmer said it was excellent, first time he has got such good info - irrigation, technical & agronomic
- Use of Dropbox and emails excellent for communication to share info and even sort out equipment issues.
- Meetings in Jordan were very important to learn skills and update training – practical – increased confidence (particularly those not trained in Australia).
- Getting whole team together regularly in Jordan has been vital for project management and very helpful for the Steering Committee.

- Some expressed concerns that there was not enough support material for some things, or that promised material was not given or passed on. (generally on Dropbox, but more trainees need to start accessing this)
- Some had to find and do things for themselves…

General Assessment

The team meetings in Amman have been a vital opportunity for updating skills in critical areas, including the use of irrigation software, the assembly of equipment and practical livestock procedures at the Jordan Institute of Technology, which was particularly useful after they had attempted some application and training in Iraq. For the four extra livestock trainees this was their only direct contact with the Australian specialists. The final team meeting involving 3 Iraqi farmers also brought valuable depth and insight into the project discussion. These training sessions in Jordan have proved to be an integral part in achieving project success, in sharing and dealing with issues in a collective sense within teams, as well as in keeping the overall project on track despite the many difficulties.

The use of E-mentoring has brought immeasurable benefits to the functioning of the project, clearly evidenced by the large number of emails by the irrigation team and steering committee, and use of Dropbox (which allows for project folder organization, the posting of large files and direct access by the whole team) and emails by the livestock team. Without this regular support it is likely that the project would have ground to halt on many levels due to both large and relatively small issues. The transfer of pictures and videos has been useful in the demonstration of problems and achievements, particularly with the Australian Teams inability to visit the sites directly.

Q3. What problems have you had implementing your part in the OTG project and how have you gone about managing the problems?

- Downloading software
- Not enough time to practice. Work on weekends.
- Delays in equipment
    - seasons lost
    - gap from training too long, needed retraining
    - once it arrived, many problems were overcome.
- Have not received equipment yet
- Vehicle access to visit sites and farmers
- Farmers had to fund many things themselves
- Some problems fitting equipment together.
- Ministry heads lack of support - funds or approvals
- Operational funding
- Lack of interest by farmers at one site – need to involve extension department – still waiting for response
- Site issues eg. access to sheep! electricity supply, misuse of site, threats etc.
- Still yet to achieve some key activities (eg embryo transfer).
- Administrative issues
- People in charge (Ministry line managers) didn't understand our project
- Phone communication very expensive – need to talk for hours, not minutes with colleagues.

General Assessment

Almost all of the problems expressed by Iraqi project members relate to difficulties within the Iraqi systems. It appears that there is a very large hierarchical system within each government ministry which makes it very difficult for approvals to be given in all the basic levels required to run a project such as OTG, particularly if it seeks to operate differently to traditional structures. Gaining simple access to basic resources such as transport, livestock, fuel and electricity has been challenging, along with travel approvals for some. These issues have been heightened due to political tensions between the Kurdish areas within Iraq, where both the Erbil and Kirkuk site are situated. Consequently, these sites have struggled to gain basic resources and have experienced the greatest delays in obtaining their equipment.

These processes are also complicated when more than one ministry is involved in the process or involving departments outside of those involved in the OTG steering committee. This was particularly evident in the 8 month delay form the time of the equipment container arriving in Basra until its final approval to be unloaded and transported to the majority of sites, despite all the apparent necessary paperwork and documentation being in place.

A key success of this project has been the OTG teams ability to patiently, but resolutely work through these various delays, with the support of AusAID in extending project deadlines, to reach the eventual desired outcomes.

Q4. What success have you had implementing your OTG project and what have you done to capitalize upon that success?

Trainee comments:

- Too early for good evaluation but step by step process.
- Learnt great personal skills on how to apply knowledge & work/share with others.
- Applying skills in real life, we have unique skills
- Training of workers
- Sharing with farmers, field days and workshops
- Learning good extension methods
- Training university students
- OTG Information on Ministry WEBSITES.
- Having key farmers on side and involved.

Steering committee comments:

- Managing project to this stage that is "On the Ground":
    - initial idea,
    - bringing teams together,
    - sending teams to Australia
    - training and sites setups in Iraq, farmer activities, etc
- Operating across various ministries, co-operating
- Overcoming many problems

Irrigation site farmers comments:

- New knowledge - increased yield, WUE and $.
- Reduced water use on farm. Water for 1ha, now 8ha.
- Strong message to share with other farmers (30 associations with 1000 farmers each).

General Assessment

The Australian team has noticed an incredible change in the majority of the project participants in their capacity to solve problems, manage upwards within and between ministries and to adapt their projects to best match the circumstances they have found themselves in. Individual trainees have gone from being relatively quiet, unsure and too scared to say anything in front of the steering committee, to being quite vocal, passionate and very clear about what they are trying to achieve and they will need to ensure the success of the project. The steering committee has also come a long way since the initial meeting in Syria, and achieved remarkable outcomes in working across ministries and gaining access and approvals with a historically difficult operating environment.

All this have been achieved through the patient support of the Australian team leadership, as evidenced at the team meetings in Amman, through the many emails to and from Iraq, as well as their abilities to support each other as teams in Iraq, particularly amongst the livestock team where some have lacked direct access to sheep, or have had to overcome other significant on-site issues.

The Australian team have learnt a great deal on how to successfully run a project both in terms of management and technical delivery within an extremely challenging country due to political, social and environmental issues. The OTG project has been forced to adapt to changing circumstances out of its control on many levels, but has managed to hold to the basic philosophy of:

- establishing a lean steering committee with the right mix of people that could best advance the project without being top heavy or bogged down in management,
- in-depth practical training in Australia of participants, as well as regular follow up project support and training (in Amman), for building their capacity to manage and implement projects at sites in Iraq with improved technologies that will become the basis for ongoing programs within their ministries,
- a commitment for trainees to practically train other ministry staff in Iraq as well as practically involve local farmers (providing irrigation sites and livestock), to strengthen the "on the ground" application, the participatory approach to extension and future development outcomes of the project.
- providing equipment and supplies that will allow them to apply technologies in Iraq, along with E-mentoring support to direct them through initial phases as required, but guiding them towards self-sufficiency by the conclusion of the project.

Despite all the challenges, the fact that the Australian team has managed to meet its milestones of setting up the steering committee, training the participants, transporting the equipment to all sites where irrigation and monitoring equipment is now set up, crops successfully grown, livestock reproduction technologies applied with lambs on the ground, staff trained by trainers, farmers groups involved and project participants eager to continue the project application beyond the life of the current project funding, all within a relatively short time frame, is an amazing

achievement. This has reaffirmed the success of the OTG model, which should be as a basis for future project development work in countries with limited direct access.

Q5. How will you use your OTG project experiences and resources in the future?

- Not clear what will happen. Funding? How we connect with National programs? Will we stay as a team? Finish still ambiguous!
- OTG needs to be shown wider.
- Want to extend to more farmers and universities.
- Field days on monthly basis
- Will talk to farmer associations about OTG.
- Want to become part of ministry plan.
- Want to stay as team, otherwise individuals responsibility to carry forward.
- Hope that project can get ongoing funding
- Project successes need to be published / recognised
- Technology / methods need to be documented so can be distributed amongst farmer associations
- Loans for Iraqi farmers to come to Australia to see and experience for themselves
- Encourage teamwork and co-operation to continue
- Farmers can see systems, but want to help them access it for themselves
- Expand extension work, train more extension staff
- Future maybe in private sector to carry forward
- Take this project to another city.
- We have project practically applied in real life, how can we continue it, and not waste what has happened?
- Must fully establish sites so managers, extension staff and farmers can see it and be convinced.
- Farmers will become more aware of water shortages
- The OTG model will be used to establish future projects

3. A brief summary of project activities (until Dec 2012)

- At least:
  - 23 Farmer field days/workshops, 226 farmers attending
  - Approximately 30 on-site hands on staff trained to various levels
  - 7 Ministry staff worker meetings, 132 attending
  - 11 university training days, 337 student/staff attending
  - 2 other conferences/ forums, 85 attending
  - 2 Reports on Ministry Websites
  - Weekly OTG meetings with Head of Ministry of Agriculture.
  - 5 OTG project meetings with Minister of Agriculture, Iraq.

Table 1. OTG Project Extension Meetings (up to Dec 2012).

Site	Staff Training*	Field Days	Nos. Attending	Ministry Meetings	Nos. Attending	University Meetings	Nos. Attending
Horticulture							
Karbala	4	1 3	25 18				
Kirkuk#	-	2	60				
Wassit	6	1 1	25 14	1	60	2 1	100 20
Livestock							
Karbala	8	1	10			2	42 6
Diyala	4	2	68	4	22		
Salah al-Din	4	10	5			1	3
Erbil	4			2	50	2	106

*estimate only

At all sites the OTG project trainees have increased the **skills and training** of the immediate staff and farmers directly involved in the project in the areas of understanding technology, the equipment assembly and operation, data collection and monitoring of results. Farmer field days, Ministry meetings and University Meetings in both horticulture and livestock have achieved increased **information and knowledge** of those participating, as well as building their **awareness** as to what this OTG technology is about and what could be achieved through it's application.

The Kirkuk site was only able to receive equipment, establish site and plant crop after Dec 2012. Since then they have reported training 19 ministry employees for 3 days (2 days theory and one day practical site visit) in June 2013.

5 SELECTED PHOTOS DEPICTING "ON THE GROUND" ACTIVITIES AT EACH OF THE VARIOUS SITES IN IRAQ.

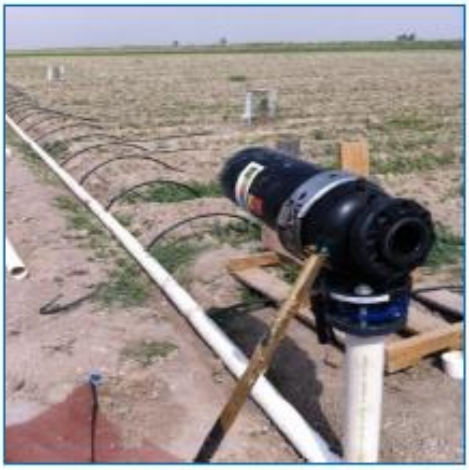
Karbala, Horticulture

Photos 1&2 Setting up weather station and data logger

Photos 2&3 Setting up irrigation systems and scheduling equipment

Photos 4&5 Downloading weather station data to laptop


Photo 6&7 Setting up and gaining readings from diviner probe




Photos 7&8 Irrigation filter assembly


Photos 9&10 GT-Bug installation


Photos 11&12 Farmer field day showcasing irrigation equipmement and design.


Photos 13&14 Meeting with Dr Maha for seed potato supply. Water meter installed.


Photos 15&16 Planting of potato crop Sept 2012


Photos 17&18 Growing potato crop Oct 2012


Photos 19&20 Potato harvest

Photo 21 Successful potato harvest


Photos 22&23 Methaq presenting OTG project

Kirkuk, Horticulture


Photos 24&25 Yousif conducting farmer workshop

Karbala, Livestock


Photos 26&27 Qismah training staff in reproductive anatomy


Photos 28&29 Staff training using low technology Australian techniques


Photos 30 & 31 First semen collection from trained rams in Iraq.


Photos 32&33 Staff training in reproductive techniques


Photos 34&35 Hussein presenting techniques to students from Karbala University


Photos 36&37 Site visit by Australian Embassy Delegation & Government officers


Photos 38&39 Use of CIDR apparatus for ewe preparation

Photos 40 Staff at Karbala holding OTG project derived lambs

Diyala, Livestock


Photos 41&42 Khudair at research station with sheep and staff.


Photos 43&44 Khudair explain OTG project and principles to farmers


Photos 45&46 Khudair demonstrating AI and ET procedures to staff and students


Photos 47&48 Khudair demonstrating AI and ET procedures to staff and students


Photos 49&50 Staff and Ministry Officer training


Photos 51&52 Training staff in pregnancy scanning.

Salah al-Din, Livestock


Photos 53&54 Sourcing fodder for awasi sheep flock


Photos 55&56 Flock grazing at site, and explaining OTG project to visiting dignitary


Photos 57&58 Installing pregnancy scanning equipment & flock management

Erbil, Livestock


Photos 59&60 Rozh presenting OTG to local media


Photos 61&62 Training staff in the use of pregnancy scanning equipment.

Photo 63 Rozh delivering OTG messages to university students.

6 EVIDENCE OF SHORT TERM TO INTERMEDIATE OUTCOME ACHIEVEMENTS.

The MERI project plan indicates many short term and intermediate outcome that could be expected given the successful implantation of OTG. These include:

- the improved technology skill and capabilities of MoA staff.
- the "enhanced" development of the project centres and sites, under the leadership of skilled staff.
- trained staff to offering further training opportunities within Iraq on project operations.
- Improve project management, governance, monitoring, evaluation and reporting skills in the Iraq MoA staff, including equitable engagement with farmers, farming groups, NGO's and other Government entities.
- Develop 'best practice' irrigation, soil and water monitoring, that result in improved crop water use efficiency and water use for a specified crop type at each of the three planned demonstration sites.
- Provide strategies for Iraqi Ministry staff to work with an engage farmers and farmer groups, in order to identify their specific needs and opportunities associated with genetic improvement amongst Iraq's sheep flocks (through a targeted case study approach); which in the longer term can serve as a model for the MoA to apply to other regions of Iraq.

Analysis of email correspondence between Iraqi OTG trainees and management committee, as well as Australian Team interviews following meetings in Erbil in July 2013 reveal a very strong case that the activities and benefits are continuing well beyond the time of direct project management of the Australian team, particularly in the above mentioned areas.

Each irrigation site has clearly continued to grow more crops, gathering important soil, water and crop data from weather stations and soil probes, involving staff, farmer and university training.

For example, results from the Karbala site were presented at the Karbala University, college of Agriculture for 2 days of workshops, resulting in staff wanting to bring classes out the OTG site, and requesting that the weather station and irrigation monitoring data be made available for student research.

There are reports of project workers having key discussions with the farmers about which crops to grow for the next season, showing a participatory extension approach is being used to advance the project.

An email in Sept 2013 from one of the irrigation team reads, *"After the theoretical training (by me) for a staff from the Directorate of Agriculture in Wassit on the evaluation of sprinkler irrigation systems two weeks ago, they will organize (the Directorate that mentioned) a practical application in it next month, on a farmer have this system of irrigation, I have some questions about it, Regards"* which clearly indicates how the trainees are using their practical understanding and skills in soil water/plant management to further the impact of the OTG program across their regions in Iraq.

Photo 64 & 65. April 2013. Farmer's son operating water diviner technology plus second potato crop at Karbala site.

Photo 66 & 67. April 2013. Trainees downloading crop soil moisture data, as well as the harvested potatoes of the site crop packaged for marketing.

Numerous copies of letters and reports from both trained OTG workers and Steering Committee members outline development proposals for the OTG project to be spread further across Iraq, which reinforces that the commitment to continue to build on what has been accomplished is very strong, and this is being driven from within the Iraqi team, and not reliant the Australian team. Examples of this are presented in Appendix 4 and 5.

The following was reported from one of the livestock team in July 2013.

"About two months before we used some CIDRs to induce and synchronize the estrus for 37 Goats in Erbil. We used the CIDRs then remove it, and inject 500 IU of PMSG.
I would like to tell you that we got an incredible result. After 24 Hrs all the goats come to oestrus, and we expect that all of them are pregnant while in the same farm the other goats did not start the breeding season yet.

The next step is to scan them for pregnancy to check the pregnancy and the twinning rate. On the other hand I'm about developing a program for genetic improvement with effective feeding system and some farm management for the breeders as a part of my extension tour that I would like to establish and start with the breeders in both mountain and land area of Erbil. I will send the details once I complete it."

Clear Action Plans detailing well designed activities have been received from the livestock group project teams at Erbil and Diyala. While the key team member at Karbala has arranged to complete further study in Australia, he has clearly trained up the staff well at his site, which is developing to be the key genetic source for Awasi sheep within the country. The recent organisation of semen straws to be sent from Australia to Iraq, detailed in Appendix 3 and 6 is evidence of the continuing activity of the OTG livestock program and expected potential impact on Iraqi livestock that will occur as a result of this project.

These examples show clear increases in the capacity of the OTG trainees to utilise the new skills and engage with farming communities to encourage extension and adoption of technologies. Another email revealed details of this officers genetic improvement plan that resulted from a discussion with his managers who needed to provide actual numbers and potential benefits to the Minister to hopefully gain funding to expand the project work. This ability for trainees to be able to upward manage within their ministries is a remarkable achievement.

At the Ministry level within Iraq there is clear evidence that there is a great deal of interest and pride in the success of the OTG project and a desire to replicate these principles and activities throughout Iraq. For example, reports from the July 2013 meeting in Erbil revealed that there is clear recognition by the senior MoA Ministry officials that the skills of the trained livestock OTG workers are in advance of those at their leading centre, the National Sheep Research Station at Abu Ghraib, and they are looking to use the capacity of the 4 OTG project centres to deliver both artificial insemination and embryo transfer, to help deliver on the broader national objective of improving the Awassi breed for the producers in Iraq. This will establish a practical delivery platform in the four regional areas as a direct result of this OTG project.

7 SUMMARY

The OTG project in Iraq has been very successful in meeting project milestones and achieving outcomes as detailed the OTG MERI project plan. This has been despite many difficulties and delays, which are common within such projects that have been attempting to establish agricultural development activities within the country of Iraq, which is still recovering from the Gulf War and the previous regime, as well as ongoing political and internal struggles that are destabilising the country.

This project has trained Iraqi staff in key technical areas related to irrigation and livestock improvements, as well as built their capacity in project management and extension. They have shown remarkable teamwork in interacting and sharing ideas across regions and across different Ministries, and are now actively seeking opportunities to further the scope of their project work through strong engagement with senior Ministry personnel. Many of these achievements appear to be very unique within the existing government structures and operating environments within Iraq.

Despite delays, equipment was shipped to Iraq and distributed to all sites, where the project trainees were able to assemble and operate successfully with other staff and farmers, to allow them to perform key project outputs. Many staff at the various site locations have been successfully trained and are now performing key project activities. The various technologies have been clearly demonstrated to many farmer groups, local university staff and students, as well as ministry and governorate officials, and this extension of project outcomes continues to grow.

The successes of this project can be attributed to the approach of the OTG project model, building on a desire to spend adequate time and resources to properly train and equip the Iraqi project workers in Australia, in preparation for them to be able the carry out the work by themselves, with remote communication support from the Australian trainers, along with the regular full team meetings in neighbouring Syria and Jordan.

The support, dedication, understanding and patience of the experienced Australian project team members has been pivotal in working through the many difficulties, issues and delays, along with the strength of the relationships they have established with very dedicated Iraqi team members.

The establishment of the Steering Committee, being driven by key senior officials across the Ministries of Agriculture and Water Resources, and being kept to a workable and functional size of dedicated individuals committed to the vision of the project was crucial to the project's success. Their ability to communicate with the various Ministers and government heads allowed for many of the project activities to proceed, where other projects would have ground to a halt.

Perhaps the most important indicator of the OTG projects success is the fact that the project activities are continuing to grow well after the direct involvement of the Australian team, as the staff involved are actively operating the sites and seeking opportunities to further the capacity of the projects activities to improve agricultural development in Iraq. There is also clear evidence that within the Iraqi Ministries there is a clear desire to utilise this projects people, sites and equipment, and to replicate the OTG model across Iraq.

APPENDIX 1: SEMEN IMPORT PROTOCOL DOCUMENTATION

Australian Government
Department of Agriculture, Fisheries and Forestry
Manual of Importing Country Requirements

Home > Live Animals > Iraq

SHEEP SEMEN

Protocol Last Negotiated

JULY 2012
Updated: 19 Jul 2012

Health Certificate

1. Country declaration

1.1. Australia has been free from the following diseases for 12 months prior to collection of the semen: bovine tuberculosis, bovine brucellosis (*Brucella abortus*), caprine and ovine brucellosis (*Brucella melitensis*), foot-and-mouth disease, peste des petits ruminants, sheep pox, goat pox, Wesselsbron disease, Nairobi disease and scrapie.

2. Donor animals

2.1. The donor males were isolated from all other ruminants of lesser health status for 28 days prior to and during the collection period.

2.2. During the collection period the donor males did not show any clinical signs of nationally notifiable ovine diseases transmissible by artificial insemination.

2.3. Details of the breed pedigree and production characteristics, semen quality and freedom from genetic defects have been attached in a separate document.

2.4. **Ovine Johne's disease (paratuberculosis):**

All donor males and teasers in the semen collection centre for the export of semen to Iraq were free from clinical signs of ovine Johne's disease (paratuberculosis) for the past two years OR from a property free of reports of ovine Johne's disease (paratuberculosis) for the past two years.

2.5. **Bluetongue:**

All donor males for the export of semen to Iraq were kept in a bluetongue virus free zone for at least 60 days before commencement of, and during, collection of the semen;

OR

All donors were subjected to either:

an ELISA for antibody to bluetongue virus, with negative results, between 21 and 60 days after the final semen collection for this consignment,

OR

an agent identification test for bluetongue virus on blood samples collected at the start and conclusion of, and at least every 7 days (virus isolation test) or at least every 28 days (polymerase chain reaction test) during semen collection for this consignment, with negative results.

2.6. Tests on the donor males were conducted in laboratories accredited by the National Association of Testing Authorities (NATA).

3. Collection and processing

3.1. The semen collection centre has met the standard specified in the current OIE Terrestrial Animal Health Code for collection and processing of ovine semen and is approved by DAFF for export purposes.

3.2. The exported semen was collected and processed at an approved centre under the supervision of a registered veterinarian.

4. Storage and transport

4.1. The semen was placed in individually identified straws, in accordance with the recommendations of the OIE Terrestrial Animal Health Code.

4.2. The semen was only stored with other semen or embryos of equivalent or better health status.

4.3. The semen was placed in new or disinfected transport containers filled with fresh (previously unused) liquid nitrogen.

4.4. Before shipment, the container with the semen identified above was sealed with an official seal by a DAFF Veterinarian.

The number of the seal being:

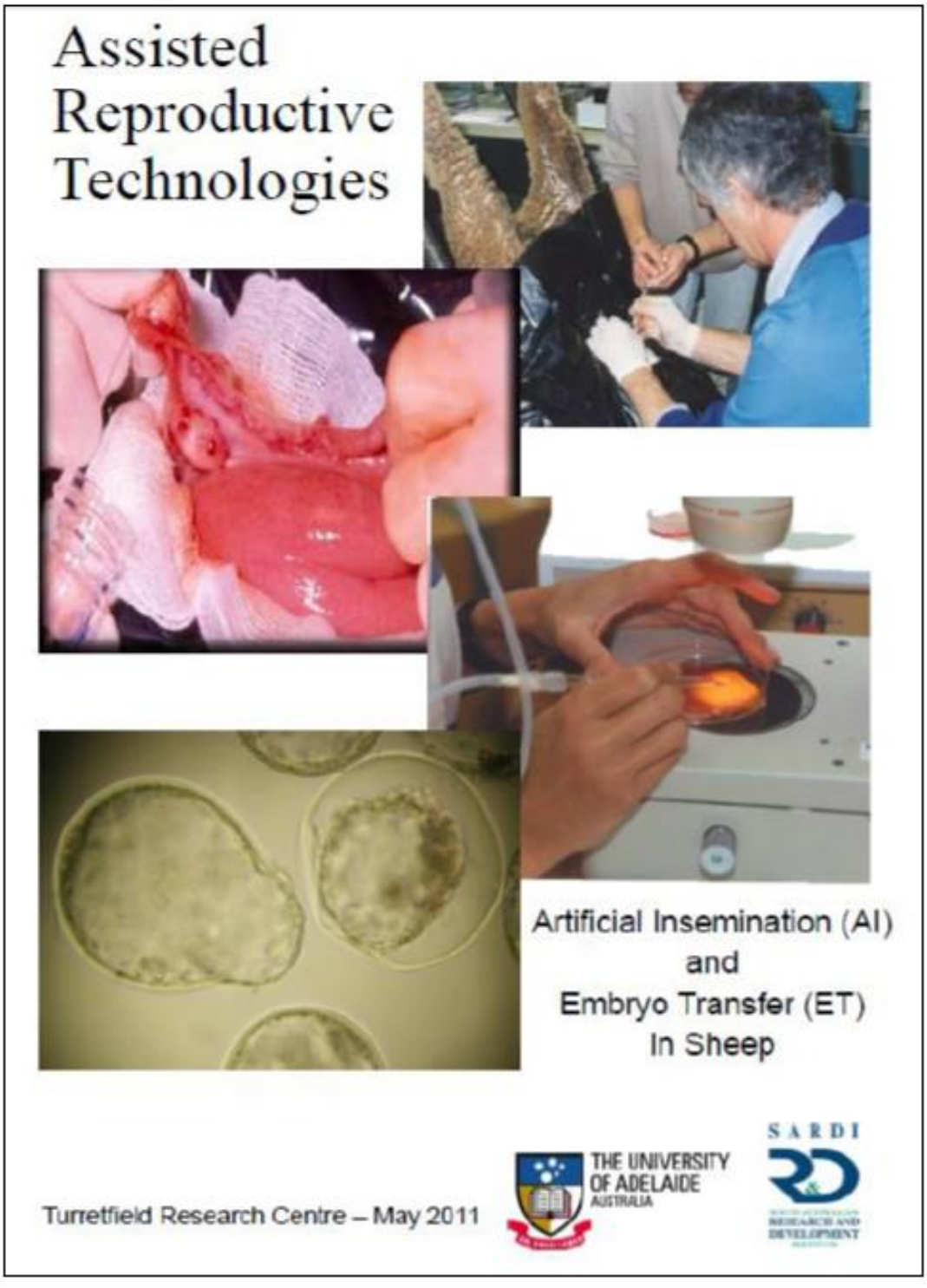
Updated: 19 Jul 2012

Artificial Insemination and Embryo Transfer in Sheep

Course Outline

- Ram Training, Semen Collection and Processing
- Semen Cryopreservation
- Synchronization
- Heat Detection
- Teasers
- Artificial Insemination (AI)
- Superovulation (MOET)
- Embryo Transfer (ET)
- Embryo Handling and Cryopreservation
- Pregnancy Scanning
- Nutrition
- Laboratory Set-up, QA
- Equipment Maintenance

APPENDIX 2: COVER PAGE AND COURSE CONTENT PAGE OF TRAINING COURSE MANUAL.



APPENDIX 3: LETTER SENT TO DR GHAZY DETAILING SEMEN SUPPLY AND EXPORT OPERATIONS.

16 August 2013

Dr Mohammed Ghazy
Iraq Ministry of Agriculture
Baghdad
IRAQ

Our warmest greetings to you Dr Mohammed.

We wish to advise that we have now successfully identified three Australian suppliers of semen for breeds of sheep that meet the Ministry of Agriculture requirements as indicated by Dr Al Kaisey in our earlier correspondence.

Please be advised that we have contracted the collection and subsequent shipment of 1,800 straws of frozen sheep semen to Iraq in accordance with the Iraq-Australia Export Protocol for Sheep Genetic Material.

The 1,800 straws will be comprised of the following:

- 1,000 straws of frozen Awassi semen, supplied by Emanuel Exports, Western Australia
- 400 straws of frozen Awassi semen, supplied by RD Farming, New South Wales
- 400 straws of frozen East Friesian semen, supplied by Prospect Stud, Victoria

These rams have now commenced their required pre-collection quarantine period, and collections from the first rams will commence approximately two weeks from now.

Once all of the collections have been completed it is our intention to contract the company *GeneMovers* to freight the semen to Iraq by air in 'dry shippers' containing adsorbed liquid nitrogen to preserve and maintain the semen at the required temperature for the trip from Australia to Iraq. It is likely that the shipment will occur in the period from October to November 2013; subject to completing collections and arranging appropriate transport to Iraq.

We now request that you seek to prepare the appropriate permissions to ensure that the shipment can enter Iraq without hindrance and in accordance with the project agreements established in the Iraq-Australia (AusAid) On-the-Ground (OTG) Sheep Reproduction Technologies Project.

We would advise that it would be best practice for us to send the shipment of semen to the Erbil Veterinary Directorate in the first instance to allow Dr Rozh Muhammed to recharge the liquid nitrogen canisters and conduct quality checks on the semen upon arrival, and subsequently tranship the straws onwards to the OTG sites. However; we will be guided by your internal protocols on the appropriate entry point (subject to confirmation of logistics by *Genemovers*).

As soon as the shipment is ready for despatch to Iraq, we will contact you again to ensure smooth passage.

Warmest regards.

Dr Sean Miller
OTG Project Leader – Australia

APPENDIX 4: LETTER SENT BY OTG LIVESTOCK TRAINEE TO THE DIRECTOR GENERAL OF RESEARCH AND EXTENSION IN ERBIL, AS A PART OF A PROJECT TO EXPAND THE OTG CONCEPTS TO OTHER REGIONS, SHOWING A CLEAR PLAN TO USE PARTICIPATORY EXTENSION APPROACHES OF INVOVING FARMER DISCUSSION FROM THE START, AND WORKING TOGETHER TO FIND PRACTIAL SOLUTIONS.

Extension paper

Address: Expand the knowledge of effective feeding system and improved sheep to increase the farmer income by encouraging farmers to breed sheep.

Introduction:

Sheep yogurt is one of the most desirable and very special products to Erbil City, but the production of milk is very limited. There are two main reasons for that:

1. Decreasing the number of breeders.
2. Decrease the production of milk amount as well as the milking period during the year.

It is very important to think how we can increase the number of sheep breeders, and increase the quantity of the milk in our local Karradi sheep breed as well as the duration of milking across the year.

Purpose:

1. Handling with all breeders challenges to encourage them to breed more sheep by updating their knowledge with new farm skills and management, and effective feeding system.
2. Increase the production of milk per ewe, and expand lactation period.

Results:

1. Increase the number of breeders to breed improved sheep.
2. Increase the production of milk.
3. Increase the income of the farmers and breeders.

Methodology:

1. Meeting with innovative farmers and breeders.
2. List the main challenges that makes the breeders sell their sheep.
3. Identify the core of the problem.
4. Make a list of options to find the solutions of the problem.
5. Identify the core of the solution with the farmers.
6. Apply the solution on the ground.
7. Monitoring and evaluation.

APPENDIX 5: REPORT FOR OTG TRAINEE SHOWING EXPANSION OF OTG PROJECT IN ERBIL

OTG Erbil / September 2013

Finally the Governorate (not the MoA) accepts to fund a small budget for one year to start our project. I will name it (mini OTG). The Governorate funded about (30,000$) for our project for one year. The plan was to start with just 15 ewes in my office location. We were very busy last month and we were able to complete the following tasks:

1. Prepare and clean a hall that will be the E.T branch main building.

   This will include:

   a. Operations room.
   b. Laboratory.
   c. Office.

2. Clean and prepare the land to plant alfa alfa.
3. Prepare the sheep room.
4. Buying 15 ewes.
5. Buying barley for one year for 15 ewes.

Challenges began when you start working practically. I became a shepherd after I finished my work from afternoon to evening. But some spider hats appear again to suppress the project. problem solving and facing challenges was one of the OTG lessons, so we moved to plan B and we change the sheep location to the country side while we still have the ET main building inside Erbil. We hire a shepherd, and we are now using Herish's land to keep the project ON.
We have many plans and we are very optimistic to get some good results.
We will update all these by a monthly report for all our activities.

Regards,

Pictures:

1) Preparing the land to plant alfa alfa.
2) Barley in my hand.
3) My first day as a shepherd while my ewes are grazing.

APPENDIX 6: LETTER DETAILING PROCESSES REQUIRED FOR IRAQI IMANENT RECIEVAL OF SEMEM FROM AUSTRALIA

Government of South Australia
Rural Solutions SA

Loxton Research Centre
Bookpurnong Road,
PO Box 411
Loxton SA 5333

DX 52102

ABN 33 763 159 658

Tel (08) 8595 9100
Tel 1300 364 322
Fax (08) 8595 9199

info@ruralsolutions.sa.gov.au
www.ruralsolutions.sa.gov.au

Dear Dr Al-Ghabban,

In order to enable the shipment of sheep semen to proceed from Australia, the Australian export authority understands that we do not require a specific import permit from Iraq to send the containers to you. Consequently, as soon as the semen has been collected and the health tests have been completed in Australia, we will prepare the shipment and process the material through Australian customs and quarentine ready to despatch to Iraq for the OTG project.

However, we understand that there may be a requirement in Iraq for you to have paperwork that authorises the entry of the semen to Iraq, and passage through Iraq customs.

We strongly advise you to ensure that you prepare these documents urgently as we will be in a position to send the containers to Iraq within the next 21 days.
Please advise us immediately when you have this paperwork prepared as we will not send the containers until these approvals are in place in Iraq as we do not wish to place this highly valuable shipment of frozen semen at risk of unnecessary delay and damage on arrival in Iraq.

Please note that this request is urgent as the semen will be ready to depart for Iraq within the next 21 days.

Kindest Regards

Team Leader OTG

Rural Solutions SA

PRIMARY INDUSTRIES and RESOURCES S.A.
GOVERNMENT OF SOUTH AUSTRALIA
11th October 2013

CC: With appreciation Dr Sean Miller, Principal Consultant (IAfD). International Agriculture for Development.

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