AGRICULTURAL DEVELOPMENT ASSESSMENTS AND STRATEGIES IN POST CONFLICT SETTINGS: AN EMPIRICAL CASE STUDY OF EIGHT SOUTHERN IRAQI PROVINCES

A Record of Study

by

JAMES C. HAFER

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF EDUCATION

December 2010

Major Subject: Agricultural Leadership, Education, and Communications

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	David Lawver
Committee Members,	Gary Briers
	Steven Fraze
Head of Department,	Jack Elliot

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ABSTRACT

Agricultural Development Assessments and Strategies in Post Conflict Settings: An Empirical Case Study of Eight Southern Iraqi Provinces. (December 2010)

James C. Hafer, A.S., Murray State College; B.S., East Texas State University; M.S., Montana State University-Bozeman

Co-Chairs of Advisory Committee: Dr. Glen Shinn
Dr. David Lawver

The purpose of this study was to synthesize emergent agricultural development reports related to post-conflict needs assessments in eight southern Iraqi provinces.

This study is an empirical case study of Post Conflict Agricultural Development Assessments and Strategies in Eight Southern Iraqi Provinces**.** The objective is a systems approach using qualitative and quantitative methods to improve Iraqi agricultural practice, extension and training, community development, security, and policies for governance. The design called for a case study and a description of pre-deployment activities of a military-based civilian assessment team, initial organization and adjustments, and techniques for internal and external communication. Particular attention was given to agricultural specialties, crosscutting constructs, and data collection and analysis protocols in eight provinces in Iraq.

Three objectives were identified to achieve the purpose of this study. The first objective was to identify emergent agricultural development themes from each of the eight Iraqi provinces. The second objective was to identify emergent agricultural development trends from each of the eight Iraqi provinces. A third objective was to

provide relevant case documentation to assist in future agricultural development/post conflict development efforts.

It was found that Iraqi agricultural production lags due to many factors, including counter productive government policies that undermine productivity, distort local economies, and confound security issues and competition via subsidized credit and agricultural inputs. Outdated technology and undertrained producers lacking knowledge of production related areas such as plant and animal genetics, fertilizers, irrigation and drainage systems and farm equipment. Inadequate and unstable electricity availability and provision, degradation of irrigation-infrastructure and management systems, a complete lack of or insufficient access to credit and private capital as well as inadequate market development and network infrastructure have all taken their toll on evolution and improvement of agricultural growth in southern Iraq.

It may be that the largest threat to the future of Iraq is not violence, but the diminishing hope of young people caused by their inability to obtain vocational based skills training and the lack of jobs that match such skills. A pervasive lack of job opportunities or perceived lack of job availability may encourage continued civil unrest and possibly continue the insurgency. In order to address this issue, an aggressive youth development focus can make a positive impact in the current society. A majority of youth without useful skills are forced to abandon the farm and move to cities or to pursue other means of earning income in rural areas.

DEDICATION

To my family and my son, Jace,

It is of little doubt that words alone cannot adequately express the gratitude and appreciation that I have for my family. When it comes to parents, simply stated: I won the parental lottery!

Mom and Dad, who would have ever known that thirty plus years ago a literal "greenhand" freshman in Vo-Ag would find a calling on which to base a career? I know you had your doubts.

Mom and Dad, I will eternally be grateful for all of the afternoon feedings of Limmy heifers, steers and crossbred barrows, the copious funds for entry fees, Blue and Gold Sausage sales, clean jeans, pressed FFA jackets, my state FFA degree scrapbook, the help halter breaking Lady Sampson, the building of my showbox, the trip to the Iowa State Fair and the Arizona Nationals. The relentless value and importance placed on doing one's best and the instilled expectation of a college education are appreciated.

Most importantly, thank you for the support and encouragement only loving parents can provide; without your exhibited support, drive and work ethic you both continue to model and instill in me this very day, I doubt I would have had the opportunity to pen this.

ACKNOWLEDGEMENTS

A tired cliché exists to the effect that if one were to spy a turtle on top of a fence post, bets are it did not get there by itself. I am that turtle! I wish express my sincere appreciation and owe a debt of gratitude to my committee, all of whom took a chance on me and perpetually worked to place that turtle on top of that fencepost; Dr. Glen Shinn, Dr. David Lawver, Dr. Gary Briers and Dr. Steven Fraze. Thank you; I appreciate the perseverance, encouragement and support, guidance and direction you have afforded me. Thank you for serving on my committee.

In addition, I will forever appreciate the committed efforts of the Joint Faculty at both Texas A&M University and TexasTech University (including Ms. Clarice Fulton) in working to make this doctoral program one of the very best in the country.

To my honest friends; all of whom have proven to be true brethren of tremendous brotherhood and friendship time and again via words and acts of undeniable friendship and encouragement- much obliged. Kirk Denny, thanks for the spot-on wisdom and persistent encouragement, the long August hopper-filled days on the North Fork of the Tongue in the Bighorns – those 60 fish days, the cow mews, raghorn bull and the endless problem solving red and whites. Maybe one day Shelia will forgive us? Hal Witt your relentless clairvoyant words of wisdom and goading, perseverance, encouragement and stick-to-it-ivenss and time honored trust as a true friend is appreciated and a blessing. Your 30 plus years of true friendship have truly been rock of Gibraltar for me; who would have known our Oklahoma Vo-Ag I class would have lead us where we are today? Thanks Brother. Dr. Marty Frick, I truly appreciate the tutelage and gentle push

in the academic direction, unwavering friendship, and what you have helped me achieve professionally and academically. Dr. Ken Bruwelheide, Dr. Scott Davis, Ms. Deborah Cavett, Dr. Theresa Murphrey, thank you all for the ongoing encouragement.
Thanks to Dr. Davis at Montana State University for his critical eye and input.

A word of thanks and gratitude to the United States Department of Agriculture CSREES (NIFA) and Chief Dull Knife College for their tolerance, cooperation and patience in my endeavors of the past 13 years. I have indeed considered myself very fortunate to have the opportunity to live, learn, teach and thrive in such a unique and rightfully entitled haven “the last best place” of Big Sky Country. Thanks Montana.

I’d be remiss not to express my profound appreciation for the brave men and women of the United States Armed Forces for their support of Team Borlaug’s endeavor in gathering this important data, and their dedicated assistance in securing the hope and future of the Iraqi people.

Reminiscent of today’s battles waged by US and coalition forces in Iraq and Afghanistan in helping provide for a better tomorrow, this study is dedicated to my father Lt. James Hafer, Third Infantry Division, Fifteenth Regiment, Heavy Tank Company, 4th platoon and the men who fought a vicious week-long battle on Outpost Harry (http://www.ophsa.org/). This little known, yet pivotal week long bloody battle was instrumental to the truce talks by forcing Chinese concessions for early closure in the waning hours of the Korean Conflict. The battle for Outpost Harry was the initial step in providing for a vibrant South Korean people, economy and country.

TABLE OF CONTENTS

CHAPTER Page

CHAPTER Page

LIST OF FIGURES

Page

Page

CHAPTER I

INTRODUCTION

Background to the Study/Locating the Author

The foundations of this study were shaped by my experiences, biases, and personal opinions. I recognized at the beginning as a mid career graduate student, my inquiry and research experience merged with my lifetime of learned experiences and who I am.

My roots are in agriculture—the great-grandson of a pioneer family who homesteaded Oklahoma land under the provisions of President Abraham Lincoln. The land is still owned by the family and I am rooted in this land. This culture and history in production agriculture provided an environment for a student "learning to do." The public schools, agricultural education philosophy, and caring teachers provided a sense of place for "doing to learn." The larger community and democracy of politics, religion, and supply-demand market economics served to inculcate the values of "earning to live and living to serve."

These unique agricultural environments in which I now work and in which I now teach are major contributors to my pragmatist view and my approach of this case study. My belief in President Lincoln's view of a tripartite land-grant system of education, extension, and applied research was the major filter in the lens through which I viewed and interpreted these data.

This record of study follows the style of the *Journal of Agricultural Education.*

As a student and practitioner of agriculture and after 20 years of teaching experience at the secondary and postsecondary level, I am very much a believer in people and education—the social sciences. I see quality education as a broad-brush panacea for most maladies of today's world. I am confident this ideology is reflected in my interpretation of these data. Granted, a biological or physical science-based researcher and author drawing from this exact case study may interpret these very data with a much different perspective and outcome. This is who I am and these are my perspectives.

According to International Fund for Agricultural Development (IFAD), an international financial institution and a specialized United Nations agency dedicated to eradicating poverty and hunger in rural areas of developing countries, agriculture is a proven engine for poverty reduction. Gross Domestic Product (GDP) growth generated by agriculture is up to four times more effective in benefiting the poorest half of a country's population than growth generated by other sectors (IFAD, 2009a).

Many development agencies focus on reducing poverty in rural areas of developing countries by helping poor rural people to increase their food production and incomes. Yet, according to IFAD (2009b) support to the agricultural sector in developing countries has declined dramatically since the 1970s. Government spending on agriculture in many of the poorest countries averages only 4 per cent of public expenditure. Development aid to agriculture fell from US$8 billion in 1984 to US$5 billion in 2007.

IFAD (2009b) states it is now widely recognized that natural hazards and violent conflicts cannot be treated independently from the general problems of economic, human, and institutional development:

> The severity of the impact of a shock, a crisis that has lasting negative impact, including natural disasters and outbreaks of violence is correlated with the degree of resilience of a country, which in turn depends on the strength of the central and local governments and community-level organizations. Interventions aimed at preventing and moderating the impact of crises are therefore justified on humanitarian grounds and as part of economic development strategies. (p. 35)

In addition to natural disasters and violent conflicts, IFAD (2009b) notes non-income causes of poverty (e.g. exclusion, discrimination, indignity, and insecurity) contribute more to the weak resilience of rural societies in poor countries than income poverty (i.e. consumption below a given amount for an acceptable minimum standard of living).

> Non-income poverty originates in unfavorable institutional settings which deny the lower strata of society access to social capital, proactive participation in public life and equitable sharing of human development opportunities. These are well known risk factors of political instability. (p.35)

Aid is often defined as to provide with what is useful or necessary in achieving an end, or to give assistance (Merriam-Webster, 2009).

According to Hjertholm and White (1998):

> Aid is an international operation channeling tens of billions of dollars to developing countries each year and employing hundreds of thousands of people in a multitude of organisations. Aid programmes have always been hindered by their use for the political or commercial advantage of the donor, one could plausibly trace aid back to gifts from one king or ruler to another in medieval or even classical times. Aid was also seen as a general benefit to the population of the recipient country and that some continuity can be established with the present-day aid infrastructure. (p. 4)

Additionally, Hjertholm and White (1998) postulate that historically, aid has served a multitude of objectives:

> For some donors, the allocation and quality of aid have been largely shaped by concern for the development needs of recipients. By contrast, the foreign aid of some larger donors has been used principally as a foreign and commercial policy tool. Despite many changes over the years, there has been one constant in the history of aid, namely that the development objectives of aid programmes have been distorted by the use of aid for donor commercial and political advantage. (p. 3)

This is not to say that aid has never been used for development nor achieved any beneficial effects, but this statement is conditioned by the firmly modernist ideological stance of donors: they tend to believe there is a single model of

development based on a particular conception of Western liberal democracy. (p. 4)

Fairbanks and Brennan (n.d.) state that post-conflict societies are typically rife with corruption, weak or illegitimate political institutions, damaged infrastructures, ineffective economies, and a society with no shared vision on how to develop a solution. The resulting conflict goes beyond immediate pain and suffering and can inhibit the country or region's ability to stop the cycle of violence. One of the primary causes, if not the primary cause, is relative and sometimes comprehensive poverty, and an inability to improve the underlying economic conditions.

According to FAO (2004), enabling small-scale farmers to face the challenges of globalization will require special attention to rural capacity and institution building as well as efforts to improve rural infrastructure, including roads, communications, marketing, transport, storage and processing facilities.

Appropriate agrarian institutions are essential, such as those that facilitate credit and technology transfer, as well as a legal framework to defend land and water claims and access rights. The key player in providing the commercial components of such infrastructure and the ensuing management of downstream activities is the private sector itself - highly responsive to an enabling macro environment and public investment in rural infrastructure (FAO, 2004).

The United States Agency for International Development (2009) opines that the United States has a long history of extending a helping hand to those people overseas struggling to make a better life, recover from a disaster, or striving to live in a free and democratic country. It is this caring that stands as a hallmark of the United States around the world–and shows the world our true character as a nation. Paul Brinkley, Deputy Under Secretary of Defense for Business Transformation, stated in the July-August 2007 issue of the Military Review:

> As liberators of the Iraqi people, we have an obligation to seek remedies to Iraq's postwar depression. This depression puts our armed forces at risk today, and our children at risk of violence tomorrow. It is the challenge of our time. How will we respond? (p. 4)

Historical Context

A pivotal player in international post conflict reconstruction, the United States implemented one of modern history's best known and most successful projects—the Marshall Plan. The plan was initially implemented in 1947 to address the urgent need for humanitarian aid to postwar ravaged Western Europe. The plan was the largest and most successful program of foreign assistance ever undertaken by the U.S. government (Chambers, 2000). The harsh winter of 1946–47 underlined the inability of European countries to achieve a sustained economic recovery from the dislocations and destruction of World War II. American leaders feared that poverty and hunger would make Western European countries vulnerable to Communist appeals (Chambers, 2000). From April 1948 to December 1951, the United States sponsored program was designed to

rehabilitate the economies of 17 western and southern European countries in order to create stable conditions in which democratic institutions could survive. The United States feared that the poverty, unemployment, and dislocation of the postwar period were reinforcing the appeal of communist parties to voters in Western Europe (Marshall Plan, 2009).

The Marshall Plan focused intently on revitalization of industry, restoring factory capacity and associated employment, wealth generation, and intracontinental trade among nations that had recently been at war with one another. It required European leaders to define their own economic and industrial revitalization plans, promising massive amounts of U.S. financial assistance in return for progress in economic restructuring and integration. This approach facilitated the reestablishment of effective government in war-torn, demoralized nations and laid the groundwork for the future economic integration of Europe now embodied in the European Union (Brinkley, 2007).

A similar yet lesser known program not bound by specific geographical region was the Point Four Program, an economic aid program for poor countries, announced by United States President Harry S. Truman (Point Four Program, 1991).

U.S. Military Involvement

The North Atlantic Treaty Organization Parliamentary Assembly notes violent conflict inflicts appalling, visible and invisible damage on developing societies. Only after a reasonable degree of peace and security is established can reasonable economic, political and cultural reconstruction begin (NATO, 2004). In addition to sustained political engagement and regional diplomacy the United States Military supports a

peaceful and prosperous Iraq, and continue to play a pivotal role in the ability to establish regional stability and post-conflict development in Iraq.

U.S. Military forces continue the transition from combat and counterinsurgency missions to primary stability tasks that focus on training and assisting the Iraqi Security Forces (ISF), providing force protection for U.S. military and civilian personnel and facilities, assisting targeted counter-terrorism operations, and supporting civilian agencies and international organizations in their capacity-building efforts (Congressional Report, 2009).

Multi-National Military Involvement

U.S. and Iraqi officials are working within a framework of joint engagements to enhance stability, promote reconstruction, improve governmental transparency, advance regional relationships, and lay the foundation for a diversified, growing economy (Congressional Report, 2009).

Just as U.S. and Iraqi officials are working to provide stability, so are the multi-national peacekeeping coalition forces, as described by The North Atlantic Treaty Organization Parliamentary Assemblies 2004 report:

> Increasingly, international peacekeeping forces are asked to provide that security. NATO itself has deployed troops in recent years to Bosnia, Kosovo, the former Yugoslav Republic of Macedonia, and Afghanistan, and several NATO member states have sent forces to Iraq with some NATO support. NATO is also soon to begin training Iraqi security forces. Western militaries are also being asked to perform vital development tasks. US forces in Iraq were not only deployed to

> confront rebel spoilers but also rebuild key infrastructure-a visceral manifestation of growing security-development links. In Afghanistan, NATO member countries have deployed Provincial Reconstruction Teams (PRTs) with a range of reconstruction responsibilities from bridge repair to political support. Deployed forces are asked to ensure that basic humanitarian needs are met with great dispatch. (p. 3)

Many nations and various international organizations are supporting the effort to rebuild Iraq through multilateral or bilateral assistance. In March 2003, a U.S.-led multinational force began operations in Iraq. At that time, 48 nations, identified as a "coalition of the willing," offered political, military, and financial support for U.S. efforts in Iraq, with 38 nations other than the United States providing troops. As of May 2007, 25 coalition nations were contributing about 12,600 troops to multinational force operations in Iraq. This compares to the 145,000 U.S. troops in Iraq, for the same time period (GAO, 2007).

Eighteen years of conflict has inflicted a devastating toll on Iraq's socio-economic growth and development. Identifying, assessing and addressing the enormous economic and social shortcomings in post-conflict settings guarantees both opportunities and challenges. The development and implementation of effective post-conflict agricultural assessment strategies are crucial to post-conflict economic reconstruction.

Limitations

This study is limited in the following ways:

1. This study is based on data collected in eight Iraq provinces between July 01, 2008 and December 15, 2008. The data were collected between July and December and represents data and conditions at that time.
2. Findings and results of this study cannot be generalized beyond this Iraqi population.
3. Incomplete Team Borlaug (2008e) explanation of methods utilized for use of Rapid Rural Participatory Appraisal approach in gathering provincial data.

Delimitations

1. Discussion is based on actual events that occurred in the eight Iraqi provinces between July 01, 2008, and December 15, 2008.

Assumptions

The following assumptions are made concerning this study:

1. Agricultural development assessments and strategies in post conflict settings are important in the stabilization of rural Iraq.
2. Post conflict agricultural development assessments and strategies in Iraq differ from those in other post conflict countries.
3. Iraqis agriculturalists possess the ability to identify post conflict agricultural development needs and are honest in their responses.

4. Findings related to agricultural development assessments and strategies in post conflict settings will be used in selection of development initiatives, both by Iraqis, PRTs, and MND-C Multinational Forces.
5. Change related to agricultural development assessments and strategies in post conflict settings will occur.

Statement of the Problem

The purpose of Team Borlaug's participatory rapid rural appraisal and needs assessment effort was to identify and assist in the priority-setting of agricultural development needs and strategies in eight post conflict settings in central Iraq.

A case study will be developed using the field notes of 14 agricultural specialists and eight provincial Team Borlaug (Team Borlaug, 2008a, 2008b, 2008c, 2008d, 2008e, 2008f, 2008g, 2008h) reports, relating to agricultural specialties, crosscutting constructs, and data collection and analysis protocols in eight provinces in Iraq from May-December, 2008. Eleven crosscutting constructs: cooperation, economic competitiveness, education and training, environmental stewardship, future view, governance, health and wellness, land tenure, receptivity to change, security, and sustainability areas will focus on agricultural specialties to utilize the team findings.

The agricultural specialty areas were: agricultural business, agricultural economics and market development, agricultural engineering and farm machinery, aquaculture, crop production and management, extension education, higher agricultural education and vocational-technical education, horticulture and cold chain management,

livestock production and animal health, organizational management and leadership, soil fertility and land reclamation, water and irrigation systems, and youth development.

A single case study will be utilized, in part due to the unique nature of the case. According to Yin (1994), single-case studies are ideal for revelatory cases where an observer may have access to a phenomenon that was previously inaccessible. These studies can be holistic or embedded, the latter occurring when the same case study involves more than one unit of analysis, and in this case multiple provinces.

Purpose of the Study

As professionals in agricultural education we often find ourselves in a new era ushered in by global trends of population growth, impact of technology, environmental degradation, poverty and hunger, migration-immigration, and global terrorism (Barnett, 2009; Barnett, 2005; Friedman, 2008; Friedman, 2007; Kennedy, 1993; Naisbitt, 2006; United Nations, 2009). Each trend poses special consideration for agricultural education, extension, and development—especially development in post-conflict regions. We need new paradigms, new mindsets, and new blueprints to transition from the 20th century to a 21st century environment and from conflict to development to sustainability (Shinn & Briers, 2009a).

The purpose of this study was to synthesize emergent agricultural development reports related to post conflict needs assessments in eight southern Iraqi provinces.

Objectives of the Study

The following objectives were developed to guide the conduct of this study:

1. Identify emergent agricultural development themes from each of the eight Iraqi provinces.
2. Identify emergent agricultural development trends from each of the eight Iraqi provinces.
3. Provide relevant case documentation as to assist in future agricultural development/post conflict developmental efforts.

Conceptual Framework

The conceptual framework for this study is based on Grounded Theory and Sensitizing Concepts (Bowen, 2006) and Glaser (1993, 2006). Grounded theory is a research approach or method that calls for a continual interplay between data collection and analysis to produce a theory during the research process. A grounded theory is derived inductively through the systematic collection and analysis of data pertaining to a phenomenon (Strauss & Corbin, 1990). Data collection, analysis, and theory stand in reciprocal relationship with one other. A grounded theory is generated by themes, and themes emerge from the data during analysis, capturing the essence of meaning or experience drawn from varied situations and contexts (Bowen, 2006).

Inductive analysis is the principal technique used in the grounded theory method. Patton (1980) noted, “Inductive analysis means that the patterns, themes, and categories of analysis come from the data; they emerge out of the data rather than being imposed on them prior to data collection and analysis” (p.360).

Less eloquent, yet more simply stated, Allen (2003) explains grounded theory as:

> A research method that operates almost in a reverse fashion from traditional research and at first may appear to be in contradiction of the scientific method. Rather than begin by researching and developing a hypothesis, the first step is data collection, often through a variety of methods. From the data collected, the key points are marked with a series of codes, which are extracted from the data text. These codes are grouped into similar concepts in order to make them more workable. From these concepts categories are formed, which are the basis for the creation of a theory, or a reverse engineered hypothesis. This contradicts the traditional model of research, where the researcher chooses a theoretical framework, and only then applies this model to the studied phenomenon. (p. 2)

Grounded theory is a systematic process of generating a theory from data that contains both inductive and deductive thinking. The overarching goal is to formulate hypotheses based on conceptual ideas. Grounded theory can be of great benefit in answering the question of "What was going on in an area" by generating either a substantive or formal theory. Stern (1995), argued that "the strongest case for the use of grounded theory is in investigations of relatively uncharted water, or to gain a fresh perspective in a familiar situation" (pg. 29).

Sensitizing is a crucial step in the overall grounded theory process. Charmaz (2003) has referred to sensitizing concepts as “those background ideas that inform the overall research problem”(p. 251). Sensitizing concepts draw attention to important features of social interaction and provide guidelines for research in specific settings. Blaikie (2000) has argued that research that is concerned with theory generation might require sensitizing concepts but no hypotheses. Indeed, qualitative research, including grounded theory research, does not start with hypotheses or preconceived notions. Instead, in accordance with its inductive nature, it involves the researcher’s attempts to discover, understand, and interpret what is happening in the research context (Bowen, 2006).

CHAPTER II

LITERATURE REVIEW

History

Although long a component of U.S. foreign policy, strengthening weak and failing states has increasingly emerged as a high-priority U.S. national security goal since the end of the Cold War. Serafino (2009) notes that former President George W. Bush articulated in his February 2, 2005, State of the Union address, "to build and preserve a community of free and independent nations, with governments that answer to their citizens, and reflect their own cultures" cast the once-discredited concept of building or rebuilding government institutions, economies, and civic cultures in a new light. Agricultural development reduces global hunger and poverty because it is a proven engine of economic growth early in the development process. Throughout history, growth in agriculture was a precursor for industrial growth. From mid-18th century England to late-19th century Japan to modern China whose rural poverty declined from 53 percent in 1981 to 8 percent in 2001. (USAID, 2009a)

World Bank (2008) purports agricultural growth has special powers in reducing poverty across all country types. Cross-country estimates show that Gross Domestic Product (GDP) growth originating in agriculture is at least twice as effective in reducing poverty as GDP growth originating outside agriculture. (pg. 6) The initial movement for agricultural development is deeply rooted in the Green Revolution. Muir (1998) states:

> The Green Revolution has been important in the United States and other developed nations as well as in the lesser developed nations of the world in establishing sustainable agriculture and reducing famine. In 1944 the Rockefeller Foundation with the aid of the Mexican government established a plant-breeding station in northwestern Mexico, with a goal of boosting grain yields in a world that was already in trouble with food supplies and rapid population growth. The project was headed by Norman Borlaug, often referred to as the father of the green revolution, a plant breeder from the University of Minnesota who developed a high-yielding wheat plant and later won the Nobel Prize for his work in this area, the effort was tremendously successful. (p. 1)

Many countries today are beneficiaries of the initial Borlaug efforts, which paved the way for developing countries to bolster their sustainability via modern and effective agricultural production practices.

Existing Agency Post-Conflict Agricultural Development Policies and Procedures

The State Department

Contributions from several important governmental agencies and parties frame the ability to deliver agricultural development work. One of the most notable is the State Department. The 9/11 Commission Report (2004) reminds us of the perception that international terrorism can exploit weak and unstable states. This in turn convinced many policymakers and analysts of the need to strengthen U.S. and international capabilities to foster security, good governance and economic development, especially in post-conflict situations.

In his January 23, 2007, State of the Union address, former President George W. Bush pointed to the need for a civilian reserve corps as a tool in the generational struggle against terrorism:

> Such a corps would function much like our military reserve; it would ease the burden on the armed forces by allowing us to hire civilians with critical skills to serve on missions abroad when America needs them. It would give people across America who do not wear the uniform a chance to serve in the defining struggle of our time. (p. 7)

According to the U.S. Department of State (2009) a consensus developed within the Executive Branch, in Congress and among independent experts that the U.S. Government needs a more robust capability to prevent conflict when possible, and if necessary manage stabilization and reconstruction operations in countries emerging from conflict or civil strife.

In July 2004, Congress authorized the reprogramming of funds to create the State Department's Office of the Coordinator for Reconstruction and Stabilization (S/CRS), which in turn provides for more civilian involvement in the post conflict efforts. The U.S. military supported the creation of S/CRS' and its mission. In a prepared statement for testimony before the Armed Services committees in February 2005, General Richard B. Myers, Chairman of the Joint Chiefs of Staff, cited the creation of S/CRS as:

> "In the future, provided this office is given appropriate resources, it will synchronize military and civilian efforts and ensure an integrated national

> approach is applied to post-combat peacekeeping, reconstruction and stability operations".

Wyler (2008) concludes that, The State Department's Office of the Coordinator for Reconstruction and Stabilization seeks to create a cadre of volunteer civilians that could be rapidly deployed anywhere in the world in response to an emerging crisis. These civilians would have unique skills and training that could be useful in post-conflict situations and would include police officers, judges, lawyers, agronomists, public health officials, city planners, economists, and others.

The Department of Defense – DoD

As stated in the November 2005, Department of Defense (DoD) Directive number 3000.05 titled: Military Support for Stability, Security, Transition, and Reconstruction (SSTR) Operations which establishes DoD policy and assigns responsibilities within the Department of Defense:

> 4.1. Stability operations are a core U.S. military mission that the Department of Defense shall be prepared to conduct and support. They shall be given priority comparable to combat operations and be explicitly addressed and integrated across all DoD activities including doctrine, organizations, training, education, exercises, materiel, leadership, personnel, facilities, and planning. (p. 1)

Military Support for Stability, Security, Transition, and Reconstruction or SSTR operations also implicates the DoD in planning, training, and preparing to conduct as well as support stability operations pursuant to the authority vested in the Secretary of Defense. The directives further state, specifically the policy of DoD to include:

> 4.2. Stability operations are conducted to help establish order that advances U.S. interests and values. The immediate goal often is to provide the local populace with security, restore essential services, and meet humanitarian needs. The long-term goal is to help develop indigenous capacity for securing essential services, a viable market economy, rule of law, democratic institutions, and a robust civil society.
>
> 4.3. Many stability operations tasks are best performed by indigenous, foreign, or U.S. civilian professionals. Nonetheless, U.S. military forces shall be prepared to perform all tasks necessary to establish or maintain order when civilians cannot do so. Successfully performing such tasks can help secure a lasting peace and facilitate the timely withdrawal of U.S. and foreign forces.

Lastly, as expressed in item 4.4., of the Military Support for Stability, Security, Transition, and Reconstruction mission of integrated civilian and military efforts are key to successful stability operations. Whether conducting or supporting stability operations, the Department of Defense shall be prepared to work closely with relevant U.S. Departments and Agencies, foreign governments and security forces, global and regional international organizations, U.S. and foreign nongovernmental organizations and private sector individuals and for-profit companies. (p. 3)

United States Department of Agriculture – USDA

The United States Department of Agriculture (USDA) states that the Foreign Agricultural Service's (FAS) mission is to create economic opportunity for American agriculture by expanding global markets. FAS serves U.S. agricultural interests by

supporting international economic development and trade and science capacity building as well as expanding and maintaining international export opportunities (FAS, 2009).

The Foreign Agricultural Service was established March, 1953. FAS reorganized November, 2006, realigning functions and personnel to address significant changes in the world agricultural trade picture and new challenges (FAS, 2009). Additionally, the Foreign Agricultural Service strives to provide foreign development assistance via trade related technical assistance. A major goal of USDA trade and development programs is to increase agricultural productivity and trade, as well as investment in developing countries to enhance economic growth, food security, and the supply and affordability of food (FAS, 2009).

Michael Yost, Administrator of the Foreign Agricultural Service, U.S. Department of Agriculture (2008) notes;

> Today, FAS is helping revitalize agricultural infrastructure and capacity by deploying its experts and unique institutional resources to assist developing countries in becoming economically stable and capable of supporting their populations, which is mutually beneficial to the US and developing nations. Trade and development programs are assisting foreign governments to adopt productivity-enhancing technologies, reconstruct the agricultural sector in post-conflict or disaster areas, develop sustainable natural resource management systems, and strengthen agricultural research and extension programs throughout the world. (p. 7)

In Yost's 2008 remarks to the House Agriculture Committee**,** the United States Department of Agriculture most notable role has been through USDA employees, who have volunteered as advisors on Provincial Reconstruction Teams (PRT), which typically consist of military units of 10 to more than 100 personnel with two to three civilian U.S. government advisors. PRT agricultural activities include soil and water conservation, irrigation and water management, grain and seed storage, post-harvest loss reduction, market system development, and livestock health, nutrition, and breeding. According to Yost (2008) other notable USDA/FAS PRT team accomplishments include:

> PRT members efforts have resulted in the installation of windmills in southern Afghanistan to pump water for irrigation and livestock; the training of Afghan veterinarians in detection and treatment of diseases; rehabilitation of a university laboratory for agricultural teaching; development of post-harvest storage facilities; and the mentoring of provincial directors of agriculture and agricultural extension to help improve services for farmers. Iraq: PRT member advisors have helped establish farmer organizations, invigorate agricultural extension, rebuild institutional capacity to clean and maintain irrigation canals, and recreate veterinary infrastructure to foster animal health. (p. 7)

Yost (2008) opines FAS has been instrumental in leading the Department's participation in the United States Government's Civilian Response Corps (CRC) that will provide the capacity to effectively respond to crisis in fragile countries. FAS negotiated an agreement with the Department of State to begin the recruitment of the first three of

the proposed eight USDA Agricultural Experts who will be members of the Active Component of the CRC Representing USDA, these experts will be able to be deployed as part of an interagency team within 48 hours of a crisis and assist in the development of an integrated response

Since 2003, USDA has deployed 48 volunteers to Afghanistan and 20 to Iraq from nine different USDA agencies, including the Agricultural Marketing Service; Animal and Plant Health Inspection Service; Cooperative State Research, Education, and Extension Service; Farm Service Agency; FSIS; FAS; Forest Service; Natural Resources Conservation Service (NRCS); and Rural Development (FAS,2009).

United States Agency for International Development – USAID

On September 4, 1961, the Congress passed the Foreign Assistance Act, reorganizing the U.S. foreign assistance programs including separating military and non-military aid. The Act mandated the creation of an agency to administer economic assistance programs. In November of1961, President John F. Kennedy established the U.S. Agency for International Development - the first U.S. foreign assistance organization whose primary emphasis was on long-range economic and social development assistance efforts. Freed from political and military functions that plagued its predecessor organizations, USAID was able to offer direct support to the developing nations of the world (USAID, 2009a).

Entrenched in the economic development theory of W.W. Rostow (1960), the new focus of development was to achieve economic growth, democratic process and political stability in the developing world to combat both the perceived spread of

ideological threats such as communism and the threat of instability arising from poverty (USAID, 2009b). Today this philosophy still guides much of the development planning in the newly-formed U.S. Agency for International Development.

Nearly five decades later, USAID continues to play a vital role in promoting U.S. national security, foreign policy, and the war on terrorism, as well as working in agriculture, democracy and governance, economic growth, the environment, education, health, global partnerships, and humanitarian assistance in more than 100 countries to provide a better future for all. It does so by addressing poverty fueled by lack of economic opportunity, one of the root causes of violence today (USAID, 2009b).

Team Borlaug Early Assessment Negotiations

Briers and Shinn (2009) report that after months of discussions with the Department of Defense (DoD), a university team of agricultural scientists and specialists was recruited for an initial six-month deployment in Iraq to conduct rural agricultural assessments in Babil, Dhi Qar, Diwaniyah, Karbala, Maysan, Muthana, Najaf, and Wasit provinces.

Recruited by the Department of Defense, particularly MG Richard Lynch of the Multi-National Division-Center (MND-C), Team Borlaug, a team of agricultural scientists and specialists, was commissioned to conduct rural agricultural assessments, provide technical training, conduct problem-solving research, formulate agricultural policies, and advise local, provincial, and national level leaders on improving the Iraqi agricultural economy (Shinn & Briers, 2009b).

According to Briers and Shinn (2009) UN Millennium Development Goal objectives were part of the fabric of the development activities in Iraq. Eight international development goals, also known as the Millennium Development Goals or MDG's, bolster Team Borlaug (2008e) efforts:

1. Eradicate extreme hunger and poverty
2. Achieve universal primary education
3. Promote gender equality and empower women
4. Reduce child mortality
5. Improve maternal health
6. Combat HIV/AIDS, malaria, and other diseases
7. Ensure environmental sustainability
8. Develop a global partnership for development

The Millennium Development goals, dovetailed with the U.S. Department of Defense's Multinational Division–Center (MND-C) objectives, support development and reconstruction in order to establish conditions for security, stability, and prosperity. The objectives are in concert with the UN MDGs; the objectives were part of the fabric of our development activities.

Texas A&M University, Norman Borlaug Institute for International Agriculture (the Texas A&M University international agricultural development unit), was contracted by the Department of Defense. Dr. Edwin Price, associate vice chancellor and director of the Borlaug Institute, was the “point person” in the discussions; he was the primary person responsible for recruiting the team members. Fourteen individuals, both scientists and specialists, were contracted by the Borlaug Institute to do the needs assessment work. Each team member was selected for technical (agricultural subject matter) expertise and/or “process”/context skills (Briers & Shinn, 2009).

CHAPTER III

METHOD

Team Borlaug (2008e) is a group of agricultural scientists providing the command of Multinational Division-Center (MND-C) with technical support for ongoing civil affairs and counter-insurgency missions. The team responded to the division command and was supported by MND-C units. It was funded by the Task Force for Business and Stability Operations (TFBSO) through the United States Department of Agriculture Foreign Agricultural Service (USDA/FAS). Teams operated in Iraq under a cooperative agreement between the USDA/FAS and Texas AgriLife Research of the Texas A&M University System, representing The Borlaug Institute for International Agriculture (Team Borlaug, 2008e).

The primary purpose of Team Borlaug (2008e) was to advise the command on agricultural issues and provide onsite, real-time information to farmers for increased farm production. Additionally Team Borlaug (2008e) provides recommendations to provincial government, related Provincial Reconstruction Teams (PRT's) and related partners (Team Borlaug, 2008e).

Shinn and Briers (2009a) opine that "our collective goal, as researchers and teachers, is to continually improve the effectiveness, efficiency, and meaning of agricultural education and improve the lives of individuals, families, and communities" (p. 2). Shulman (2002) encourages, "as we look at our purposes for education, and at the taxonomies that aim to give language and shape to those purposes, we need to keep

front and center our recognition of the contrasts, the tensions, the antinomies—seeing them not as problems but as opportunities to define our roles" (p. 10).

This study was an empirical case study of Post Conflict Agricultural Development Assessments and Strategies in Eight Southern Iraqi Provinces**.** The studies goal was a systems approach using qualitative and quantitative methods to improve Iraqi agricultural practice, extension and training, community development, security, and policies for governance. The research design called for a case study and a description of pre-deployment activities of a military based civilian assessment team, initial organization and adjustments, and techniques for internal and external communication. Particular attention will be given to agricultural specialties, crosscutting constructs, and data collection and analysis protocols in eight provinces in Iraq.

The purpose of Team Borlaug's (2008e) participatory rapid rural appraisal and needs assessment effort was to identify and assist in the priority-setting of agricultural development needs and strategies in eight post conflict settings in central Iraq.

The 13 agricultural specialty areas of Team Borlaug (2008e) were: agricultural business, agricultural economics and market development, agricultural engineering and farm machinery, aquaculture, crop production and management, extension education, higher agricultural education and vocational-technical education, horticulture and cold chain management, livestock production and animal health, organizational management and leadership, soil fertility and land reclamation, water and irrigation systems, and youth development. Data analyzed included the field notes of 14 agricultural specialists and eight respective provincial reports relating to agricultural specialties. Crosscutting

constructs of data collection and analysis protocols in eight provinces in Iraq from May-December, 2008 provided a rich environment for the case study (Team Borlaug 2008f). According to Shinn and Briers (2009b) the case method was appropriate for the purposes: to observe, describe, and measure the constructs, including people, technologies, processes, and the organization as a whole. Promising strategies and recommendations resulted in improvements of the agricultural education enterprise.

A single case study was utilized, in part due to the unique nature of the case. According to Yin (1994), single-case studies are ideal for revelatory cases where an observer may have access to a phenomenon that was previously inaccessible. These studies can be holistic or embedded, the latter occurring when the same case study involves more than one unit of analysis, and in this case multiple provinces.

Case Study Method Approach

Yin (2009) postulates the case study is but one of several ways of doing social science research. In general, case studies are the preferred method when (a) "how" or "why" questions are being posed, (b) the investigator has little control over events, and (c) the focus is on a contemporary phenomenon within a real-life context. This situation distinguishes case study research from other types of social science research.

Relevant case studies attempt to explain a phenomenon; an explanatory case study consists of: (a) an accurate rendition of the facts of the case, (b) some consideration of alternative explanations of these facts, and (c) a conclusion based on the single explanation that appears most congruent with the facts (Yin, 1981).

Furthermore, a case study is an ideal methodology when a holistic, in-depth investigation is needed (Feagin, Orum, & Sjoberg, 1991). Case studies are designed to bring out the details from the viewpoint of the participants by using multiple sources of data (Winston, 1997). Winston (1997) posits case studies are multi-perspectival analyses, meaning the researcher considers not just the voice and perspective of the actors, but also of the relevant groups of actors and the interaction between them. This one aspect is a salient point in the characteristic that case studies possess. They give a voice to the powerless and voiceless.

Case study is known as a triangulated research strategy. Snow and Anderson (cited in Feagin, Orum, & Sjoberg, 1991) asserted that triangulation can occur with data, investigators, theories, and even methodologies. Stake (1995) maintained that the protocols that are used to ensure accuracy and alternative explanations are called triangulation. The need for triangulation arises from the ethical need to confirm the validity of the processes. In case studies, this could be done by using multiple sources of data (Yin, 1984). The difficulty in case studies is to establish meaning rather than location.

Yin (1994) presented at least three applications for a case study model:

1. To explain complex causal links in real-life interventions
2. To describe the real-life context in which the intervention has occurred
3. To describe the intervention itself

In addition to the aforementioned applications, Yin (1994) proposed five components of case studies: a study's questions, its propositions, if any, unit(s) of

analysis, the logic linking the data to the propositions, and the criteria for interpreting the findings (Yin, 1994, p. 20).

Some of the early criticism of the case study as a research methodology was that it was unscientific in nature, and because replication was not possible (Winston, 1997). The literature contains major refutations by Yin, Stake, Feagin, and others whose work resulted in a suggested outline for what a case study protocol could include. Yin (1994) reminded the researcher that there is more to a protocol than the instrument. He asserted that the development of the rules and procedures contained in the protocol enhance the reliability of case study research. While it is desirable to have a protocol for all studies, Yin (1994) maintains that it is essential in a multiple-case study.

The case study protocol should include the following sections (Winston, 1997): an overview of the case study project including project objectives, case study issues, and presentations about the topic under study. Other essential elements of case studies include field procedures, reminders about procedures, credentials for access to data sources, and location of those sources. Case study questions, the questions that the investigator must keep in mind during data collection, serve as a guide for the case study report.

Winston (1997) concludes that case study methodology has been subjected to scrutiny and criticism at various times since the 1930's. As a research tool, it has not been a choice that is listed in the major research texts in the social sciences. However, case study is a reliable methodology when executed with due care. The literature, while

not extensive, contains specific guidelines for researchers to follow in carrying out case studies, Yin (1994) and Stake (1995).

Description of the Unit of Analysis

Shinn and Briers (2009b) reported that Team Borlaug objectives focused on improving "continuity and interaction" in irrigation, poultry, fish farming, feed, feed mills, soil, water, livestock, and crops.

Subsuming constructs—under-girding categories that explain phenomena—included themes of cooperation, economic competitiveness, education & training, environmental stewardship, future view, governance, health and wellness, land tenure, receptivity to change, security, and sustainability. These constructs gave rise to reverse engineered hypotheses, which in turn, gave the researchers opportunity to "ride with a loose rein but a firm knee." Loosely using Glaser's (1993, 2006) protocols and Bowen's (2006) sensitizing concepts, the team assumed a 360° observation viewpoint for several practical reasons—command, contexts, processes, products, safety, and utility. (p.

Interview Protocols

Opening conversations and questions are framed in a case study. Typically, interviews spanned an hour or so but some were as long as four hours entwined with a meal by the host. The first order of the day was to initialize a relationship. The team focused on only a few constructs and each interviewer—usually three— pursued a particular theme. General opening questions included themes like "tell me about your role and scope in agriculture"—details of personal experience—or "how do you see today: better, same, worse than yesterday? Why?" Or—"if we could do one thing to

improve Iraqi agriculture, what would it be?" Sustainability was one among 13 subsuming constructs. Exploratory questions included themes like "Can you continue to do what you are doing? Why?" Or—"What change is needed to sustain your family? Why?" The interviewer committed to "hearing twice, seeing twice and speaking once." The hosts responded with gracious hospitality and brutal honesty. (p. 4)

Field Notes

At the end of the day, each team member wrote a brief of the experience, including particular details of interest but in the 200-300 word range. Field notes were electronically reported using standard file names, along with the grid location and date. These field notes were shared with the larger team via a listserv. Post-analyses used all field notes and related documents. The Internet was an essential tool. (p. 4)

After-action Reviews

The team adopted after-action review (AAR) as a field technique to systematically discuss an event, focus on performance standards, share what had happened and why it happened, and to learn how to get maximum benefit from the experience. The AAR was an integrative step in reporting accurate observations, identifying potential strategies, and recommending alternative courses of action (USAID, 2006).

After a steep learning curve, the AAR occurred at the close of every day with a 20-30 minute focused team dialogue—without judging success or failure—around performance issues of "sustain, improve, and tomorrow's objective." The AAR included all participants in the event—team members, military personnel, and civilian contractors.

The AAR event analyzed things to sustain, to improve, while identifying steps in planning, preparing, conducting, and using the results as a continuous improvement technique. AARs did not judge success or failure but they made an effort to discover why things happened. The technique focused directly on experience and accomplished objectives. Participants surfaced and internalized important lessons as a part of the discussion. The results were more participation, more meaning extracted from the experience, and more lessons learned and shared. (p. 4)

Documents

The deliverables included a feasible provincial-level agricultural strategy, nested with memorandum of agreement strategies. Strategies were included in the Government of Iraq 2009 budget. Breeze® and written documents describing specific and generalized observations, promising strategies and potential recommendations in English served as individual internal midterm reports in each province. The team adopted the axiom “pale ink is better than brilliant memory”. (p. 4)

Shared Results

Governors, cabinet members, provincial reconstruction teams (PRTs), regional opinion leaders, and engaged community members received final reports in each province. These reports, delivered as oral and written reports in English and Arabic, described observations, promising strategies, and potential recommendations with appendices that include pre-proposals for projects and programs. (p. 4)

CHAPTER IV

FINDINGS

The primary purpose of this research was to synthesize emergent agricultural development reports related to post conflict needs assessments in eight provinces in southern Iraq. The case was analyzed using eight Area of Operation (AO) final reports produced by the Borlaug Institute Iraq Advisory Group (Team Borlaug). Team Borlaug is a group of agricultural and veterinary scientists providing the command of Multinational Division Center (MND-C) with technical support in its ongoing civil affairs and counter-insurgency missions. (Team Borlaug, 2008a)

Three objectives were identified to achieve the purpose of this study. The first objective was to identify emergent agricultural development *themes* from each of the eight Iraqi provinces. The second objective was to identify emergent agricultural development *trends* from each of the eight Iraqi provinces. A third objective was to provide relevant case documentation to assist in future agricultural development/post conflict developmental efforts.

Evidence for this case study was obtained from each respective AO final report document. Yin (2009) stated that documentation is one of the six sources of evidences available to a researcher; a document serves to corroborate and augment evidence from other sources. Data for this study were collected from June through November 2008. For this case study, data from several sources were compiled, including; *interviews, field notes, final provincial reports, and after-action reviews.*

Each AO report comprised documentation from three or more interviewers. Typical interviews spanned an hour; some were as long as four hours. Each team usually focused on only a few constructs—with an emphasis on establishing a collaborative relationship.

Team Borlaug (2008c) adopted after-action review (AAR) as a field technique to systematically discuss (20-30 minutes) an event, focus on performance standards, share what had happened and why it happened, and learn how to garner maximum benefit from such an experience. The AAR event analyzed opportunities to sustain and to improve, while identifying steps in planning, preparing, conducting, and using the results as a continuous improvement technique. The AAR was an integrative step in reporting accurate observations, identifying potential strategies, and recommending alternative courses of action. (USAID, 2006)

At the close of the day, each team member authored field notes - a brief narrative of their daily account. Field notes were then reported electronically using standard file names, electronic storage locations, and dates. These field notes were shared with the larger team via a listserv. Post-analyses documentation used field notes and related documents.

Eight AO final reports, one per province, were synthesized for this study. A total of 319 pages of data were reported by Team Borlaug (2008a) personnel over a six month period. This includes one report each from eight provinces as noted below.

The first report AO Vanguard - Babil Province, 30 June, 2008; provided an in-depth, longitudinal examination of the agricultural development sector and related local

agricultural businesses. This method provided a systematic way of looking at events, collecting data, analyzing the findings and reporting the results. This phase was conducted over a 32-day period engaging 50 person-days in Forward Operating Base (FOB) briefings and 176 person-days in field observations. It also included interviewing approximately 300 key agricultural actors plus local farmers and civic leaders. Approximately 2,000 hours of observational data were recorded in daily field notes. (pg 4)

AO Vanguard – Najaf, 26 July, 2008; an in-depth, longitudinal examination of the agricultural development sector and related agricultural businesses. This method provided a systematic way of looking at events, collecting data, analyzing the findings and reporting the results. This phase was conducted during the month of July and engaged 51 person-days in FOB briefings, 269 person-days in field observations and interviews with 97 key agricultural actors plus 14 local farmers and civic leaders. Approximately 636 hours of observational data were recorded as daily field notes. (pg 5)

AO Vanguard – Karbala, 30 August, 2008; an in depth, extensive examination of the whole agriculture, education, and business sectors. This phase provided the team with a holistic view of looking at events taking place in country. Team Borlaug (2008e) engaged in days that were multifaceted, many times going out for on‐site engagement and returning for a meeting in the afternoon. With over 500 hours spent in the field, and half that spend in on-site meetings, Team Borlaug (2008f) successfully met with over 100 local farmers and civic leaders. In addition, the team successfully held two specific

workshops on irrigation/wind power and NGO formation. This was given over 100 local farmers and businessmen. (p. 4)

AO Gunner – Wasit, 30 September, 2008; Team Borlaug (2008a) traveled widely in Wasit, investing 24 days and more than 1300 person-hours in field research. The team studied conditions at more than 70 field sites: farms, rural villages, agricultural supply and processing businesses, irrigation pump stations, and extension demonstration sites. The team learned of goals, achievements and opportunities from government leaders, agricultural unions, local sheikhs, extension personnel and other agricultural experts, veterinarians and owners and managers of agricultural businesses. The team conducted intensive interviews, made field observations and offered technical guidance as appropriate. (p. 4)

AO Long Knife – Dhi Qar, 28 October, 2008; Team size varied from three to five members and conducted seven field missions representing 272 person-hours of direct engagement. The team documented conditions with more than 32 pages of typed field notes. (p. 2)

AO Long Knife- Muthanna, 28 October, 2008; The team made four field missions and seven site visits representing 150 person-hours of direct engagement and an additional 90 person-hours compiling and synthesizing 38 pages of field notes and reports. (p. 4)

AO Long Knife – Maysan, 28 October, 2008; three members of Team Borlaug (2008c) made a limited, short-term assessment of agriculture in Maysan from 5-15 October 2008. The team made six field missions and held one meeting at FOB Garry

Owen, representing 140 person-hours of direct engagement. The team documented conditions with more than 40 pages of typed field notes. (p. 4)

AO War Horse – Diwaniyah, 20 November, 2008: Conducted assessments over a 22-day period engaging 110 person-days in field observations, and interviewing approximately 50 key agricultural actors plus local farmers and civic leaders. Approximately 560 hours of observational data were recorded by six team members in daily field notes. (p. 4)

Data were compiled first by a cursory scan of the emergent themes associated with each of the eight Team Borlaug (2008e) provincial after-action reports. Utilizing emergent themes, Technical Knowledge Areas (TKA) and Social Knowledge Areas (SKA) were developed and topics assigned to respective groups. For this study, social knowledge systems refer to relevant topics associated with living populations, including; Economic Competitiveness, Education, Training and Problem Solving, Security, Cooperation, Governance and Leadership, Land Tenure, Sustainability, System Constraints, Needs Assessment Systems, The Larger System and Engaged Institutions, Change Agents and Agricultural Development, Major Themes and Constructs. Technical Knowledge Systems refer to relevant topics associated with mechanical, technical or scientific areas, including; Water, Soils, Energy, Animal Genetics and Production, Crop Inputs, Mechanization, Credit and Finance.

Each of the eight respective Team Borlaug (Team Borlaug 2008a, 2008b, 2008c, 2008d, 2008e, 2008f, 2008g, 2008h) electronic provincial after-action reports was read

by the researcher. During the reading, comments from each AO report were noted relating to each specific technical knowledge or social knowledge area.

Topics were then numerically ranked in order of most content pages of data to least pages of data, in an attempt to organize the data. Chapter IV reporting order was established by quantifying the total number of pages of content material noted and listing the topics in order from the most pages of content to the least.

This chapter presents the findings of the case study. The initial four sections below are organized to respond to the first four items below. The Larger Systems and Engaged Institutions, Needs Assessment System, Major Themes and Constructs and Vision, Strategies and Tactics.

An additional two sections address the seven Technical Knowledge System reporting areas used in each AO report as well as each of the twelve Social Knowledge System reporting areas used. Additional emergent categories follow, including: SWOT Analysis, Change Agents and Agricultural Development, The Sequence, Factors Leading to Success, Communication, Roles, Use of Opinions, Centralized vs. Decentralized Diffusion Systems, System Constraints, Generalizable Principles, Data Analysis, Summary and Findings information.

The Larger Systems and Engaged Institutions

A multitude of private and public entities are engaged in a host of long and short term rebuilding and developmental efforts to transition Iraq into a globally competitive country. The United States Department of Defense and related entities are responsible for the initial security for daily, on-the-ground developmental efforts. A host of private

and public institutions are engaged including: Iraqi Ministries of Agriculture, Health, Education, and the Ministry of Youth and Sports. These institutions collaborate to combine efforts and talent for the vast array of tasks to sustain and build Iraq. Private and public sector non governmental organizations (NGOs) and governmental organizations (GOs) are charged with the responsibility for developing and delivering substantial human and institutional capacity at all levels. Iraqi governmental entities are crucial to the combined efforts; local, provincial and national groups all lend talent and capacity to the varied tasks and efforts.

Additionally, Iraqi vocation/technical, public and higher educational institution personnel including extension, research and educational professionals embrace the ongoing development. Sheikhs, agricultural business managers and entrepreneurs, government leaders, public and private agricultural businesses were engaged; efforts to sustain, develop, and foster relationships with agricultural educational institutions; agricultural businesses and agricultural associations and unions, input supply businesses (e.g., seed, pesticides and fertilizer), food processing plants, and machinery construction and repair facilities are all recognized as vital pieces of the reconstruction puzzle

Needs Assessment System

The Borlaug Institute, in concert with the INMA project was responsible for the evaluation efforts in the Eight Iraqi provinces in Southern Iraq. The team worked with the division command and was supported by MND-C units, the Task Force for Business and Stability Operations (TF-BSO) and the United States Department of Agriculture Foreign Agricultural Service (USDA/FAS).

In concert with security obligations provided by the Department of Defense (DoD), the Texas AgriLife Research of the Texas A&M University System, representing The Borlaug Institute for International Agriculture, toiled to provide the command of Multinational Division Central (MND-C) with detailed, comprehensive technical support in its ongoing civil affairs and counter-insurgency missions. The mission was to note, describe and document observed site-specific agricultural development conditions, recommend potential strategies and propose short-term and intermediate recommendations for the MND-C area of operations in Iraq. Additional and continued ongoing efforts relating to needs assessments will be needed to sustain and advance Iraq's future. As Iraqi agriculture continues to evolve and expand, so must the critical entities that facilitate this change.

Major Themes and Constructs

Major themes are centered on commonly identified needs and issues identified by Iraqi agriculturalists and related laypersons. Constructs are valued and prioritized by their related critical value and potential impact on related system enterprises. Activities having critical impacts in relationship to adding infrastructure dimension to building human capacity include education and training-development and delivery; sustainable water and electricity infrastructure development and provision; national, provincial and community governance development and enforcement; long term natural resource policy development; market development; and fair trade policy development. The recognized need for comprehensive land tenure and management policy development and reform is

paramount. Funding for such project opportunities dictate the direct value of each specific construct.

Vision, Strategies and Tactics

The vision and related efforts devoted to Iraqi developing substantial economic growth and stability are shared by many. The long term planning efforts and foresight into such activities by private and governmental entities that support and embrace the sustained long-term development efforts and strategies are critical.

Current apathy and business as usual mindsets must be replaced with supportive and creative educational and support systems that parlay negatives into productive positives, The prioritization of youth development and extension operatives to assist in elimination of indecisiveness and apathy will help to pave the way to economic and social success. The support in developing human capitol is not only important in developing a competent workforce; it is paramount to sustain stability and attract foreign investment and development funding and opportunities.

Tenacious ongoing security will be necessary in bolstering the reduction and eventual loss of ISAF security efforts. With a reduced threat of sectarian violence, peace and prosperity are a more likely to occur with agricultural development to follow.

Substantial and sustainable governmental policy evolvement and acceptance is needed to facilitate and promote social growth and justice. The lack of transparent agricultural sector policies and regulations will continue to be a major obstacle in the progressive development and guided direction of the Iraqi agricultural sector.

Success is hinged on prolonged efforts that address developing and transitioning to a free market economy; which, in turn, will assist in development of and support the establishment of fair market trade rules and regulations. The development and implementation of these rules and regulations will assist long term economic fairness, in which all may participate and profit, and thus are essential to success in Iraq.

Open, transparent and sustained communication with the laypersons and agriculturalists of Iraq will be critical in charting the success of future developmental efforts. Development and implementation of strategic planning and directives that incorporate and diffuse extension programming and technical expertise into the Iraqi social fabric are essential in developing infrastructure. The utilization of long term planning and directives are crucial to the vitality of the agricultural sector in Iraq.

The provision of viable options and common sense educational opportunities provides long term sustainable hope for the people of Iraq, for whom, without any other means of battling the insurgency, desperation prevails.

Technical Knowledge Systems

For this study, Technical Knowledge Systems refer to relevant topics associated with mechanical, technical or scientific areas, including: Water, Soils, Energy, Animal Genetics and Production, Crop Inputs, Mechanization, Credit and Finance.

Social Knowledge Systems

For this study, social knowledge systems refer to relevant topics associated with living populations, including: Economic Competitiveness, Education, Training and Problem Solving, Security, Cooperation, Governance and Leadership, Land Tenure,

Sustainability, System Constraints, Needs Assessment Systems, The Larger System and Engaged Institutions, Change Agents and Agricultural Development, Major Themes and Constructs.

Both the technical and social knowledge systems were self identified by frequency of their appearance in each of the respective after action reports. These technical and social knowledge systems were identified and aggregated due to their immediate subject relevance and commonality across the eight southern Iraqi provinces of this study.

SWOT Analysis

A SWOT analysis is one method used to evaluate the *Strengths*, *Weaknesses*, *Opportunities,* and *Threats* involved in a project. The four elements listed below are outline SWOT analysis as used in this study.

Strengths (Internal)

- What are known strengths?
- What are known advantages?
- What is done well?
- What relevant resources are available?

Weaknesses (Internal)

- What are known weaknesses?
- What are known disadvantages?
- What is done poorly?
- What relevant resources are lacking?

- What should be avoided?

Opportunities (External)

- What potential opportunities exist?
- What could be improved?

Threats (External)

- What external threats exist, if any?
- What external competition exists, if any?

Change Agents and Agricultural Development

Change agents are instrumental in facilitating change. Change agents are often considered or known as content knowledge specialists with human dimension flair. For a change agent to be truly effective, they must have an intimate knowledge of their audience and subject matter. Today's change agent likely uses a multitude of media to reach their audience in addition to the simple word of mouth. Rogers (2003) describes the change agent as an individual who influences clients' (followers') innovation-decisions in a direction deemed desirable by a change agency. (p. 370)

With most international agricultural development performed by government agencies and related NGOs, a change agent is responsible for the approach and related actions associated by these development groups. The change agent is interested not only in facilitating change but also wants to better the follower's current situation, slow diffusion and negate any undesirable innovations.

The Sequence

Rogers (2003) notes seven ideal roles for the change agent which can be identified in the process of introducing an innovation. (p. 370) These roles include:

1. To develop a need for change,
2. To establish an information exchange relationship,
3. To diagnose problems,
4. To create an intent to change in the client,
5. To translate an intent into action,
6. To stabilize adoption and prevent discontinuance, and
7. To achieve a terminal relationship.

Factors Leading to Success

Change agent efforts are critical to success. Perceived change agent success in adoption of innovations by the follower (client) is positively related to the extent of change agent effort in contacting followers. Follower orientation is a key to a change agent's success in securing the adoption of innovations by followers. Success of a change agent is positively related to a follower's needs rather than change agency's needs.

Compatibility with Followers' Needs

Change agents' success in securing the adoption of specific innovations by followers is positively related to the degree to which a diffusion program is compatible

with followers needs. If followers recognize a true need and worthy, seamless application, it will likely be adopted.

Change agents' should be aware of their followers' felt needs and adapt their change programs accordingly. They should not cease efforts in helping to form followers' needs for the betterment of their cause. Change agents' success in securing the adoption of innovations by followers is positively related to the credibility witnessed by the follower. A change agent needs to be seen as credible in the follower's eyes to be successful.

Change agent empathy – success is positively related to change agent empathy as directed towards the follower group. The adage of: "they don't care how much you know, until they know how much you care" is applicable because the follower must have a sense of empathy, or the change agent will not be successful

Once opinion leaders adopt an idea and critical mass is reached, the change agent can begin their retreat.

Communication

The empirical role of the change agent is to help bring about and facilitate change. Often, change agents diagnose major issues and related pitfalls, including motivation, empathy, understanding and related skills. The change agent then offers a clear approach to the project implementation which is capable of producing change.

Change agents are often technical experts with a passionate vision. Most are able to clearly communicate need, are astute listeners, are well suited and able to

accommodate for individual differences and are able to debate in a fair, clear and civil manner under difficult and trying circumstances.

Roles

Opinion leaders play the role as a model because their ideas and behaviors serve as an impetus to others. Opinion leaders often communicate messages to a primary group and influence the attitudes and behavior change of their followers. It is often advantageous to use an opinion leader in hastening the adoption of an idea, strategy or message.

Uses of Opinion Leaders

Opinion leaders are often used to sway opinion and propose change. Often at the forefront of progressive change, opinion leaders help to sway individuals or groups of individuals in favor of adopting change. Often that change may take the form of an innovation, basic or applied research, technological transfer, information dissemination, diffusion and networking.

Centralized vs. Decentralized Diffusion Systems

Two systems exist for diffusion of innovation: centralized and decentralized. Decision making in centralized systems is concentrated at a high level, while decentralized systems feature wide sharing of power within the diffusion network. In centralized systems diffusion is vertical--from the top down, as innovations emerge from formal R&D projects. Decentralized systems use horizontal diffusion, as local experimentation is often the innovation source. Centralized systems favor technology

push, where "needs" are defined at a high level while decentralized systems use technology pull, where needs are defined locally. (USDOT, 2010)

Innovations which cannot be easily modified or re-invented are best diffused using a centralized system. Innovations which lend themselves to modification are best diffused by a decentralized approach because such an approach allows local adaptation of innovations to reflect local needs.

Centralized Systems

1. Overall control of decisions is by national government administrators and technical subject matter experts.
2. Diffusion is from top down experts to local users of innovations.
3. Innovations come from formal R and D conducted by technical experts.
4. Decisions about which innovations should be diffused are made by top administrators.
5. An innovation centered approach using technology push which includes emphasizing needs created by the availability of the innovation.
6. A low degree of local adaptation and re-invention of the re-invention is used for innovations as they diffuse among adopters.

Decentralized Systems

1. Wide sharing of power and control among the members of the diffusion system and client control by local community leaders is implemented.
2. Diffusion innovations are shared through horizontal networks of peers.
3. Innovations come from local experimentation by non-experts, who often are users.
4. Local units decide which innovations should be diffused on the basis of their informal

evaluations of the innovations.

5. A problem centered approach is used where technology pull is created by the locally perceived needs and problems.

6. A high degree of local adaptation and re-invention of the innovations is used as they diffuse among adopters.

System Constraints

Pervasive lack of physical infrastructure, including access to potable water, reliable electricity, and common fuel sources are major impediments for the Iraqi people. Included in lacking infrastructure is the noticeable absence of modern and safe processing facilities for the wholesome production of animal and plant protein. Lack of cold-storage facilities hamper the production and distribution of fresh, perishable foods the Iraqi citizens crave. Outside, foreign market competition and the lack of developed transportation routes and roads are often expressed as major obstacles to Iraqi agricultural growth. Additional system constraints include poverty, lack of public health services and sanitation, and a perceived lack of effective governance and related policy development. Lack of communication between groups is a major impediment to progress. This lack of communication is often mistaken for ill will or irreconcilable differences between major Iraqi factions when, realistically, it is often simply a lack of ability to gather and communicate needs and differences.

Generalizable Principles

The Iraqi people desire peace, stability and adequate prosperity to provide for their families. Education and a skilled work force are culturally valued and are highly desired and sought after. Research, extension and university education programming are important and valued to the Iraqi producer; the Iraqi agricultural scientist often seeks to communicate and collaborate with extension and producer/production personnel. Basic, rudimentary education is of paramount concern to gain basic employment including youth development and vocational skills training.

Data Analysis

The antecedent selected for reporting the case was a systems approach discussing the composition and impacts and moves closer to the details of the environment.

A total of twenty-two topic areas are reported. The results reported in this chapter are divided into nine topics; two of those nine topics; Technical Knowledge Systems and Social Knowledge systems, contain fifteen sub-topics; seven and eight each, respectively. Each of the nine sections, and corresponding subsection were reported using a Strengths, Weaknesses, Opportunities and Threats (SWOT) format approach and table detailing specifics relating to the SWOT areas. In addition to the SWOT areas, corresponding tables include power statements succinctly addressing each of the SWOT questions.

Years of conflict and disregard have left much of the Iraqi rural infrastructure in perilous disrepair, degraded the environment, and forced much of the rural population into subsistence agriculture, food-insecurity and crushing poverty.

The prognosis is not entirely negative as there have been strong interventions in infrastructure, governance, and agriculture. However, their impact has been diminished by a lack of coordinated activities. Iraqi and related entities must now work in a collaborative manner to increase rural incomes, create infrastructure, and deliver services and security on a national level. Potential deliverables and opportunities are discussed below.

Crop Inputs

For this study crop inputs are defined as inputs to assist directly in producing a plant or crop that can be grown and harvested for sale or subsistence. In Iraq, several crops exist including, but not limited to, fruits, vegetables, cereal grains and forages.

Strengths: Most Iraqi farmers seem to be pleased to be back on their land and doing what they have done for generations – farming. Continued use of sheikh-influenced agricultural associations will assist producers in maintaining production continuity and stability of land use as well as provide access to much needed inputs and capital for farming activities. Continued implementation of producer-elected boards of directors will help promote stable production practices in many provinces across Iraq. The stability provided by local agricultural unions and associations will bolster the ability to promote loan incentives to increase lending to agricultural sectors.

Weakness: A general disregard for routine maintenance and overall machinery disrepair and the lack of proper tillage and planting implements are major impediments to production in most rural areas of Iraq. Often farmers desire but are unable to receive agricultural loans due to lack of land ownership and related land tenure issues; most

producers express the desire to expand operations but lack access to necessary capital, remain at their current production level. A majority of farmers do not own their land and therefore are not able to use it as collateral for agricultural loans.

Improper labeling, handling or careless use and application of dangerous agricultural chemicals is a potential problem for Iraqi producers; as is the access to proper chemicals and related labeling information in Arabic print. Infrastructure to support reliable and efficient cold storage (for perishable crops and related storage) is lacking. Cold storage is practical to provide market stability and flexibility when sending products to market and maintaining quality products with, increased shelf life. Crude and often totally lacking transport infrastructure exists and is an obvious impediment to timely and reliable transportation of goods to market. A disconnect exists between the universities, extension, and producers; often in the form of little or non-existent support from Iraqi government and extension personnel. This lack of support exacerbates poor quality and low production practices. Mismanaged or neglected lands are notable limitations in Iraqi production scenarios.

Opportunities: Certification of input suppliers as legitimate providers of technical based information to farmers by developing training courses as part of producer certification programs. Promotion of implementation of alternative crops for use such as; pulse crops, cowpeas, Milo, and grain sorghum. Promote and implement the production and use of oilseed crops (including sunflower, canola, peanut, cotton, and soybeans) as means for additional or alternative crops. Where feasible, encourage the promotion and development of date production and processing for at-risk, vulnerable lands the

implementation of a potential CRP type program may be justified. To provide national market protection and security, pursuit of the development of a tariff, import tax or government subsidy or buying program to address the issue of unfair trade and competition known to exist in Iraq. Pursue and promote varietal testing by government and university entities bolstering producer efforts relating to promising new seed varieties like salt-tolerant wheat with resistance to rust and mildew. Implement and teach new innovative crop rotation and integrated production systems; which hold promise over specialized monocultures, to help reduce the need for synthetic fertilizers and pesticides, while increasing overall productivity on smaller plots of land. Concentrate efforts in teaching basic literacy skills and employing the use of hands-on training to aid producers in selecting cropping systems and working the land efficiently. Research and implement potential value added opportunities in product processing like tomato processing, production of date sugar, pickling vegetables, cucumbers, and okra; and corn oil and cereal grain utilization for potential livestock feed use to create a more efficient system.

Threats: Lack of quality inputs like low-quality and low germination rate, broken and insect damaged seed and inadequate rates of fertilizer application are limiting factors in production efforts. Unfair competition via unregulated imports and excessive export tariffs from neighboring countries all pose serious threats to the stability of the Iraqi agricultural sector. Lack of total or limited access to water for irrigation and livestock use as well as continued, prolonged drought conditions are major liabilities to producers. Continued misuse and lacking enforcement of potent agricultural chemicals is a

recognized hazard by all production entities in Iraq. As shown in Figure 1, the lack of available producer based subsidies, the extreme costs of related agricultural inputs, general access to foreign, low-cost imports and little opportunity to produce value-added products, will be of substantial discourse in achieving sustainable practices in Iraq's agricultural economy. Available machinery for on farm production is either mismatched, out of maintenance, or virtually nonexistent. Most production in Iraq is habitually completed by traditional methods; underutilizing the available land base and planting capacities. Most Iraqi farmers lack the needed expertise necessary to implement new technologies related to modern agricultural practices.

Strengths: Agricultural associations Content farmers	*Weaknesses:* Equipment and maintenance Land tenure is lacking Non-Arabic labeling Content farmers
Opportunities: Potential producer education Cold storage development Alternative crop potential Tariffs on outside products	*Threats:* Lack of producer credit Lacking land tenure policies Outside market competition Farmer/Government disconnect

Figure 1. Crop Inputs Perceived Strengths, Weaknesses, Opportunities and Threats.

System Constraints

For this study system constraints are defined as impediments like a pause or break in notable progress. In Iraq, several system constraints exist including: limited infrastructure, lack of water and lack of governmental support.

Strengths: Sheikhs/Boards of directors of agricultural associations are fairly well organized and strongly influence community involvement and decision making processes and should be further exploited.

Weaknesses: Lack of water and electricity and frustration with the governmental support relating to these services is common. Farmers complain by nature yet many have legitimate concerns about the lack of reliable electricity, the degradation of soils from salt buildup, the increasing cost of agricultural inputs, and the fixed price of wheat. Many hold perceptions of unfair competition in local markets from imports. The most pressing issues in the minds of farmers and agricultural communities are water, youth development, improved seed for crops and animal brood stock, animal health and diagnostics, and the development of indigenous talent for the extension service, agricultural colleges, universities, NGOs, and agricultural associations. Limited water infrastructure for optimizing agricultural production inhibits producers. Pumping capacity and reliability are the major characteristics of a lacking water supply; pumping capacity is limited by generator capacity, fuel shortages and infrastructure (canal and weir) disrepair, field drainage and silted tile systems are in disrepair. Land mismanagement and neglected farming practices are a problem in areas of displaced farmers. Youth are a constraining variable; because students are often unaware of employment opportunities and job market trends and opportunities.

Education is valued in Iraq, yet many universities do not actively seek to recruit students. Vocational based schools do exist, however due to financial constraints, distance and antiquated equipment and facilities, most youth choose not to attend. Students in vocational schools and universities often spend a majority of their time in theory-based education with little hands-on, applied experiential learning. Educational programs for women and young girls are virtually non-existent. Often, little coordination

and lack of earned trust exists between Iraqi farmers and extension which poses potential problems.

Animal producers are lacking basic knowledge and applied application of production skills. Basic production practices and quality assurance are virtually non-existent. Internal and external parasites, little use of vaccines, nutritional deficiencies, diseases, poor reproductive efficiency/performance, and communicable diseases are common in all three major species of livestock (sheep, goats, and cattle/water buffalo). Few farmers have received any training on livestock health prevention or recommended vaccination schedules. Meat and fluid milk sanitation practices are virtually non-existent. Custom animal harvesting and handling of byproducts is often unsanitary and inappropriate. Poultry production is often hampered by lack of usable facilities and the availability of local feeds. Most poultry is imported due to lack of production inputs.

Opportunities: New crop varieties and tillage practices need to be explored (oilseeds/pulse crops/soybeans). Explore new opportunities for Iraqi vegetable farmers and date producers may help some producers. Agricultural associations are recognized as change agents and show great promise. Inland water sources pose a formidable opportunity for aquaculture production

Threats: A national commitment to systematic reclamation is essential for agricultural vitality. There is little understanding of small business plans and their implementation. Farmers are unclear on how to use bank loans to further develop and diversify businesses with land ownership and tenure being a limiting factor for loans. Literacy is a limiting factor for many on-going educational and training program

opportunities. Lack of appropriate agricultural policy is a notable shortcoming. Lack of transportation and transportation infrastructure and agricultural imports from neighboring countries is a real threat to Iraqi sovereignty and production. Lack of mechanized agriculture equipment, machinery knowledge and investment in maintenance and improvement is a recognized problem. Absence of meaningful employment is of notable concern, with a notably high unemployment rate. Lack of water quality, quantity and use practices is of major concern. As noted in Figure 2 critical need for basic rural development to meet fundamental human needs exists; great need for potable drinking water, primary health care, primary schools and improved roads, especially in rural areas are all threats to Iraqi sustainability and growth. Rapid urban growth may pose a significant threat via further impoverishment of rural areas. Excessive soil salinity and desertification pose severe threats to production of sustainable crops in most areas.

Strengths: Agricultural union support	*Weaknesses:* Lacking infrastructure (water/electricity) Unfair competition Lack of producer knowledge (agriculture)
Opportunities: Producer education New crop variety interest Balance of employment and technology	*Threats:* Lack of youth development opportunities Lacking access to credit Lacking access to employment Urban migration

Figure 2. System Constraints Perceived Strengths, Weaknesses, Opportunities and Threats.

Education, Training, and Problem Solving

For this study education, training and problem solving will be defined as a logical approach to overcome obstacles and formal and non-formal teaching of skill sets

and applications of higher order needed in day to day activities. In Iraq, several education related needs exist including formal, non-formal, vocational-trade based, extension, youth, women and producer opportunities.

Strengths: Historically educating Iraqi youth has been highly valued. Education is critical to implementation of strategies. Continual, ongoing education and training from extension agents and university officials is paramount to achieve success. Parents practice the time-honored generational approach to agricultural education, in that a son learns good practices from his father. Universities and colleges can be good venues for testing new crop varieties. A small yet viable cadre of professional extension engineers and administrators currently exist to provide technical advice and training in new agricultural technologies. Youth are likely and willing implementers of change; the transition from a command economy to an open economy means that many older producers will have to look to the younger progressive producers for their leadership.

Weaknesses: Most students lack awareness of employment opportunities. A pervasive belief among students is there will be a government job awaiting them upon graduation. A majority of Iraqi student are not aware of potential opportunities in the local job market. Iraqi educational institutions do not actively recruit students into their institutional programs or institutions. Few existing vocational secondary schools for agriculture exist in Iraq; those that are operational are not in rural areas. Potential students cited three reasons for not attending these schools: finances; distance (from home); and antiquated curricula, texts, equipment, and technology. Producers are likely

not educated or trained sufficiently to be productive resources supporting their own agricultural development.

Little, if any, educational opportunities exist for Iraqi women, especially those in remote and rural areas. Additional development of the extension programming is of utmost importance to the progress of all areas of production agriculture in Iraq. Formal extension programming needs to foster a more comprehensive and aggressive role in purveying new agriculture technology. This effort should aggressively target high need areas identified within provincial governments and encourage more emphasis to be placed on training agriculture associations and related farmer organizations.

Development and implementation of training and demonstration programs to upgrade the skills of the extension service personnel are needed. Demonstrations and trial opportunities for universities and extension service to boost productivity and efficiency in areas like horticulture, aquaculture, vegetable production, poultry production, land/soil reclamation, animal production best management practices and mechanized agriculture production are sorely needed. Few international exchange programs exist for Iraqi students. Lack of time and access e restrictions are issues cited by Iraqi youth relating to education completion.

Opportunities: Facilitate and encourage collaboration among university faculty members, technical college faculty, extension faculty and agricultural associations to deliver and demonstrate accurate and timely technical information to individual producers. Iraqi women play a critical role in production of rural agricultural goods and services; educational opportunities for their betterment are of paramount concern. In

addition to women's needs, specific programs addressing widow's opportunities are of concern. As noted in Figure 3, mechanized and market-oriented agricultural education is paramount to Iraq's future; as the Iraqi economy moves toward niche and value-added processing and commercial scale production facilities, less manual labor is required, and more entrepreneurial and critical thinking skills will be necessary. Youth development and education opportunities are lacking and of great value to Iraqi society, especially those relating to extracurricular extension, teaching and community programming. Training in agricultural skills and computers are needed. Organize and promote funding of proven, successful youth groups that parallel the Boys and Girls Clubs, 4-H, FFA and others and that can be established by business leaders / sheikhs physically based at existing schools or newly built community centers, possibly located at the agricultural association complexes. Provide intra-curricular and extra-curricular activities that stand to potentially boost school attendance and reduce exposure to unnecessary and unwarranted negative and potentially dangerous influences. Develop and incorporate school curriculum based on individual and group projects which emphasize entrepreneurial skills and methods, youth development, critical thinking, professional development and leadership. Develop and implement a needs-based vocational skills set model for illiterate workers centered on safe work practices. Develop and establishment of college/provincial higher education centers to aid in the identification of potential youth, who should attend college, assistance in applying for college or vocational school and actively seek potential scholarships, is necessary. Iraqi institutions of higher education need to examine and reevaluate their formal and extension based educational

programs in response to newly evolved established needs and demands. Short term, certificate based education programs addressing urgent critical need (water and electrical infrastructure, mechanized production, food processing and cold storage) areas of specific production need to be established and funded. Research based facilities need to be better used and staffed.

Continued education for professional administrators and engineers in animal production, animal health and food safety areas is encouraged; as is the recognized need to assist head extension administrators with developing plans of work by extension engineers for planning, conducting, and accountability and assessment purposes.

Threats: Many Iraqi students are uncertain of opportunities for self improvement; therefore, they neither seek self improvement nor recognize its importance. Illiteracy rates are of concern. Extension service and agricultural association programming provides very little direct education and training for Iraqi producers and processors. Limited infrastructure and facilities are issues related to extension and higher education programming abilities. Iraqi Post Secondary Agricultural Education needs to address shortcomings (poor facilities, limited infrastructure, little to no student advising and recruitment, little hands-on education and antiquated curricula). Viable employment opportunities for college graduates in the agricultural sciences need to be established and groomed. Lack of communication fosters absence of collaboration and growth; increased, direct, quality communication needs to be fostered and implemented. Educational issues affecting Bedouins and related ethnic populations are a concern. Bedouins are most concerned that young adult males are illiterate and not qualified to

work most jobs, thus predisposing them to potential negative and dangerous outside influences. Intervention must occur to de-escalate resentment and perceived disparity between opportunities for urban versus rural youth, and generational differences in perceived lack of education and related opportunities. A negative bias must be debunked related to the perceived ability of rural students to attend and adequately perform in higher education endeavors. A sharp focus and methodical approach is needed to identify which farmers should be prioritized for immediate development.

Strengths: Education is valued Extension education potential Informal education opportunities	*Weaknesses:* Limited infrastructure Lacking methods and modern curricula Expense Distance Lack of women/youth programs
Opportunities: Extension involvement Learning by doing Youth educational opportunities Women's educational opportunities Vocational educational opportunities Governmental/private agency cooperation	*Threats:* Lack of educational opportunities Entitlement mentality of youth High illiteracy rates Lack of employment opportunities

Figure 3. Education, Training and Problem Solving Perceived Strengths, Weaknesses, Opportunities and Threats.

Animal Genetics and Production

For this study animal genetics and production are defined as associate factors and inputs relating to animal production for meat, milk, fiber and draft purposes or a mix thereof.

Strengths: Aquaculture is a viable enterprise in most areas of Iraq. Iraq's economy provides for increased protein consumption. Locally bred Awassi lamb and

mutton from Iraq are reportedly the most highly desired of all fat-tailed sheep breeds. Although meager, a government subsidized feed program does exist for livestock.

Weaknesses: As noted in Figure 4 on p. 69, there is clear frustration with the lack of support services for livestock producers. Lack of access to commercial feedstuffs for animal application is of concern. The lack of a production census is a weakness relating to service provision and related development and education efforts relating to the livestock industry. Animal diseases are prevalent and there is no preventative practices regarding production efforts.

Opportunities: Develop small-scale multi-purpose feed mills that can be used to produce feed for aquaculture and poultry farming. Many farmers and agricultural communities prioritize animal brood stock, animal health and diagnostics as an area in need for improvement. Better control of disease and improved animal health are promising near-term strategies. There are numerous opportunities to further develop inland water bodies like reservoirs, rivers, and irrigation canals for expanded aquaculture production. Use imported carp/bunni varieties with superior brook stock performance for hybridization with locally adapted carp/bunni strains. Bee production and small scale fresh poultry and single-family quail production flocks should be encouraged and promoted; especially for women, widows, and young children. Provide producer and supply side verification/certification as legitimate providers of technical information to farmers by developing training courses as part of a certification program. Develop fish demonstration plots and projects. Develop aquaculturalists in training by holding technology transfer and demonstration field days. Use reclaimed land for sites to place

ponds for fish production. Encourage collaborative approaches to agriculture and/or poultry associations that can coordinate vital inputs to poultry production and ensure product quality. Consider introduction of Coturnix quail. Establish and implement Best Management Practices related to production and processing of livestock, milk and birds. Work to align livestock production as a parallel means of income, rather than a secondary or tertiary means. Study the opportunity and logistics associated with cooperative sire batteries for producer use. Promote education and utilization of livestock Expected Progeny Differences (EPDs) and artificial insemination when possible. Promote the use of dual purpose dairy breeds. Use local extension personnel and other change agents who understand the Iraqi values and beliefs system related to animal production; this would best influence change in attitudes and responses to change in animal technologies used by provincial farmers. Provide youth aggressive opportunities for exposure to the animal sciences. As change agents, youth provide the expedited segue for improvement in production practices. Provide exposure to and opportunities to participate in value added and niche marketing of specialized protein products. Collaborate with local high schools, universities, colleges, and technical institutes, production associations and agricultural unions to redesign curricula in animal science to provide model/demonstration facilities and animals and to include laboratories in appropriate subjects. Gather and train a local cadre of qualified producer's to assist in and address with area veterinarians routine production issues and related tasks. This symbiotic agreement will help facilitate best management practices and quality assurance in all areas/species of production. Colleges and Veterinarians need to better

collaborate in disease diagnosis, treatment services and outreach for Iraqi producers. Work to establish cost effective, non-duplicative CVM/DVM programs and programs of study. Study, plan and implement an effective and feasible solution for the sanitary and safe handling and disposal of animal processing byproducts. Major revision and overhaul of most Iraqi processing facilities to meet food quality standards (HACCP) are needed. Sanitary and poor or lacking mechanized production facilities are noted as impediments to the provision of fresh, wholesome animal protein to the Iraqi people. A feedlot and or backgrounding/growing facility should be planned and implemented and replicated, if found to be practical. Study and promote the potential use of *Bos indicus* breeds and/or composites to be tested for outcross with the "grade" Friesian cattle and other breeds. Consider the use of cooperatives and livestock chain programs for the betterment of livestock producers.

Threats: Extension service as created and fostered prior to the U.S. military presence is not trusted by farmers as a source of information. The lack of reliable electricity is perhaps the most important factor that will allow for commercial poultry production. Outside imports of fresh chicken are detrimental to local producers. Lack of cold storage facilities hampers the production and storage of fresh meats. Farmers are usually disinterested in new technologies relating to livestock production, as they often recognize livestock as a secondary source of income. Endo and exo-parasites, nutritional deficiencies, diseases, poor reproductive efficiency/performance, and communicable diseases are common in all major species of livestock in Iraq (sheep, goats, and cattle/water buffalo, camel). Education, best practices and care must be promoted and

taught in the processing and handling of product and post-processed products of animal protein. Mishandling of animal proteins is of real concern. Frustration with lack of governmental concern and assistance, as well as lack of incentive is driving producers out of the agricultural production sector. Drought is a major issue of concern in most production scenarios across Iraq. Inconsistent distribution commodities and malnutrition may be becoming a serious problem among the Bedouin population. Lack of access of water for livestock as well as potable water for human consumption is of paramount concern. Livestock range conditions need to be evaluated and a grazing management program put into action and enforced. Shrinking herd size and associated loss of producer capitol/equity in herd reductions needs to be addressed. This loss of equity due in part to prolonged drought and deterioration of range conditions, lack of feed and developed livestock water is deemed a major threat to livestock producer's viability and lifestyle.

Strengths: Aquaculture Lamb/mutton production Poultry Production	*Weaknesses:* No application of EPD practices Production is not a primary enterprise Poor governmental support Poor animal health program Lack of processing facilities Poor sanitation of existing facilities
Opportunities: Development of commercial feed mills Teach/promote proper production practice Bee/honey production Fluid milk production Youth involvement in Animal Science	*Threats:* Unfair trade and imports Lack of extension trust Lack of water for production Ongoing/extended drought

Figure 4. Animal Genetics and Production Perceived Strengths, Weaknesses, Opportunities and Threats.

Governance and Leadership

For this study governance and leadership will be defined as the ability to lead and or direct or govern as an individual or entity.

Strengths: Iraqi leaders presently place their priority on domestic welfare, peace and economic stabilization and prosperity rather than on global economic competitiveness; this is achieved via input subsidies, guaranteed product prices and food distribution. Tariffs on outside, non-Iraqi produced commodities are being considered. Superior quality of such agricultural products as rice, dates and lambs are a source of national pride and well recognized and received by the international community.

As noted in Figure 5 on p. 76, the use of agricultural association centers for programs (e.g., technical training, business training, leadership and entrepreneurship activities) and surrounding land for project plots administered by extension service and other educational faculty is highly recommended and welcomed. Sheikhs and agricultural association boards of directors strongly influence the community involvement and decision making processes. Agricultural associations have evolved to meet specific needs of producers in specific communities. Agricultural associations have been legitimized; have procured non-governmental organization status in most provinces; and exhibit promise as change agents for moving crop production enterprises toward a viable industry. Current agricultural associations oversee and manage the fair distribution of inputs while providing the individual agriculturalist more purchasing power due via bulk purchasing. Modest regional plans that serve to prioritize investments and innovations in agricultural sub-sector exist, but are in need of oversight

and revision. Both for-profit and non-profit groups play viable roles in the production sectors of the Iraqi economy. The Iraqi Poultry Producers Association is an example of the effect a national association can have on both micro and macro level policy. Current polices are in place regarding major issues including regulations and implementing service, soil testing, plant and animal disease diagnostics, pesticide and related agricultural chemical standards and testing services. Benefits from selective Iraqi agricultural policies have helped to reduce poverty and hunger. Iraqi Ministry of Agriculture staff communicates their interest and intent to reduce governmental involvement in agricultural input supply through a programmed reduction in rates of support. Global competitiveness in quality agricultural products and their related market value may be reality for a select few commodities. The Iraqi population is dependent upon agriculture; it is important agriculture remains viable. To maintain its viability; leaders should consider the idea of using petroleum based resources to bolster the agricultural sector. The value and responsible use of subsidies, low interest loans or lines of credit need to be promoted and used to "jump start" the agricultural sector in Iraq. The establishment and use of agricultural advisory councils to help bridge the gap between government and farmers is a promising strategy.

Weaknesses: The lagging development of indigenous talent for the extension service, agricultural colleges and universities, NGOs and agricultural associations, high unemployment, is expressed as a concern of many producers in Iraq. Local leaders need to have the opportunity to speak and be heard; national leaders should champion such opportunities and implement ideas and input when and where deemed possible. A need

exists for financial and distribution oversight performed by the government to regulate the agriculture associations. The use of elections to facilitate civic education on a micro level is recognized and encouraged. Generic government agriculture policies, specifically input subsidies, lack of program flexibility relating to machinery, infrastructure and land tenure issues, contribute to insufficient incentives for efficient production. The use of participatory management programs that empower producers to manage production variables and infrastructure and make decisions regarding their destiny has been positively noted. Efforts to avoid duplication of effort among multiple extension programs should be pursued and duplicate programmatic efforts evaluated and adjusted accordingly.

Opportunities: It is recommended that agricultural associations' leadership serve as farmer representatives in irrigation districts, and this type of leadership be promoted and established in other districts. Districts can use their collective voice to drive change and use multi-stakeholder dialogues to solve water resource management issues and develop water policies. The implementation of a local community center model that would attract youth by offering sports clubs and activities and provide a teaching a curriculum that suggests life planning and developing personal skills is possible. Central, community- based organizations members, such as agricultural association members, are recommended to serve on the board of directors community centers enabling them to suggest possible vocations based on educational and tangible skills. Use of existing programs offered by the extension service (e.g., honey bee production, seed production and quail production) would provide a solid basis for community center programming.

Continued use of sheikh-influenced agricultural associations with implementation of producer-elected boards of directors is encouraged and recommended and promotion of loan incentives to increase lending to agricultural associations and producers they serve is needed. Agricultural associations should have more support and be used to reach their potential; the ability for these entities to direct, manage, educate and serve their production clientele is not yet fully realized due to lack of a unified vision. Agricultural associations should be lead institutions that spearhead to solve pressing land tenure and trust issues.

It is recommended that relationships be developed and fostered among local universities and technical colleges, the regional and local offices of the extension service to develop collaborative demonstrations of new technology and plant variety trials that potentially stand to be beneficial to local producers and agricultural associations. Custom private service providers (aerial and ground application spraying, chemical application services, artificial insemination and related livestock services) that would offer a long list of potential agri-services is a viable alternative to the current lack of services. Incentives to join agricultural associations, like provision of discounted inputs and availability of technical expertise should be promoted and advertised. Provision of specific, hard to find retained services, to be hosted by agricultural association can be used as a promotional membership and recruitment tool. Poultry associations should be arranged as providers of vital inputs necessary for poultry production assisting to ensure quality products and to assist in cost sharing and cooperative equipment utilization. Development of collaborative efforts among extension personnel, private and

governmental veterinarians, university and college faculty members, researchers and farmers' associations to share and implement recommended vaccination and parasite control/treatment schedules are encouraged.

Local agricultural associations are encouraged to retain services of veterinarians for disease diagnosis and treatment. Plans to increase private vendors, Iraqi ministries, provincial government, and agricultural associations input and eventual guidance of development and sustainability efforts are encouraged. Options exist to differentiate the agricultural economy into three sub-sectors; (a) long term input- and/or product price-supported sector comprising field crops, primarily grain and oilseed; (b) a free market sector comprising of animal agriculture and horticulture, with intermediate term protection of select horticulture crops; and (c) immediate term promoted sector utilizing select products of nationally recognized quality, such as dates, lamb and rice. Responsibility for irrigation water supply, which will support all sectors, will remain public. Recommendations for a national transition plan are necessitated by a recognized need to develop a transitionary method for farm inputs and outputs from a central to a more democratic business model. Dialogue between national and local agricultural leaders concerning future views, shared goals and visions for Iraqi agriculture need to be identified and facilitated. Independent Agricultural Associations hold the potential for growth in terms of input procurement, machinery maintenance and wholesale purchasing power. Further investment in the creation and establishment of NGO status Agriculture Associations needs to be continued. A recognized and overarching goal is to move the Iraqi agricultural economy forward and toward greater responsiveness and to shelter

price variance and dependency on subsidized inputs. Encourage support for the Bedouin population from the Ministry of Agriculture and Provincial Government; enabling Bedouins equal access to water, medical, veterinary and educational services as well as emergency feed for their livestock. Various potential sources of funding for provincial agriculture exist. Provincial leadership needs to document and evaluate each source with regard to their feasibility and viability

Threats: A “haves” and “have nots” paradigm exists among the agricultural community in Iraq causing difficulty in governance and communication fostered positive direction. Farmers express and possess little knowledge of government regulatory, testing and diagnostic facilities and opportunities. Little contribution or impacts from national policies and programs relating to local affairs is opined by local leadership; however, it is clear that some producer input support is received, but it is described as being inadequate. A divide exists between current members of leadership society and the general farmer. The rudimentary system of self governance and teamwork for the betterment of society has yet to gain a following. Equity management is a problematic issue for Iraqi producers. Favoritism and corruption exist in specific agricultural associations and this characteristic stands to be a major stumbling block to producer success if not adequately addressed. A lack of leadership related to infrastructure development planning exists in many provinces of Iraq; a general disregard for project planning and site management has caused excessive spending with minimal benefit to the populous.

The historical precedent of regime agricultural policies needs to be discontinued; with independent action and participatory decision making opportunities promoted.

Many farmers belong to producer based organizations that have little influence on agricultural policy. A multitude of agricultural union leaders expressed frustration in their inability to effect policy or operational changes on behalf of the aforementioned members, especially when attempting to bring grievances to higher levels of government. A national policy is needed to help reduce dependence on low cost imported food products by establishing local procedures to protect Iraqi farmers from unfair competition. Leadership and technology transfer in Iraq suffers from tight confinement of hierarchical organizations and lack trust relationships.

Strengths: Tariff considerations National agricultural product pride Extension service application Allegiance to tribal groups	*Weaknesses:* Top-down centralized policies Underdeveloped talent Weak local leadership Duplication of services Little producer equity
Opportunities: Oil economy support for agricultural development Develop producer input voice Increase agricultural association responsibilities Collaboration among university and governmental agencies	*Threats:* Selective Governmental policies Have vs. Have Not mentalities Little local inputs in development of national policy Poor governmental planning and project oversight

Figure 5. Governance and Leadership Perceived Strengths, Weaknesses, Opportunities and Threats.

Water

For this study water is defined as an essential element to human and other life forms existence as well as being an essential input to related livestock, food and crop production and processing.

Strengths: Most producers are receptive of and hungry for water related technology transfer education and outreach efforts. The majority of Iraqi producers acknowledge that enacting systematic water allocations suggested by water districts is a key to long term, sustainable agriculture. Groundwater and surface water have historically been, and remain of seemingly equal importance in Iraqi production. Flood and furrow irrigation are prevalent in Iraq. Both methods exhibit low water use efficiency (WUE); on the other hand they also exhibit low infrastructure needs and costs. The use of windmills and solar power to supply water for family scale farms is recognized. In addition to surface water, artesian springs and wells and shallow, drilled wells are important sources of water in Iraq.

Weaknesses: Iraqi's mentioned one of the most prevalent issues in the minds of farmers and agricultural communities was water and their frustration with the government for lack of planned infrastructure for water. Most Iraqi producers feel that water should be free of charge and readily available for their use. Water quantity, distribution and quality are limiting inputs in Iraqi agricultural production. Irrigation infrastructure was largely neglected by the previous regime, furthering producer dependence on deeper and more expensive groundwater sources. Due in part to shortages of electricity for pumping water, inadequate drainage systems and increased

soil salinity, Iraqi producers have not yet fully recognizing the potential of their arable land. Production and educational issues concerning the rational use and conservation of water in most Iraqi provinces are well understood and well planned. Strategic projects are underway to improve the issue with the most significant limiting factor they face in achieving their plans being the lack of equipment, especially canal lining equipment, dredges and portable rotary drilling rigs.

Iraqi irrigation drainage systems are also in need of renovation; few fields have functional sub-surface tile drains or in-field drainage basins, and many are likely clogged and/or in need of maintenance and or replacement.

Opportunities: Pervasive and continual education and training from extension agents and university officials related to water and water use policy is critical to producer success.

Transboundary negotiations for water rights and security on the Tigris and Euphrates rivers is critical; water allocation methods, canal cleaning and restoration and improved and efficient water use practices are essential for immediate and long term viability. Educational programming and outreach efforts are needed to inform and educate producers about water use and efficiency and management efforts. Adequate water handling infrastructure exists, yet Iraqi producers lament that they would further invest in improved water development.

As increased well production evolves, groundwater monitoring systems and regulatory compliance will become increasingly necessary to ensure appropriate water yields. Education and outreach programs addressing causes of soil salination in Iraq are

needed; a long history of irrigated agriculture, excessive water use and inefficient irrigation practices, high evaporation rates and poor field drainage have necessitated the need for conservancy and change. The real challenge for Iraqi's is access to and efficient use of its water resources. A comprehensive, detailed plan providing for the reversal of soil salination and recovery land is paramount to Iraqi producers. Availability of water plays a critical role in the important marshland/wetland reconstruction efforts in Iraq. More efficient water use methodologies such as drip and sprinkler irrigation may be feasible alternatives to traditional irrigation practices; educational and outreach activities promoting such alternatives need to be made available to producers.

Many farmers confess they do not possess the knowledge, skills or money to operate privately-owned pump stations. As pump replacement becomes necessary, it should be accompanied by topic relevant producer training courses in operations and maintenance, business planning and financial management. Where possible, use of local means in obtaining pumps and pump specific parts and service should be practiced. Upgrade related to electrical transmission lines and transformers is necessary, should private ownership of pumping obligations be continued; implementation of educational training programs in pump operation and maintenance, accounting, administration and business management would be of great value.

Threats: In many areas of Iraq, irrigation water is also used for human consumption; due in part to the lack of potable water purification systems and technologies. Pumping capacity and reliability, water transport/drainage, Water Use Efficiency (WUE) and equitable distribution are all cited as troublesome limitations in

crop and livestock production efforts. Enforcement of water rights and allocations are often neglected, leaving downstream users without their allocated water. Iraqi producers are worried over proposed plans for major water storage reservoirs in Turkey and Syria, especially as drought and allied diversions have already decreased river flows.

Irrigation water and farm ground salinity and related reclamation issues are of major concern, as reflected in Figure 6. Provincial land reclamation will be delayed until improved drainage infrastructure is established and additional energy resources (reliable electricity, availability of fuel and spare parts) become readily available for pumping water. Lack of available water for Bedouin use is of growing concern. Increasing incidents of shallow water tables (<2 m) in many areas of Iraq are cited as a serious problem affecting both agriculture and municipalities. Lack of adequate water has been identified as a major impediment and limiting factor to increase agricultural production and related employment opportunities. Specific irrigation prone areas of Iraq are not productive because soil salinity, sulfur content and hydrocarbon pollution inhibit crop growth. In many production areas of Iraq, such as Wasit, soil salination is an extremely serious issue facing farmers, with perhaps 75-80% of arable land considered too saline to cultivate crops. In Iraq, as in many countries, increased demand for urban water nearly guarantees that water availability for agriculture is unlikely to ever again be as readily available as it was in the past. A sharp decline in animal production is exacerbated by poor forage and feed production in non-irrigated areas.

Strengths: Water education programs Water knowledge and awareness	*Weaknesses:* Perception of free water Potable/waste water infrastructure Lack of electricity and fuel for distribution and production
Opportunities: Need for water allocation planning Distribution and management systems Development of delivery management infrastructure	*Threats:* Drought Poor management practices Expense of infrastructure development Soil salinity Water and water right disputes Production declines

Figure 6. Water Perceived Strengths, Weaknesses, Opportunities and Threats.

Mechanization

For this study mechanization is defined as an agricultural associated mechanical means or processes used to achieve an output.

Strengths: Modern agricultural associations may hold the key as a transitional impetus from manual tillage to modern era mechanized production. These associations act as service providers and technical and production consultants. Alternative power means are viable and need further exploration; data exists to indicate that both wind velocity and irradiation are more than sufficient to power wind mills and solar arrays. It is not certain however, if there is sufficient wind to justify the use of wind turbines for electrical power. The use of demonstration projects to promote technology and technological transfer is highly touted and welcomed.

Weaknesses: Crop machinery is in deplorable condition leaving field operations to be conducted by hand. Relatively few date processing facilities still exist, and these are working with antiquated equipment. A limited number of older model tractors exist with ill-matched pieces of functional equipment like grain drills, row planters, sprayers,

and harvesters. Caution must be exercised when considering the replacement of existing manpower with mechanical power. The current agricultural market needs to maintain full manpower employment, with potential to grow over time. Access to specific and to a lesser extent common mechanized equipment especially canal lining equipment, dredges and portable drilling rigs can be a major detriment to production efforts.

Opportunities: Improved machinery maintenance is critical for continuity in all phases of production efforts. Matching tractor size and related implements/equipment is essential for long-term efficiency. Little qualified assistance in mechanized production exists; producers welcome mechanical means, yet lack the practical knowledge and mechanized farming experience. Adherences to one or two common brand names of tractors would facilitate maintenance and training, spare parts inventory and ancillary tillage and harvesting equipment needs. The same holds true for secondary tillage, planting and harvesting equipment. Tractors and related machinery should be scale-appropriate for the production enterprise and farm. A typical farm requires 35-55hp tractors. Select appropriate Power Take Off - machinery where appropriate for application (e.g., corn pickers, mowers, grain harvesters, chemical sprayers, electrical generators, paddle wheel and aerators, irrigation pumps). Implements including tandem discs, field cultivators, harrows, chisel sweeps, plows, culti-packers need to be capable of easy adjustment, with calibration settings and instructions available in Arabic, to accurately deliver optimum application rates at appropriate depths and intervals.

Adequate and proper tool and technical manual resources need to be made available to assist producers in service and maintenance of equipment. Properly designed

and equipped facilities and adequate training need to be made available to producers for equipment maintenance and repair. Use qualified agricultural association members in concert with extension service personnel to implement education and training efforts. Provide appropriate tools as an incentive to those that complete specific mechanized training programs. Provide vocational based training in applied agricultural mechanics in the secondary schools with a suggested curriculum to include tractors, machinery, structures, electricity and related needs.

Development and promotion and encouragement of immediate short-term technical training in agricultural mechanics at the technical college level to include diesel service, electrical controls, small engine theory, irrigation technology, hydraulics, power transmission and basic and applied welding. In addition to technical training, enhance and encourage agricultural mechanization and engineering programs at the agricultural college level (e.g., water and irrigation management, machinery design and development, farm electrification). Encourage and teach the use of no/minimum tillage systems rather than traditional moldboard plow use for appropriate soil types (clay and loamy soils) such as no-till, chisel plow and chisel sweep tillage. These practices will assist in conserving soil and reduce erosion and power and fuel consumption needs. Enhance and encourage collaboration among the agricultural mechanization and engineering program at the agricultural college level, university faculty members, technical college faculty, extension faculty and agricultural associations to deliver and demonstrate accurate and timely technical information to individual farmers. Integrate theory and hands- on applications.

Consideration must be given to the view, voice, and policies of provincial ministers, leaders, kada'a leaders, nahiy'ah leaders, agricultural association leaders, agricultural engineers syndicates and individual farmers for successful adoption and diffusion of new production scenarios. Promotion and practical application of alternative low-energy power energy alternatives should be considered where available. The need for improved electricity provision, access to low cost diesel and appropriate repair and maintenance parts and supplies for powering water pumps is glaringly apparent. Modern cold storage and animal harvesting and processing technology and equipment are lacking. Poultry, fish and vegetable production are lacking the elemental mechanical means for simplified and consistent production.

Lack of proper infrastructure and mechanical means is a recognized stumbling block in relation to commercial feed manufacturing and related technologies. Lack of access to functional equipment, technical malfeasance and equipment maladjustment and lack of proper guidance perpetuate the cultural and traditional tillage mindset and production justifications leading to continued ineffective and sub par production yields. Alternative crops (oilseeds, sunflowers, cotton) and value added production and processing (additional flour milling capacity, cotton ginning) of related potential and existing crops is a viable opportunity; yet, outside investment and technical expertise is needed to make these efforts a success. A current agricultural census would be of great benefit to establish baseline information regarding numbers and types of farms, farm location, specific crop yields, soil types, farming practices, water use and availability,

present and potential infrastructure, equipment inventory and related applicable information.

Threats: As noted in Figure 7, years of neglected and low-level investment in agricultural mechanization have left Iraqi agricultural infrastructure in shambles. Iraqi's must work to overcome antiquated and catastrophic mandates such as Rule #35 and Rule #350; laws which limit producer growth via limited permanent investments in infrastructure, machinery and soil fertility improvement. New tillage approaches need to consider a "full-employment model" with related efforts focused upon efficiency while being careful not to replace manual labor opportunities when and where appropriate. Looming water quality issues involving potential commercial animal feeding facilities, animal harvesting and processing facilities and dairy production efforts need to be planned and implemented in a timely manner and should not further complicate constrained water quality issues.

Strengths: Agricultural Union participation in modernization of mechanization Alternative power applications	*Weaknesses:* Machinery/implement condition Machinery maintenance Machinery maintenance education Limited access to parts and service
Opportunities: Traditional and alternative tillage practices	*Threats:* Zealous replacement of people with machinery Antiquated laws and rules

Figure 7. Mechanization Perceived Strengths, Weaknesses, Opportunities and Threats.

Needs Assessment Systems

For this study, needs assessment system is defined as a systematic way of exploring conditions as witnessed firsthand and then a comparison of specific ideas for improvement with the ultimate goal being self-sufficiency.

Strengths: Information gathered from rapid rural appraisal assessments is intended to provide constructive details associated with specific agricultural issues, provide on-site real time advice on agriculture activities, provide technical assistance for fall/ winter crop and livestock programs, coordinate with related programs led by Iraqi and other organizations, build quantitative and qualitative models to support agricultural planning, strengthen Iraqi agricultural colleges and enlist their help, structure a framework for youth enterprise and leadership development, and develop a paper on the military role in agricultural development in conflict regions. Province specific information is used to advise military commanders on agricultural issues and to provide on-site, real time recommendations for agricultural development organized around observed conditions, promising strategies and action-oriented recommendations. Related information and strategies and recommendations are intended to guide local, provincial and national level leaders in the transformation of the Iraqi agricultural economy while bringing stability to the region. The multidiscipline team approach encompassed a host of discipline specific experts for a comprehensive study of needs. Approaches included longitudinal examination of the agricultural development sector and related agricultural businesses. Assessment team members were able to achieve in-depth assessments of

most major areas of production agriculture and develop an idea as to how Iraqi extension and other government agencies and agricultural associations cooperate and interact.

Assessment teams observed conditions on farms, demonstration centers, extension and cooperation offices, greenhouse ranges, irrigation pump and canal systems, and a pilot date processing plant. These teams were able to conduct intensive interviews with agricultural association leaders, extension engineers, government agriculture and water resource personnel, local farmers, political leaders, provincial veterinarians, and tribal sheikhs. This method provided a systematic way of looking at events, collecting data, analyzing the findings and reporting results. Teams performed detailed, extensive examination of the whole agriculture, education, and business sectors in specific provinces. Needs assessment team members were able to meet with numerous members of NGO's, government, university and private sector agriculturalist in a multitude of settings and provinces. Market walks were used by assessment team personnel and gave tangible economic data, enabled the team to have hands-on experience with the business climate of specific provincial areas, and gauge the receptivity of Iraqi citizens to American civilians and military. Visitation by assessment team members of numerous and varied project sites currently in construction allowed teams to assess the real objectives of the governing bodies of agriculture versus the perceived goals. Much of the data gathered was compiled and information provided to local farmers with the hope of increased farm production.

Weaknesses: Violence and insecurity issues contained in specific geographical areas of Iraq deemed work too dangerous to fully examine all areas of interest in all

targeted provinces. Specific religious holidays excluded movement for several days. Lack of ongoing, continual and evolving systematic evaluation may cloud or blur the development picture in Iraq.

Opportunities: Intentions of assessment teams were to provide a host of specific recommendations which would facilitate action points relating to both short and long term agriculture sustainability issues in Iraq. Based on input from a multitude of military units, state department officials, USAID and USDA representatives ,varied and specific recommendations provide action points for agriculture sustainability in Iraq. A multitude of parallel opportunities exist for further evaluation and related development opportunities in Iraq.

Threats: Figure 8 reflects the fact that not all provincial areas of Iraq are represented in the findings and results, and care must be used not to infer results from specific provinces to non-related communities. A re-insurgence of instability in the region due to political or economic issues may hamper and impede future evaluative and developmental efforts.

Strengths: Provision of constructive issue(s) details General and specific recommendations for agricultural development	*Weaknesse*s: Excludes some production enterprises and locales. Needs often evolve and change with conditions
Opportunities: Strengthen programs as per recommendations Findings guide transformation/development	*Threats*: Continued insurgency Lack of trust Lack of access to population

Figure 8. Needs Assessment System Perceived Strengths, Weaknesses, Opportunities and Threats.

Economic Competitiveness

For this study economic competitiveness is defined as the ability of an entity to provide goods and services which meet or exceed local and or international standards and provide the producer a livable wage in performing such an endeavor..

Strengths: Many producers are considering change and are willing to consider new organizational strategies, new technologies and new marketing strategies to improve their quality of life and competitiveness. Little evidence exists of foreign competition for animal protein in the local market place except for whole frozen broilers and fish.

Historically as economies improve, consumer demand for animal proteins typically increases; as the Iraqi economy grows, the demand for locally produced protein is likely to follow.

Iraqi leadership places higher priority on national welfare, peace and economic stabilization than on global economic competitiveness; government support programs achieve this through input subsidy, guaranteed product prices and food distribution. Superior quality of internationally recognized agricultural products such as rice, dates and lambs are a source of Iraqi pride. It is noted and recognized that the agricultural “full employment model” should be heeded and not to replace manpower with mechanized means until the Iraqi workforce and economy are fully stabilized. However, in many provinces of Iraq it is noted that mechanized agriculture may be needed to offset expenses associated with high labor costs.

Weaknesses: Iraqi farmers are increasingly concerned with the increasing cost of agricultural inputs and the fixed price of wheat. Iraqis suggest notable negative market

factors affecting economic competitiveness including pressure from imported produce. Local farmers often produce vegetables with little or no economic or technical assistance from the government. No support either through input distribution or commodity price support is provided by the Ministry of Agriculture. Iraqi farmers are finding it difficult to both profit from production and sell at competitive levels without adequate levels of import subsidies. Delayed payment from the government for sales of grain adversely affects farmer cash flow and inhibits the ability to properly plan and prepare for the next cropping cycle. Extraordinarily difficult situations are often faced by Iraqi farmers; market roads and markets have been unsafe and the risks exact a real cost on farm production and profitability. Electrical power is not providing reliable or sufficient energy to operate pumps to provide water to farmers. Processing plants are closed and provide little opportunity to transform raw farm products into the valuable finished goods that consumers need. Many local needs are being met by cheap imports from neighboring countries. Massive government importation of food aid, often provided free to the population, also strains the Iraqi producer's ability to compete locally. Lack of disposable income forces Iraqi producer to prioritize expenses related to specific enterprises, often at the expense of allied enterprises. Many producers forgo routine accepted animal health practices or divest of quality fertilizer, seed and viability standards to ensure positive cash flow.

Opportunities: Iraq has a real opportunity to transition from a central planning model to a more democratic business model. USDA/USAID is assisting Iraqi's in planning and implementing methods to transition to a market economy utilizing

agricultural associations. In transferring from a central planning government model to a market driven economic model, Iraqi agricultural associations have a likely opportunity to become principal actors serving as procurement, services and distribution agents; agricultural association may wish to expand by developing subsidiary machinery and cold storage rentals, wholesale product markets, tractor service centers, vaccine and agricultural chemical sales. For a select few Iraqi commodities global competitiveness regarding quality and value may be a real possibility. It is generally recognized and accepted in the long term that some Iraqi agricultural markets will not be globally competitive. Government support of those sub-sectors results in hunger and severe poverty prevention, thus promoting the population living in the rural economy; this allows them to remain in the rural setting rather than job seeking in the cities.

Iraqi producers see development of youth leadership programs, entrepreneurial skills and the ability to create business plans as the critical underpinnings of success in a market driven economy. Input costs (seed, and fertilizer) are partially reduced by government subsidies, yet farmers purchase about half their inputs on the open market.

Rice is relatively expensive to produce, farm labor wise, compared to other cereal grains with the exception of specialized varieties. Additional research is needed to study the practical economic sustainability of rice production. Iraqi producers are encouraged to view livestock as an economic enterprise as well as a cultural value. Dairy and central wholesale markets are viable opportunities in Iraq and in need of further research.

Threats: Many Iraqi producers hold perceptions of unfair competition in local markets from imports; tariffs on imports are being considered. Unknown security situations breed contempt for related economic development opportunities. Many Iraqi producers express their desire to obtain but are unable to receive agricultural loans. Producers express their desire to expand operations but without appropriate access to capital are unable to expand. Many Iraqis express land ownership as a major limiting factor for loans. Figure 9 notes that the vast majority of farmers does not own land and cannot use it as collateral for agriculture loans. Most land is government owned; and a lack of incentive for reinvesting in farm infrastructure is prevalent. This is due in part to the fear that the rented or leased land may be taken back by the government and the value of the investments will not be recognized.

A petroleum based economy—often called Dutch Disease—may play a significant role in the limited profitability and viability of the agricultural industry; the lack of profitability in the farm sector may reflect fundamental conditions in the Iraqi farm economy. The farm labor pool is in a downward spiral. The growth of the Iraqi police and military forces has put extreme pressure on the available human resource pool in the agricultural sector.

Strengths: Willingness to improve/change Expansion to full utilization of agricultural associations	*Weaknesses:* Petroleum based economy High labor costs High cost of agricultural inputs Little financial/technical assistance Delayed government payments for products/production Shallow/unskilled labor pool Direct government competition Land tenure issues Poor/lacking production practices Reluctance and resistance to change
Opportunities: Full employment model Full utilization of agricultural associations Youth development potential	*Threats:* Lack of infrastructure-weakness Inexpensive imports Perceived unfair competition

Figure 9. Economic Competitiveness Perceived Strengths, Weaknesses, Opportunities and Threats.

Sustainability

For this study sustainability is defined as opportunities and activities which help to support and assist in the forward progress of Iraqi agricultural economy.

Strengths: A prevalent desire exists among most Iraqi's to learn and better themselves and their environment. The abundance of natural resources, geographic location and current level of security is a natural draw for annual tourism and provides a strong foundation on which to build sustainable success for the Iraqi people. Most Iraq producers support the use of agricultural associations as a beachhead for sustainable change.

Weaknesses: Iraqi youth have a perceived reluctance to pursue jobs outside the government, bear responsibility for personal finances and pursue and obtain practical, hands on training. These characteristics are symptoms of the current disconnect between

a desired future and that of future leaders. Urgent updates and implementation of educational infrastructure, curricula and technological programming is of critical importance to youth and rural infrastructure in Iraq. Agricultural development depends on the improvement of infrastructure that includes a viable road system, reliable electrical distribution, universal access to potable water and developed distribution systems as well as wholesale agricultural market development. Better inter-agency planning is essential to agricultural development. Iraqi leadership is often misguided and ill-informed in project planning. They often invest in venues which have limited value. A general disregard for project planning and improper and inadequate oversight has caused excessive spending with minimal return. Often corruption and general apathy are driving factors relating to initiative and progress..

Opportunities: It is suggested that distribution of all development and related grants and subsidies be made available to specific agricultural associations that have achieved non-governmental organization status, hosting a membership of at least 100 farmers, and that possess a board of directors which has received training in business plan development and basic accounting. Grants or in-kind derivatives should be an incentive for sustainability Agricultural associations should be targeted for assistance in the development of joint ventures / partnership agreements or contracts if grant and or specialized funds are used. This will provide a competitive advantage related to labor, associated costs and market share. Agricultural associations should be a target audience to receive extension education and training programs. Opportunities exist for agricultural associations to become principal actors serving as procurement, service and distribution

agents that offer services to producers at a fair market price and return profit for reinvestment to the association. This transforms agricultural associations into a co-operative for farmer members, with return distributions to be allocated by farm size and enterprise. Agricultural association leadership may choose to expand services they offer by developing subsidiary machinery/tractor service centers and cold storage rentals, wholesale product markets, and other profit centered ventures. Coincidentally enacting systematic water allocations developed by water districts is a key to the long term hope of sustainable agriculture in many provinces of Iraq.

Personal investment in the development and management of Iraq's natural resources must be taught and reinforced through future development opportunities to instill proper stewardship. The development of Iraqi youth as civic leaders via leadership programs, entrepreneurial skills and business education opportunities, and business planning; the development of entrepreneurial skills are cornerstones of success in an emerging market driven economy. Youth development opportunities involving adult mentors who instill the value of life-long education are paramount to long term capacity building.

Educational opportunities; including service learning opportunities, experiential-learning, trade and vocational, as well as higher education opportunities are all key to long term success. Sustainability efforts are critical to Iraq's future. Provision and use of improved and reduced input costs like fuel, seed, feed, chemical, reliable and efficient electricity, resource saving practical technologies and outreach and education are all critical to Iraq's continued and sustained development. Sustainable use of groundwater

resources for aquaculture and crops needs additional extensive valuation. One of Iraq's most prevalent resources, human capitol, is in need of practical and applied educational training to remain viable and sustainable. Economic growth will dictate change from a menial labor based market to a more skills and higher education driven market. Economics rather than politics need to be driving factors and foci for development in Iraq. Private, outside investment and infrastructure development is critical to Iraq's future. Priority establishment and direction is important to Iraq's future development and sustainability.

Continual needs assessments including: reviews of existing plans, projects and programs; verification of existing plans, projects and programs; and visits to record the state of agriculture; and current and future views of stakeholders are needed to insure progress towards agricultural sustainability. A concerted approach to review existing plans and evaluate their alignment with provincial agricultural development priorities by varied entities include: provincial, institutional, educational, tribal, private and private entities. These entities should be prioritized according to a set of weighted criteria by the committee and conclusions made by general consensus. Once prioritized and implemented, projects should be assessed on a regular and consistent basis.

Threats: Figure 10 reflects that continued doubt and unsettled violence may be the largest impediments to development in many provinces of Iraq. A young and impressionable, uneducated and menial-skilled workforce is a major detriment to the development and potential well-being of Iraq. Land tenure and ownership issues are critical to sustainability of the agricultural sector.

Strengths: Desire for improvement Copious natural resources Willingness to change	*Weaknesses:* Youth outlook on jobs Lacking educational infrastructure Lacking community infrastructure Lack of project planning, implementation and oversight
Opportunities: Tourism industry Increased role of agricultural associations in sustainability efforts Improved interagency planning and cooperation Managed water allocation Youth development potential Ongoing needs assessment Affordability of agricultural inputs	*Threats:* Corruption Unsettled violence Commodities dumped by neighboring countries Effects of oil prices and Dutch Disease

Figure 10. Sustainability Perceived Strengths, Weaknesses, Opportunities and Threats.

The Larger System and Engaged Institutions

For this study the larger system and engaged institutions are those entities involved and actively participating in the continued developmental activities and progress of the Iraqi agricultural infrastructure.

Strengths: Technical expertise coupled with capable, knowledgeable people make a difference in development. A host of those entities are recognized as capable cooperators: Team Borlaug (2008e) was a group of agricultural and veterinary scientists providing the command of Multinational Division Central (MND-C) with technical support in its ongoing civil affairs and counter-insurgency missions responsible for the bulk of materials gathered in Iraq. Support for extensive efforts of information gathering by the team was provided by Multinational Division Central (MND-C) with technical support by MND-C units, the Task Force for Business and Stability Operations (TF-

BSO) and the United States Department of Agriculture Foreign Agricultural Service (USDA/FAS).

The strength and relative success of developmental efforts in Iraq are in part, due to a multitude of participants. A repetitive list (repetition is to be expected due to the eight provincial reports and the varied cooperators/collaborators that exist in each) of those with talent and direction to make informed decisions and make life better for Iraqi's includes Continued and newly fostered collaborative opportunities with, governmental and non-governmental organizations and related entities follows, including; The Iraqi Organization for Motherhood, Childhood, and Handicap Care" (IOMCH), Boys and Girls Clubs, Iraqi Army and Sons of Iraq, Sheikhs, industry, local universities and technical colleges, the regional and local offices of the extension service, Central Euphrates Farmers' Market, the Government of Iraq (GOI), the Iraqi Army (IA) and Iraqi Police (IP) , Babylon University and Mussayib Technical College, as well as Mussayib Technical Institute, the Ministry of Higher Education and Scientific Inquiry, faculty and/or veterinary professionals, faculty, research and extension professionals, Veterinary Local Centers (VLCs), extension educators, local private veterinarians, governmental veterinarians, university and college faculty members, farmers' associations, tribal elders and leaders, multiple stakeholders, ministers, provincial leaders, qada'al and nahiyah leaders, Provincial Reconstruction Teams, (PRT's), Ministry of Agriculture, Ministry of Higher Education and Scientific Inquiry, Quick Reaction Funding Agencies (QRF), United States Department of Agriculture/United States Agency for International Development (USDA/USAID),

Department of Defense (DoD), Team Borlaug (2008e) and related developmental personnel are imperative for future development efforts.

Other provincial contributors in reconstruction efforts include: Provincial Government, the FOB Endeavor PRT, and related partners, agricultural development sector and related agricultural businesses, locally educated Iraqi scientists, farms, agribusinesses, markets, members of the local community, Turkey and Syria, its future leaders, the youth, The provincial extension office, The Youth and Sports Provincial Council, paternal education (from father to son), existing youth centers, urban/rural centers, Iraqi university or technical institute, advising or career counseling, students, professor, higher educational institutions, the Kufa University College of Ag and the Kufa Institute of Technology, Libraries, professors and staff, Women's Programs, Farmers, Ministry of Agriculture, foreign investment, Universities and colleges, Independent Agricultural Associations, Research and Extension, farmers, extension agents, and researchers, Date Research Station, INMA, Provincial Government, local Date Association, Date Marketing Board, PRT and PC, wholesale market, vendors, customs personnel, PC Ag Director, extension service, Kufa Technical Institute and Kufa University Agriculture Department, Green Belt project located near the Date Palm Research Station, GOI, office of the provincial veterinarian, Shiite Muslim pilgrims, (abattoirs): al Najaf Slaughterhouse, Kufa Slaughterhouse, and Heera Manathera Slaughterhouse, professional extension engineers and administrators, Kufa University College of Agriculture, Meshkhab Rice Research Institute, sheep herders, Provincial Council, head extension administrator, provincial veterinary hospital, to animal

producers in the community, Nine veterinarians and Nine technicians, Government veterinarians, abattoir workers / meat inspectors, butchers, and other animal protein food workers, Governor Assad and Mr. Mazook, ministers, provincial leaders, kada'a leaders, nahiyah leaders, agricultural association leaders and agricultural engineers syndicate, of private vendors, Iraqi ministries, provincial government, and agricultural associations, DoD, school teachers, soldiers and farmers, community members, community leaders, university faculty members, technical college faculty, extension faculty and agricultural associations, Processing plants, farm sector, neighboring countries, Iraqi farm economy, tourism, Office of the Governor, USDA/USAID, QRF, lawmakers, future business leaders, Parents, U.S. 4-H system, beekeepers, 10th Mountain Division, US Army; Team Borlaug; PRT Najaf, Private Greenhouse Producers, Kufa University College of Agriculture, Kufa Technical Institute, Najaf Agricultural Extension, and Najaf Agricultural Association, Najaf Agricultural Irrigation Scientific Committee, Local livestock farmers, poultry producers and aquaculturists, seed stock companies,various PRT, the US Army, Colonel Keith Sharples, the whole agriculture, education, and business sectors, farmers, civic leaders, NGO's, Extension and Research personnel, Karbala Water Resources Directorate, DG's of Water and Agriculture, Directors of the Greenhouse Tomato Date Research Stations, Green Belt Project Manger and various other farmer managers, Dean of the vocational technical high school, research centers, military and police, youth, vocational high school, vocational technical institutes, professors, extracurricular extensions of the government, Youth Centers, Bedouins, Government Veterinary Services, IP, IA, Bedouin tribal leaders, NGO Humanitarian

Coop, ethnic groups, religions, tribes, The Model Village Project, DG of Underground Water and Hydrology, family scale farms, DG's of Water Resources and Underground Water, Karbala College of Agriculture, Ministry of Youth and Sports, Youth and Sports DG, girl's programming, library, QRF, youth center in Karbala, paternal education, sheiks, sons and daughters, farmers, Youth in Media NGO, Ministry of Agriculture, Greenhouse Research Station Desert Extension Center, tourism and agrotourism, Iran, Syria and UAE, farm labor, farm workforce, Date Producers, Ain al‐Tamur Fruit and Vegetable growers, Field and Greenhouse Vegetable Growers in the semi desert Areas West and Northwest of Karbala City and the Bedouin Herders, investors, PC, Inma and the PRT, extension service, Karbala Ag College, Ag Advisory board of the PC, DG of Underground Water and the PRT, Shi'a Muslims pilgrims, The poultry industry in Karbala, The Euphrates Fish Farm, The greenbelt and tree nursery as well as the date research center, agricultural engineers, State Company for Mechanical Industries (SCMI), The Iraqi Poultry Producers Association, Commander of MND‐C., Dr. Guy Fipps, Mark Smith and Glen Shinn, president of Babylon University, Ambassador Croker, JAM, Diamler Benz, Private investment, The Iraqi economy, Wasit government, FOB Delta PRT and related partners, wheat producers, seed testing and certification laboratory and a seed cleaning facility, agricultural union leaders and agricultural engineers / extension personnel, farmers and agricultural leaders, Team Borlaug, textile factory, Al Numaniya Pickle & Canned Foods Co, Wasit corn producers, Ministry of Agriculture Project Division, Ezza and Numaniyah extension stations, Inma, DG of Agriculture, Greenhouse operations, Ag Unions, Ag Associations, Cooperatives, Central

Euphrates Farmers' Market and Agriculture Center, Sheik Saad Experiment station, provincial veterinary hospital and district/satellite veterinary clinics, government veterinarians, poultry growers associations, Al Jazeera Company in Jordan, Al Haditha poultry company, Wasit youth, urban versus rural youth, Al Kut University, short‐term vocational training, Sons of Iraq (SOI), Iraqi society, extracurricular education, Nongovernmental organizations and/or farmers' unions, adult farmer education, Albo Drach, school, clinic, mosque, community leaders, Ministry of Health, Iraqi public and private sector institutions, community leaders, Agricultural Extension, Ministry of Health, Ministry of Education, Ministry of Youth and Sports, universities and other entities, Agricultural processing and agribusiness, agricultural enterprise, Agricultural and food based enterprises, Communities and households, technical experts, political machinery of the Ba'ath Party, agricultural union leaders, higher levels of government, For profit agricultural unions and NGO agricultural associations, local tribal leaders, government officials and farmers, Army Civil Affairs (CA) units, stakeholders in agricultural development, agricultural and political leaders, Provincial council agriculture committee, Provincial Directors General of Agriculture and Water Resources, Provincial Extension Service and Project Division, Agriculture departments of local universities or technical institutes, Farmer unions, Agricultural associations or cooperatives, Agricultural supply or support businesses, Tribal leaders (sheikhs) with significant land holdings, Recognized leaders in agriculture and innovative/progressive producers, Train‐the‐Trainer Program, Dr. Edwin C. Price. Marshlands Research Center, Thi Qar University, "Train-the-trainer" oriented programs, Extension programs,

agricultural union leadership, livestock producers livestock producers, Agricultural associations, unions, non-governmental organizations, farmers and political leaders, Civil Affairs team, Major Kelly Thrasher, PRT, Civil Affairs, PC directorates, National Ministries, Agricultural Associations, and other interested parties, Agricultural associations, agricultural union, Dia Qar Communist Party, director general of agriculture, extension, key farmers, leaders, Iran, Iraqi agricultural markets, “early adaptor” farmers, agricultural association leaders, subsistence farmer families, the Governor, Provincial Council, Director Generals of Provincial Ministries, NGO/Agricultural Associations, USAID/USDA, and MND-C command, veterinarians, Bedouin shepherds, Italian PRT's Mittica Training Center, provincial veterinary staff using Military Public Health staff, small farmers, greenhouse producers, greenhouse farmers, area farmers, small farmers, rural people, Talib Hussein, President Ali Isamil, Marsh Arab society, local tribes and multi-national agencies, Thi Qar College of Agriculture, NGO’s, Key Sheiks—early adopters, agricultural leaders, entrepreneurial agribusinessmen, The Dhi Qar PRT, Government of Italy, Muthanna PRT, Dr. Indu Ram, Army Civil Affairs team, Major Kelly Thrasher, SSgt Michael Rothermel, Guardian Platoon of the 2nd Brigade 12th Cavalry, Lt Kester and SSgt Combs, agricultural businesses, PRT, Civil Affairs teams, livestock producers, the Ministries of Trade and of Agriculture, the Muthanna Agricultural Union, sheep herders, Agricultural unions, DGs of Agriculture, Water Resources, and of Veterinary Services, the PC Agricultural Committee, the Dean of the College of Agriculture and a representative of the Governor, NGO, Sheik Shabad, Farmers in Al Talliq village, Jorfat Village, Center

of Excellence Project, Mishkab Rice Center, extension directors, The Dhi Qar extension offices, local government officials, women's programs, family members: youth, young adults, adult men or women and widows, entrepreneurial agribusinesses , agricultural association, Agriculture University, Technical school, farming Cooperative, farming community, Dr. Edwin C. Price. During its stay in Diwaniyah, Team Borlaug (2008b) assessed both qualitatively and quantitatively the agricultural sector. Farmers, sheikhs, agricultural business managers, entrepreneurs, government leaders, government officials, PRT members, local tribal leaders, university, vocational institute, vocational high school and extension outreach, provincial governance, extension service, governance for agriculture, the governor and planner, agricultural union leaders, district and sub-district councils, local representatives of the Ministries of Agriculture and Water Resources, relevant stakeholders, Water management associations, farmer groups, Al- Mishkab Rice Research Institute, agricultural associations or cooperatives, ministers, provincial leaders, qada'a leaders and nahiyah leaders, DoD, private vendors, Iraqi ministries, provincial government and agricultural associations, vocational training, short-term technical training, soldiers and farmers, community members and community leaders, school teachers, university faculty members, technical college faculty, extension faculty and agricultural associations, Dr. Salih Hussein Jabor, the DG of Agriculture, shepherds, cattle herders, buffalo herders, tenant farmers, sheikh, shepherds and camel herders, buffalo herders, Office of Agricultural Extension and Cooperation, Qadisiyah University's College of Agriculture nor Diwaniyah Technical Institute, Qadisiyah University College of Veterinary Medicine, Provincial Veterinary Hospital, government

veterinarians, private veterinarians, Extension engineers, Youth, agricultural high school, college students in agriculture, students in agricultural high school, Civil Affairs Unit, poultry associations, the agricultural bank, fish farmer, rural youth, rural girls, Iraqi youth, government-owned slaughter facilities, Police, rural communities, laborer, governor of the province, private farms, land owners and tenant farmers, Kuwait, Qatar, agricultural advisory council, Date Palm Nursery, foreign investors, State-owned Enterprises (SoE), privately-held businesses, wholesale livestock and vegetable markets, wholesale distributors, Syria and Iran, entrepreneur, State Owned Enterprises, Privately Managed or State-Owned, Private-Owned Combination, mill site manager, foreign investors, Ministry of Finance, centrally located wholesale markets, agricultural leaders, technical and vocational education, extension and consultancy services and governmental agencies, Army Civil Affairs (CA), local leaders in their communities, USDA/USAID.

Weaknesses: Ministers of Agriculture, Education, and Youth and Sports need to collaborate in achieving and pursuing one common goal for the best interest of serving and developing Iraqi youth. Collaborative pursuit and support of youth from agricultural extension, educational programming, and community centers will be pivotal in providing youth a safe haven for continued education.

Opportunities: A sincere desire for long-term capacity building relationships with agricultural educational institutions through knowledge transfer and academic programming exists in Iraq. It is noted that critical spokes in the larger wheel of agricultural development in Iraq should continue to be promoted because of their

necessity in on-farm productivity and marketing. Agricultural businesses, including both input businesses (fuel chemical, fertilizer, seed) and processing facilities, agricultural associations, food processing plants, and machinery construction and repair facilities prove to be invaluable to the growth of the Iraqi agricultural sector. Pursue and establish collaborative agreements with leading aquaculture centers throughout the region and world; for example, the Pond Dynamics and Aquaculture CRSP (Collaborative Research Program) funded by USAID and based at Oregon State University, or the World Fish Center in Penang, Malaysia would bolster affordable, high quality protein production for Iraqi consumption. Based on friendly and interested cooperation of and interaction with military units, state department officials, USAID and USDA representatives and hands‐on opportunities implemented at specific farm and production sites across Iraq are important; Figure 11 reflects that a series of executive and topic specific recommendations that would provide action points for both short and long term agriculture sustainability in Iraq have been developed. Iraqi's favor organized participatory irrigation management programs that empower farmers to manage and maintain pump stations and water distribution infrastructure and to make decisions about water allocation. Provincial management associations should include farmers, agricultural union leaders, nahia councils, local representatives of the Ministries of Agriculture and Water Resources and any other relevant stakeholders. Water management associations need to be organized with the support and guidance of extension, providing training for farmers in system maintenance, best irrigation practices and administration of association related activities.

Threats: Lack of communication among and duplication of efforts by developmental agencies threaten to hamper developmental efforts in Iraq. Linear, top down leadership is also recognized as a problem.

Strengths: Variety of institutions and agencies Varied technical expertise	*Weaknesses:* Lack of knowledge Lack of commitment Lack of history of collaboration
Opportunities: Increased capacity Increased communication Increased collaboration opportunities Increased communication/trust	*Threats:* Interdisciplinary/agency infighting Lack of communication Top-down leadership culture

Figure 11. The Larger System and Engaged Institutions Perceived Strengths, Weaknesses, Opportunities and Threats.

Change Agents and Agricultural Development

For this study change agents and agricultural development is defined as those entities involved in agricultural development capable of producing significant change and improvement in specific practices and innovations.

Strengths: Change agents prove to be invaluable resources in the development and implementation of new and improved agricultural based programs and infrastructure. Most recognized change agents possess a broad background and open minded view of issues and ideas related to international development. Often one will encounter more than one correct solution to a perceived problem or opportunity. “Train-the-Trainer” opportunities are successful in Iraq.

Weaknesses: Resistance to change is a recognized and often witnessed pitfall of most change agents. Fast moving and ever-evolving and potentially unseen international

and political issues are potential barriers to the change agent. Decisions implemented and passed down rather than field-based and practical can be impediments to on-the-ground needs. Local acceptance, security and stability or lack thereof, proven need, a realistic timeframe and positive resource allocation may all prove to be major catalysts or detriment to change agents and development. Big picture rather than problem based focus relating to problems is an impediment. Lack of communication and tight confinement often leads to a lack of relationships and distrust.

Opportunities: Application of indigenous knowledge, skills and experience of human resources and infusion of modern practices and technology are mutually critical components of advancing agriculture in provinces of Iraq. It has long been recognized and mutually agreed upon that since the inception of NGO status agricultural associations, the associations exhibit promise as change agents for moving vegetable and fruit production toward a viable industry. Institutions of higher education and related faculty and staff are often looked to as change agents. Realistic, obtainable goals are benchmarks of developmental success. Continued refinement, enhancement, support and improved use of the human resource base and knowledge are needed to support agricultural development in Iraq. Youth are universally recognized as integral components of change in Iraq. Exciting, innovative technological approaches in agriculture are needed to improve the efficiency and production of agriculture and to expand youth's interest in agriculture. Technological education is needed to provide Iraqi youth the opportunity to successfully enter the agricultural workforce.

Threats: Lack of follow through relating to programming and associated agricultural development efforts. Lack of funding and the potential for misuse of associated funding is a concern. Lack of appropriate contacts and effort on behalf of the change agent is a potential threat. Lack of political awareness and responsiveness to change is a major limiting factor in implementing change. Assumptions rather facts can be detrimental to change agent's efforts. Lack of resource allocation such as team size, scheduled leaves and several team members traveling to aid in agricultural development in other parts of the country can pose threats to development. Linear associations (fund allocations to members in order of time they joined; the first eleven members always receive the benefits) and fixed or rigid rules and models of operation can be a detriment to NGOs and other related affiliations. Figure 12 notes that a 30 –year period of conflict in Iraq has isolated and stymied innovative agricultural development and related practices. The lack of unified vision is a major hurdle in agricultural development in Iraq. A lingering history of the Dia Qar Communist Party does not help in shifting local farmer's paradigm related to production agriculture.

Strengths: Development and promotion of sustainable change Problem based Indigenous knowledge/application	*Weaknesses:* Resistance/reluctance to change Lack of proven need Lack of political awareness Rigid rules Fixed political and historical paradigms
Opportunities: Train the trainer development Varied solution possibilities Potential infusion of modern practices Utilization of higher education institutions	*Threats:* Non acceptance Lack of follow through Shift in national or middle east policies

Figure 12. Change Agents and Agricultural Development Perceived Strengths, Weaknesses, Opportunities and Threats.

Major Themes and Constructs

For this study major themes and constructs will be defined issues and opportunities germane to building agricultural capacity and infrastructure in Iraq.

Strengths: The opportunity of agricultural unions and educational institutions being well poised and eagerly await opportunities to advance professional expertise. Key sheiks are often recognized as early adopters; and are more likely to lead in a changing environment by helping to diffuse innovations and communicate knowledge to willing early majority farmers.

Weaknesses: There is a need to improve communication among and between the key agencies. An entitlement mentality that the government should provide all resources is a major flaw for producers. Development of lacking infrastructure (water, electricity, roads) and support of weak, neglected, war-torn infrastructure are of considerable concern to developmental efforts in many Iraqi provinces. Leadership and developmental efforts in Iraq often suffer from close confinement, linear hierarchical organizations and lack of trust relationships.

Opportunities: A national policy agenda to protect producers from imported produce and unfair competition is needed. Such policy should provide for a lock-step approach in transition from a central planning model to market-based model. Farmers are not comfortable in navigating the current gap separating the two types of economies. National policy should also address a functional land registration system that clearly identifies property and long-term uses. Opportunities for science-based education which possesses potential to further drive economic growth and rural employment exist; such

interventions include planned production campaigns, youth entrepreneurship development, increased productivity, crop production, livestock production, food processing, transportation, input supply, labor markets, government services, improved seed varieties and production methods and enhanced natural resource management. Educational institutions and agricultural businesses provide infrastructure development capacity. Agricultural businesses (both input and output) should be perpetually supported due to their capacity in on-farm productivity and marketing. Agricultural associations, input supply businesses (seed, feed, chemical and fertilizer), food processing plants, and machinery construction and repair facilities are all vital to the growth of the agricultural sector. Educational institutions provide opportunities to build human capacity and capitol, forge long term collaborative relationships, develop trust and foster knowledge transfer and programming via direct producer support in, research and extension outreach.

Threats: Agricultural development depends on the improvement of lacking or poorly developed and maintained infrastructure. A need to organize an emergency feed aid program to curtail livestock reduction exists in provinces of Iraq. In many rural areas of Iraq basic human needs remain unmet; profound need for not only potable water, improved sanitation, basic health care, schools, dependable electricity and passable, safe roads exists. Basic animal production practices are lacking - a high incidence of communicable diseases in animals coupled with a lack of ability to diagnose, treat or implement animal health program. There are a number of veterinarians—many of whom are under-employed—and a lack of laboratory and field equipment.

Figure 13 reflects that producer frustration is pervasive and often frustrating due to lack of technical support and quality inputs. Many farmers in pursuit of a better life are choosing to leave the production sector to pursue secure jobs with Iraqi police or army. An effort to entice these people back to the agricultural sector is paramount for long term development of the agricultural sector. Many citizens are dealing with devastating issues including death of family and associates, economic losses, inadequate nutrition, total lack of primary health care, and marginal access to poor quality and even dangerous water supplies.

Strengths: Agricultural unions Key Sheiks Early Adopters	*Weaknesses:* Lack of communication Lack of infrastructure Unmet basic human needs
Opportunities: Development of national policy agenda Development/delivery of science based outreach and formal education applications	*Threats:* Lacking land tenure policies Producer equity erosion Exodus of agricultural occupations Illegal competition from neighbor countries

Figure 13. Major Themes and Constructs Perceived Strengths, Weaknesses, Opportunities and Threats.

Soils

For this study soils are defined as any organic or partially organic material capable of supporting agronomic crops.

Strengths: Iraq enjoys a rich resource base of arable land. Extensive areas of rangeland with a large capacity for livestock production exist in Iraq. Land reclamation projects are in the works and can be successfully completed in as little as a single year; un-reclaimed land is virtually useless for production efforts.

Weaknesses: Much of the capacities of range units are limited due to severe, prolonged drought and desertification conditions and mismanagement. Soil salinity is often cited as a major impediment to production. Saline saturation of fields and infrastructure is raising an already high water table and increasing soil salinity problem; previously productive fields are now flooded. Field tile drainage systems are in need of major renovation and cleaning. Much of the Iraqi soils are mismanaged, neglected and remain fallow due to prolonged violence-induced absences of Iraqi farmers. Inefficient and excessive water use paired with poor field drainage, poor irrigation practices, and high evaporation rates because of an arid climate take their toll on agriculture. Limited irrigation technology and lacking infrastructure further limit the production of Iraqi soils. Under and over tillage land preparation and inferior seed and planting methods are limiting factors for production. The execution of many soil related reclamation projects have stalled, not for lack of funds, but due to lack of implementation. Under and over utilization of fertilizers is a detriment to soils and their production potential.

Opportunities: Production is often constrained due to the allocation of soils; not the lack of productive soils. Alternative irrigation methods may be more appropriate than that of tradition flood or pivot systems. The inclusion of innovative tillage practices including chemical fallow, no and low tillage or reduced tillage will help to significantly reduce wind erosion and blowing of soil. Proper tillage and tillage management practices and education need to be introduced and fostered by Iraqi extension and agricultural associations and unions. Conservation reserve programs need to be considered for land and soil reclamation and soil conservation practices. Education and application of proper

tillage methods to achieve optimum soil tilth and uniformity of seed beds, needs to be promoted and practiced. Soil and water testing laboratories are needed in Iraq. This service, if provided by university and extension personnel and agricultural unions, would be a wonderful segue for public relations and continued outreach efforts. A comprehensive plan for reversing saline soils and recovery of lost potential farm ground is needed. The use of salt tolerant and salt savaging/scrubbing crops should be promoted for land reclamation and salinity control. Fish farms and aquaculture centers are viable alternatives for reclamation of lands where soils are too saline for reclamation.

Threats: Soil fertility testing is virtually non-existent and is critical to sustainable production. Under production and the miss-application of non-viable farming methods are a serious risk to Iraqi agriculture and self-sustainability. Figure 14 notes that financial constraints due to limited land access, issues of concern with land tenure and related expenses have forced many Iraqi farmers to look for other suitable work.

Strengths: Extensive land/range production base Long history of agriculture in region	*Weaknesses:* Limited production potential Poor/inefficient water usage Lack of technological implementation Under production
Opportunities: Formal/informal soil science education Update soil science technologies and practices Implementation of CRP type programs Tillage management programs Extension/university based education opportunities	*Threats:* Prolonged drought Desertification Soil-water mismanagement Varied soil salinity issues Producer based production exodus due to land tenure issues

Figure 14. Soils Perceived Strengths, Weaknesses, Opportunities and Threats.

Credit and Finance

For this study credit and finance is defined as the means and availability of opportunities for producers to budget and access proper channels and adequate means of capital to purchase needed goods and services. Credit is based on low interest repayment.

Strengths: Producers desire but are unable to receive agricultural credit or finance. Many producers wish to expand operations but lack capital. Land ownership is a limiting factor for loans. Most farmers do not own their land and therefore are not able to use it as collateral for agriculture loans. Various potential sources of funding for provincial agriculture exist; dedicated funds for agriculture are available from the Ministries of Agriculture and Water Resources and other related or allied groups. Other funds are available from the central government to provincial councils; provincial councils have the flexibility to allocate funds to agriculture projects.

Weaknesses: Little understanding of small business plans and their implementation is exhibited by Iraqi farmers. Producers are unclear on exactly how to access and use bank loans to further develop and diversify their businesses. Lack of access to subsidies is often mentioned as a concern of producers, yet no consideration relating to establishing or improving access to credit or finance was noted. Lack of site specific registration and registration of fish pond facilities are impediments to producer loans; promotion of the registration of fish farms to increase the proportion of fish farmers eligible for agricultural loans is needed. Wage rates, security and government policies are areas that affect business and industry growth in Iraq. Iraq is a difficult

country to start and manage a business, due in part to start-up overhead. A lack of clearly defined regulations regarding foreign investment policies in Iraq is a major impediment to new businesses.

Opportunities: The notion that agricultural associations should be targeted for assistance in the development of joint ventures / partnership agreements or contracts with producers. Distribution of potential producer grants and subsidies should be targeted at agricultural associations.

Promising strategies available to Iraqi farmers such as promotion of loan incentives to increase lending to agricultural associations are ever evolving and becoming more available to Iraqi producers. Recruitment of foreign lending institutions to stabilize local banks and aid in the development of local business plans is a recognized possibility. Low interest loans or grants for development of wind powered pump low input drip irrigation demonstrations at key demonstration farms, feed mills, and vegetable and fruit processing facilities, would be of benefit to Iraqi infrastructure; the provision of increased credit options to encourage adoption of new technologies in water extraction and distribution is essential. Financial and distribution oversight and regulation by agricultural associations may be prudent.

Establishment of farmers groups and Ag Unions to form Ag Associations or Co-operatives with NGO status could provide business and capacity building opportunities by assisting with increasing or developing new or existing lines of credit. Farmers that are capable of supplying a reliable, quality input should be rewarded with preferential access to credit and or production enhancing subsidies. The established agriculture banks

of the Ministry of Finance have in place a current system for approving producer loans. It is recommended that agricultural extension assist in educating producers about the potential of loans, loan application and loan management strategies. Ready access to capital is a key component to a successful business.

Threats: There seems to be a lack of incentive for investing in the farm infrastructure. Fear that the improved land may be taken back by the government and the value of the investments will not be recognized exists. Several members of agricultural associations noted that loans are often too difficult and risky to obtain. Figure 15 reflects the investment in permanent infrastructure or crops such as date palms, fruit orchards or vineyards often occur an overwhelming degree of debt risk and could affect the ability of the farmer to use them as collateral when seeking loans. State-owned enterprises are a detriment to the development of the free market economy in Iraq.

Strengths: Producers desire growth via credit Varied credit sources exist	*Weaknesses:* Lack of collateral Limiting land tenure policies and credit access Lacking subsidies hamper credit acquisition Exorbitant business start-up costs Excessive business volatility Lack of clarity regarding business policy and finance regulations
Opportunities: Need for business plan development Education pertaining to credit access and utilization Use of agricultural associations as lending/credit educators and facilitators Establish and promote loan incentive programs Use extension personnel to educate and administer development loans	*Threats:* Lack of qualified access to credit Devalued world commodity prices Lack of producer capitol to access credit Real or perceived national and regional security threats Risk associated with loans Lack of risk management associated with loans and credit

Figure 15. Credit and Finance Perceived Strengths, Weaknesses, Opportunities and Threats.

Energy

For this study energy is defined as the inputs associated with the ability to do work.

Strengths: The ability to empower extension faculty to address environmental issues, more specifically wind production and management (e.g., water management, irrigation methods and wind management) will positively affect the efficiency of production in Iraq.

Weaknesses: Limited supply of electricity is a serious impediment across all areas and facets of production agriculture, especially poultry and vegetable production and cold storage. Many fish farms across Iraq are currently inactive due to lack of

electrical energy or diesel fuel to pump water. Shortage of fuel is often cited as a limiting factor in Iraqi agricultural production. The issue regarding ongoing drought conditions having increased the amount of energy needed to pump and distribute water from groundwater and surface irrigation sources. Deeper wells are more expensive to produce and exhibit increased production costs. Although Iraq hosts and produces an abundant amount of crude oil, a very limited supply of liquid fuels and reliable electricity exist across the country. Generators play a critical role in provision of electricity to provincial residents.

Opportunities: Development and practical application of alternative low-energy power use where available (e.g., windmills, water turbines and solar power) is highly recommended. Modernized tillage practices that help conserve or reduce power consumption are recommended to be taught and applied by extension personnel.

A sparse amount of state subsidized fuels are made available to producers, but not nearly enough for sustainable production. Educational opportunities related to energy production, efficient utilization and conservation are needed and recognized as urgently vital to production scenarios across Iraq. Use of small extension based demonstration plots and projects relating to the education and implementation of practical energy conservation practices is recognized and encouraged.

Threats: Figure 16 reflects the notion that Iraqi agriculture is not competitive in production agriculture due in part to the low availability and lacking reliability of electrical power. Critical lack of infrastructure and or erratic electricity supply is a limiting factor regarding many sectors of production agriculture. The increased and

reliable provision of electricity is essential to maintain irrigation and other production related enterprises and infrastructure. Energy supply and reliable provision of electricity plays a critical role in the education process across Iraq. Energy infrastructure development efforts and initiatives are often seen in urban rather than rural areas across Iraq.

Strengths: Utilization of extension education in teaching energy practices Limited state subsidized fuel supply	*Weaknesses:* Limited state subsidized fuel supply Limited energy distribution and supply Poor fuel distribution and supply
Opportunities: Improved energy production and distribution infrastructure Education relating to modern energy practices and techniques Education relating to modern tillage and production practices	*Threats:* Lack of energy infrastructure is a limiting factor to successful agricultural development

Figure 16. Energy Perceived Strengths, Weaknesses, Opportunities and Threats.

Security

For this study security is defined as safe, unencumbered free development and progress of related economic development issues related to the well being of the Iraqi populous..

Strengths: Security in part, is provided by the Iraqi Army and Iraqi police with a limited amount of interaction between the United States military and International Security Assistance Forces. Provision of security has helped tremendously in establishing a sound foundation for development.

Weaknesses: The rural to urban migration and the potential for related social unrest caused by unemployment may threaten security and stability. Iraqi agriculture is

not competitive in most areas of production and this problem is exacerbated by several factors including appreciation of the Iraqi dinar, deteriorated infrastructure for irrigation and low availability of electrical power, high labor rates associated with the petroleum economy.

Opportunities: With three-fourths of the Iraqi population depending upon agriculture, it is important that the sector remain viable. The choice has been made in other modern economies with similar resource bases to transfer money from the petroleum sector into the agriculture sector to keep it viable and to help provide for food security and national security. Education of Iraqi youth and her workforce play a critical role in securing the countries future. Iraqi economic and political sovereignty and future growth are dependent upon sustainable agricultural and energy provision. Maturation and continued evolvement of political, security, economic, diplomatic, and rule of law issues in Iraq are important to development of such an economy. A more stable and attractive development environment may produce both positive near - and long-term results for the security of the Iraqi people and economy. The provision of essential human services remains a key component of national unity and a significant factor in building trust in Iraq's leadership and infrastructure. Varied entities, including the Ministry of Agriculture and Agricultural Associations abilities to provide and enforce policy and regulate markets interventions so the market can play a greater role in setting prices for crops and related agricultural inputs is important. Some believe that marginal if any intervention is necessary for a free market to establish itself and realistic commodity prices.

Threats: Iraq's confined fiscal, political and leadership situations as well as reduced oil revenues, pose significant risks to Iraq's ongoing economic development. Security related issues spawn from lacking local production, market trade and corruption. Figure 17 notes producers and political leaders opine that the agricultural economy is being undermined by Iranian influence. Prolonged political instability, lack of security and severe drought has taken a toll on the Bedouin people. The lack of progress in resolving troublesome territorial issues and disputed land holdings in areas across Iraq is a major impediment to development.

Strengths: Iraqi people and human capacity	*Weaknesses:* Poverty Rural to urban migration Lack of public services Pervasive lack of infrastructure Poor relationships among ethnic groups Lack of land tenure policy Reduced oil economy revenues Elevated unemployment
Opportunities: Petroleum sector support for agricultural development activities Continued endeavors in establishing food security Provision of public education Continued development and enforcement of effective governmental policies	*Threats:* Outside (foreign) influences Insurgency potential Transboundary water issues

Figure 17. Security Perceived Strengths, Weaknesses, Opportunities and Threats.

Cooperation

For this study cooperation is defined as a symbiotic approach of working together in collaborative efforts. It should also be noted that Agricultural Cooperatives are included in this section

Strengths: Evolving governmental and related agency synergy cooperation and unified approaches to diversified problem solving are beginning to have a positive impact on production and governance efforts in Iraq. Farmers are beginning to understand the value of cooperation and the related opportunities and rewards experienced via collective effort. Cooperation and interaction with military units, state department officials, and USDA representatives and hands on opportunities at specific farm and production sites have proven to be of great benefit. The development of collaborative activities is a positive step. Positive cooperation of and interaction with military units, state department officials, USAID and USDA representatives and hands‐on opportunities at specific farm and production sites was noted by Team Borlaug. Extension educators in cooperation with varied offices are planning, organizing and conducting methods and results based demonstrations with farmer cooperators.

Weaknesses: Cooperation is needed to create a date marketing board to support the date industry in regaining market share, developing new markets, upgrading the industry via replanting campaigns, providing cooperative training and education programs (universities and extension service) and sponsoring marketing campaigns.

Opportunities: Cooperation at the highest and intermediate levels between varied agencies is critical to success in Iraq. A major goal of cooperators in Iraq is to encourage collaboration and cooperation among agricultural groups. The development and implementation of cooperative leasing or purchase of prime animal genetics and development of farmer marketing cooperatives to wholesale excess milk is a recognized need. Women’s cooperatives should be pursued to facilitate the process of linking

women groups to appropriate markets, such as a food technology programs. These programs should enable women with adequate inputs (fruits, vegetables, etc.), the access to adequate and proper sanitary and phytosanitary methods of processing and distribution. Mishkab Rice Research Center and the International Rice Research Institute and other rice research centers like those in Vietnam, Bangladesh and West Africa are seeking scientific cooperation for improvement of rice research in related areas of southern Iraq. Cooperation and collaboration between the university, technical and trade institutions, high school and extension already exist. This relationship must continue to be embraced and fostered. Development of systematic horticultural training programs led by extension and related personnel, with a host of new knowledge provided by outside and in-house technical consultants, targeting the development of better technical information and cooperation among growers is well received. Educational institutions are described as growing, adaptable to change and wishing to develop new and maintain current cooperative relations with sister institutions. Promising strategies relating to farm machinery management, including the engagement of agricultural associations or cooperatives in the purchase and management of tractors and equipment are being fostered.

Threats: The lack of unified vision is pervasive via numerous agencies in Iraq. Figure 18 denotes that a continual confusion exists among farmers as to the role of a modern agricultural association and the historic role of the agricultural union as a political action entity.

Strengths: Varied interagency cooperation Increased governmental agency synergy Cooperation History of farmer's associations	*Weaknesses:* Lack of specific agricultural sector development (dates, feedmill) Lagging development of producer and farmer market cooperatives Lack of unified vision
Opportunities: Potential and continued collaborative opportunities Opportunities for long term food security stability projects Producer education opportunities Technology application and dissemination	*Threats:* Historical political issues Political and policy conflicts Tribal conflicts

Figure 18. Cooperation Perceived Strengths, Weaknesses, Opportunities and Threats.

Land Tenure

For this study land tenure is defined as the relationship behavior among people acting as individuals or groups relating to land and or property.

Strengths: Agricultural Associations wish to cooperate in development of a functional land registration system that clearly identifies property and its potential use.

Weaknesses: Current associated land tenure maladies are often due to lack of communication and consistent interpretation and enforcement of land policy. Many land related laws are antiquated and the ability to enforce such laws is virtually non-existent; it is difficult if not virtually impossible for a land owner to remove an unsatisfactory tenant farmer.

Many current landowners feel that rules are too protective of the rights of the tenant farmer and are often detrimental to the progress of producer's goals. Tenant farmers feel slighted and excluded due to their perceived rights under antiquated land laws. Land tenure and cadastre are issues throughout Iraq; Rule #35 and Rule #350 are

counterproductive and act to reduce permanent investments in infrastructure, machinery and soil fertility. Lack of land ownership is a limiting factor for loans. Many producers desire but are unable to receive agricultural loans to expand operations. Without land as collateral for agriculture loans the capital needed for expansion is out of reach. Lack of land ownership defines and limits the ability of farmers to make critical decisions relating to significant investments to upgrade their infrastructure and production capacity imposing severe limitations on expansion of production enterprises. Numerous large farms are owned by the private sector and farmed by subsistence farmers or sharecropper families; sharecropping systems do not provide small producers with sufficient incentive to be productive and efficient farmers. The Bedouins population across all of Iraq is subject to land tenure access issues. Ever present drought conditions and limitations on movement due to security issues have forced them into a precarious situation. Bedouins no longer have the access to wells, traditional grazing and historic assembly areas. Limited access threatens to substantially reduce herd numbers due to the need to provide necessary cash to purchase feed and water for the remaining herd. Negative social ramifications are often associated with tenant sharecropping systems and other production inefficiencies. Negative issues may also arise when productive lands are tenaciously held in tight confines by too many individuals; many favor ownership of small parcels.

Opportunities: A national policy is needed which addresses a functional land registration system. For farmers to feel more secure to pursue farm expansion, land ownership will have to be addressed. Figure 19 reflects that as tenants, a majority of

farmers lack the motivation for land development and reinvestment into property and machinery. Landless producers are often capable and guilty of exploitative land use practices that maximize short term gains at the expense of exploitative production practices. Providing producers with terminal land use rights, including outright ownership, is a fundamental requirement for land conservation and sustainable land use practices. There are established rules governing interactions between land owners and tenant farmers; however, many cases of unclear land tenure or lease terms exist. Many conundrums exist due to previous governmental policies and practices and their relationship to current governmental policies.

Threats: Current land tenure policies are major threat to production in Iraq. Several officials believe current regulations that govern land access and registration are in pressing need of review and revision; this elusive issue stands to be of more importance and influence than most any other technical issue in Iraq. Local farmers and leaders state that a lack of incentive for investing in the farm infrastructure exists because of the fear that improved land may be expropriated by the government with the associated costs of producer funded improvements lost.

Strengths: Agricultural association involvement in reform policy and communication	*Weaknesses:* Lack of communication Lack enforcement of vague laws Inconsistent interpretation of laws
Opportunities: Producer education opportunities on land tenure policy National land tenure policy revision and reform	*Threats:* Negative social and political ramifications Detrimental to farmer equity and production capacity growth Encourages exploitative production practices by tenant farmers

Figure 19. Land Tenure Perceived Strengths, Weaknesses, Opportunities and Threats.

Summary

Iraqi agricultural production lags due to many factors, including government policies that distort the market and undermine productivity, related security issues and competition via subsidized credit and agricultural inputs. Outdated technology and nescient lay people induce knowledge in related production areas of plant and animal genetics, fertilizers, irrigation drainage systems, and farm equipment. Inadequate and unstable electricity availability and provision; degradation of irrigation-infrastructure, management systems, a complete lack of or insufficient credit and private capital and inadequate market development and networks all take their toll on evolution and improvement.

It may be that largest threat to the future of Iraq is not violence, but the diminishing hope of young people caused by their inability to obtain vocational based skills training and the lack of jobs that match such skills. A pervasive lack of job opportunities or perceived lack of job availability may encourage continued unrest and possibly continue the insurgency. To address this issue, an aggressive youth

development focus can make a positive impact in the current society. A majority of youth without useful skills are forced to abandon the farm and move to cities or to pursue other means of earning income in rural areas.

Findings

The Iraqi people are remarkably resilient, self-reliant and eager for positive change. Sought after change is not easily obtained, in part, due to a host of catastrophic circumstance of which the population has inherited from its former régime. Like much of the world's population, Iraqis value their cultural values, youth, health and domestic wellbeing and strive to build a vibrant country in which to rekindle a competitive market economy for the betterment of future generations.

CHAPTER V

SUMMARY, CONCLUSIONS, PROMISING PRACTICES AND RECOMMENDATIONS

The primary purpose of this research was to synthesize emergent agricultural development reports related to post-conflict needs assessments in eight provinces in southern Iraq. The case was analyzed using eight Area of Operation (AO) final reports produced by Team Borlaug, a group of agricultural and veterinary scientists providing the command of Multinational Division Center (MND-C) with technical support in its ongoing civil affairs and counterinsurgency missions.

Objectives for the Study

To accomplish the purpose of the study, the following research objectives were established:

1. The first objective was to identify emergent agricultural development themes from each of the eight Iraqi provinces.

2. The second objective was to identify emergent agricultural development trends from each of the eight Iraqi provinces.

3. A third objective was to provide relevant case documentation to assist in future agricultural development/post-conflict developmental efforts.

Need for the Study

The purpose of this study was to synthesize emergent agricultural development reports related to post-conflict needs assessments in eight southern Iraqi Provinces. Using 11 crosscutting constructs: cooperation, economic competitiveness, education and training, environmental stewardship, future view, governance, health and wellness,

land tenure, receptivity to change, security, and sustainability, a case study will be developed focusing on agricultural specialties to utilize the team findings. The 13 agricultural specialty areas include: agricultural business, agricultural economics and market development, agricultural engineering and farm machinery, aquaculture, crop production and management, extension education, higher agricultural education and vocational-technical education, horticulture and cold chain management, livestock production and animal health, organizational management and leadership, soil fertility and land reclamation, water and irrigation systems, and youth development. Using the field notes and related documents of 14 agricultural specialists and eight provincial after action reports, relating to agricultural specialties, crosscutting constructs, and data collection and analysis protocols in eight provinces in Iraq from May- December, 2008.

Method

This study was an empirical case study of post-conflict agricultural development assessments and strategies in eight southern Iraqi provinces**.** This studies objective was a systems approach using qualitative methods to improve Iraqi agricultural practice, extension and training, community development, security, and policies for governance. The design called for a case study and a description of pre-deployment activities of a military-based civilian assessment team, initial organization and adjustments, and techniques for internal and external communication. Particular attention was given to agricultural specialties, crosscutting constructs, and data collection and analysis protocols in eight provinces in Iraq.

A single case study was utilized, in part due to the unique nature of the case. Yin (1994) said single-case studies are ideal for revelatory cases where an observer may have access to a phenomenon that was previously inaccessible. “These studies can be holistic or embedded the latter occurring when the same case study involves more than one unit of analysis, and in this case involves multiple provinces” (p.7).

Yin (2009) posited that case studies are the preferred method when (a) "how" or "why" questions are being posed, (b) the investigator has little control over events, and (c) the focus is on a contemporary phenomenon within a real-life context. These situations distinguish case study research from other types of social science research and are relevant where case studies attempt to explain a phenomenon.

Thick descriptions, both oral and written, of Iraqi production agriculture and associated life were gathered by Team Borlaug (2008e) and PRT members with the aid of personal security details courtesy of the United States Military. This information was gathered, over time, from a multitude of production based or related individuals using rapid rural appraisal/participatory rural appraisal techniques, with one caveat. Due to security demands interviews were often conducted in secure remote locations, farms, provincial governmental offices and other related areas including agricultural based markets and businesses.

Summary of Major Findings

Iraq is a country with stark contrasts; a country richly blessed with copious amounts of wealth in terms of natural resources including land, human capitol, and opportunity. Yet seemingly insurmountable issues continue to persistently plague most aspects of agricultural developmental opportunities; including lacking or non-existent

access to local markets, antiquated and confusing land tenure policies, poor or non existing critical infrastructure and little to access to educational opportunities for local producers. Additional barriers exist in relation to natural resource issues such as critical lacking infrastructure related to water supply and delivery, under developed and over utilized soils, lack of vegetable cold storage and local market access, lacking technical expertise relating to native crop and livestock production efforts.

The lack of access to basic sanitation needs for many communities; including access to potable water and waste water management infrastructure, the lack of developed transport infrastructure and virtually non-existent communication among key Iraqi governmental agencies and citizenship are all relevant issues that continue to plague the development sector.

Human resource related needs such as command-system governance, low aspiration and locus of control, aged technologies, de-coupled value chains, lack of cooperation and trust are mostly lacking and all issues of concern.

The Iraqi people are ready for success; agricultural education may very well be the banquet to satiate the hunger for such long-term success. Education and a skilled work force are culturally valued and are highly desired and sought after. Research, Extension and University education programming are critical and sought after by the Iraqi producer; with the Iraqi Agricultural Scientist often seeking to communicate and collaborate with extension and producer/production personnel. Weak infrastructure makes communication and collaboration difficult.

A multitude of barriers exist in developing and returning a lagging, war torn economy and infrastructure to a productive, vibrant state. One of the most socially

noticeable issues at hand includes the urgent need for a national policy which addresses a functional land registration system. The lack of a national land tenure policy is likely one of the most restricting issues Iraqis have to face in overcoming major obstacles related to reconstruction and economy growth. Lack of land ownership prohibits acquiring credit and potential expansion of a producer's agronomic production base; without credit and economic growth, the agricultural production sector will likely remain stagnate

For farmers to feel more secure to pursue their farm expansion, land ownership issues will have to be addressed. A majority of Iraqi producers are tenant farmers and lack the knowledge and motivation for expansive land development and property as well as machinery investment. Landless producers are often capable and guilty of exploitative land use practices that maximize short-term gains at the expense of sustainable production practices. Providing producers with terminal land use rights, including outright ownership, is an essential requirement for land conservation and sustainable land use practices.

Water, and more specifically provision of such, is often mentioned as one of the most prevalent limiting issues in the minds of Iraqi farmers and agricultural communities. Lack of water quantity and quality has been identified as major impediments and limiting factors in increasing agricultural production. Iraqis are often frustrated with the government for lack of support in provision of water. Most Iraqi producers feel as water should be free of charge and readily available for their use. Water quantity, quantity and distribution are limiting inputs in Iraqi agricultural production. Irrigation infrastructure was largely neglected by the previous regime,

furthering producer dependence on deeper and more expensive groundwater sources. Due in part to shortages of electricity, and lacking or disrepair of infrastructure utilized for transporting and pumping water, inadequate drainage systems and increased soil salinity; Iraqi producers have not yet fully recognizing the potential of their arable land. Transboundary negotiations for water rights and security on the Tigris and Euphrates rivers is critical to Iraqi production; new, effective water allocation treaties and methods are needed, modern canal cleaning and restoration coupled with improved and efficient water use practices are essential for immediate and long-term viability of water dependent production.

Most students lack awareness of employment opportunities. A pervasive historical belief among students is there will be a government job awaiting them upon graduation. The need for basic, applied educational opportunities for youth, women and war widows is paramount. The lack of access to basic educational incentives and opportunities are a stark reality for many Iraqi's. Iraqi women play a critical role in production or rural agricultural goods and services; educational opportunities for their betterment are of paramount concern. For many, the lack of basic education access and ongoing educational opportunities is a guaranteed tie to the ongoing, grinding poverty and instability.

Formal and non-formal educational opportunities are a major key to development of Iraqi agriculture, community and food security. Basic, rudimentary education is of paramount concern to Iraqi citizens; including youth development, vocational-technical skills training, preparation for and access to higher education

opportunities with the hope of securing basic employment for the betterment of self and community.

Continual outreach education and training by extension-based agent and university personnel, as well as formal producer-based education will play a pivotal role in working to educate and inform Iraqi producers as to modern farming practices and techniques, as well as modern livestock-based production issues.

Duplication of extension services and their related efforts must be managed or eliminated. The duplication of efforts by dual extension services may be as simple as communication which facilitates the building of trust; a critical component that is now lacking among agencies. Education and outreach efforts that focuses on problems rather than mere outcomes may prove to be a comparative advantage related to current agricultural production in Iraq.

The interdependent, subsidy enabled mentalities and outright apathy of many Iraqi producers coupled with a perceived lack of effective governance and lacking policy development have evolved to foster a welfare mindset for many Iraqi producers.

Many of Iraq's producers are considering change; willing to consider new organizational strategies, new technologies and new marketing strategies in order to improve their quality of life and enhance their competitiveness. A historical precedence of existing former regime agricultural policies appears to persuade farmers to conform to plans established by the central government. The act of removing independent decisions needs to be dismantled and independent action and participatory decision making processes need to be promoted. These problems are often amplified by confusing and cumbersome bureaucratic business procedures and governmental

policies with lacking or virtually non-existent dispute resolution procedures. Nominal understanding of realistic business plans and their implementation plague many farmers. Producers lack knowledge as to how to best utilize bank loans or credit to further develop and diversify their businesses, often with land ownership and tenure noted as major stumbling blocks and limiting factors for producer loans. Basic and agricultural literacy is a limiting factor for many on going educational and training program opportunities.

Iraqi leadership currently places more priority on domestic welfare, peace and economic stabilization and prosperity than on global economic competitiveness. This focus is achieved via input subsidies, guaranteed product prices and food distribution. This priority facilitates a division among members of leadership, society and the general producer. The infantile theory of democratic self-governance and teamwork as applied to agricultural production and food security for the betterment of society has yet to gain popular ground throughout the Iraqi populous. Equity management is a problematic concept application for many Iraqi producers. Favoritism and corruption exist in specific agricultural associations, which have potential to be a significant impediment to producer success if not adequately addressed in a timely manner. A lack of leadership relating to infrastructure development foresight and project planning exist in many provinces of Iraq. General disregard for project planning and site management has caused excessive spending with minimal benefit to the agricultural sector or donors.

Illegal foreign competition is a limiting factor relating to Iraqi fresh vegetable and produce production. Cheaper production and often illegal importation from

neighboring countries such as Syria and Iran pose significant complications to the sustainability and future development of such enterprise sustainability in Iraq. Little evidence exists of foreign competition for animal protein in the local market place except for whole frozen broilers and fish. Exorbitant costs associated with production inputs (electricity, fuel, seed and fertilizer) as well as vague and contradictory laws and restrictive rules and regulations are major impediments to economic growth. Iraqi governmental food aid and medaling competition has marginalized and compromised Iraqi producer efforts to increase profit, build equity and maintain self sufficiency. It is generally recognized and accepted in the long-term that some Iraqi agricultural portions of the economy will not be globally competitive. For a few select Iraqi commodities such as dates, grapes, stone fruits and pomegranates, all of which stand to promote Iraqi global competitiveness regarding quality and value; global competition may be a real possibility.

Governmental support of selective agricultural sectors provides immediate results in preventing hunger and severe poverty. These food basket policies support the populous of a rural economy, rather than forcing them to becoming job-seekers in the cities.

Lack of communication between groups is often mentioned as a major impediment to progress. This lack of communication is often mistaken for ill will or mistrust between or among major Iraqi entities. Realistically, it is often simply a lack of ability to gather and communicate needs and differences. Lack of communication fosters absence of collaboration and growth; quality communication needs to be fostered and implemented.

Lack of efficient, reliable market transportation poses a serious threat to Iraqi production. Agricultural development depends on adequate infrastructure that includes a viable road system, reliable electrical power distribution, universal access to potable and wastewater water distribution and handling systems as well as wholesale agricultural market development. Major gains in intrastate infrastructure are duly noted, yet much work is needed in securing and developing the countries primary and secondary road and transportation infrastructure.

Pervasive lack of physical infrastructure, including the need for improved public health and sanitation is of critical concern. Access to basic sanitation needs for many communities; including access to potable water and waste water management infrastructure, reliable electricity and water distribution, and readily available common fuel sources, are major impediments for the Iraqi people.

Poor animal and livestock practices prevail. Many livestock producers are lacking in basic knowledge and applied application of elementary enterprise-specific production practices. Basic animal science based production practices and quality assurance principles are virtually non-existent; identification and control of internal and external parasites, use of vaccines, nutritional deficiencies, proper ration formulation, sanitary and phytosanitary practices, reproductive efficiency/performance, as well as knowledge of communicable diseases. This lack of knowledge and protocol is reflective in all major species of livestock of economic importance to Iraq, including poultry, sheep, goats, and cattle/water buffalo. Meat slaughter and fluid milk sanitation and HACCP practices are virtually non-existent. Custom animal handling and

harvesting protocol, use and handling of byproducts are often inappropriate and promote disease.

Drought and related water depletion practices and dwindling range capacity is devastating producer equity as animals are sold to maintain family needs. Depletion of range units via unrealistic stocking capacity and poor or nonexistent enforcement of range management policies and procedures continue to take their toll. Especially hard hit are nomadic peoples such as the Bedouin, who continue to lose historic tribal grazing and watering lands, with few viable options but to sell their herds.

A general disregard for routine maintenance and overall machinery disrepair, burdened with the lack of adequate tillage and planting implements are major impediments to production in most rural areas of Iraq. A multitude of brands and types of specific tractors and implement manufactures exist in Iraq, making parts sourcing, servicing, and maintenance problematic. It would be of great benefit to adhere, when possible, to as few brand name equipment manufactures as possible. Inefficient and poorly executed farming practices are ongoing and counterproductive to increasing the yield and sustainability of the Iraqi producer. The use of modern limited or no-till applications and techniques should be explored and implemented where possible. However, caution must be exercised when considering the replacement of existing labor with exclusive mechanical power.

The current agricultural market needs to maintain full employment with potential to adapt over time. Need and opportunities exist relating to training of technical expertise and facilities for enterprise specific maintenance. The rudimentary lack of basic mechanical knowledge, lack of basic tools and fundamental maintenance

facilities are limiting factors in mechanized sustainability. New crop varieties are encouraged to be tested and implemented when found to be practical.

Alternative power means are often deemed viable for many applications and need further exploration, such as solar panel applications and windmills. These technological adaptations and applications stand to provide Iraqi producers with more production incentive and potential income source opportunities.

Sheikhs and boards of directors of agricultural associations and or agricultural unions are fairly well organized and as change agents strongly shape community involvement and the decision making processes. Agricultural associations should be utilized to provide support services for producers via existing providers, such as local machinery and mechanization experts, veterinarians, seed and chemical specialists, agronomists, banking, credit and lending specialists and related professionals. In addition, the buying (and selling) power associated with agricultural unions and cooperatives would serve Iraqi producers well in minimizing seed, chemical, petroleum and related fertilizer expenses. Agricultural associations can be instrumental in developing and implementing policies dealing with outside economic influences and potential related corruption.

Application of indigenous knowledge, skills and experience of local human resources, as well as infusion of modern practices and technology, are mutually critical components of advancing agriculture in provinces of Iraq. Change agents can be significant in relationship to providing this cultural paradigm shift, especially for late-adopter inclusion. Lack of communication, conflict related to difference of opinion, and the reluctance and resistance to change, as well as tight hierarchical confinement

may lead to a lack of effective relationships and distrust. Change agents prove to be invaluable resources in the mitigation, development and implementation of new and improved food security based opportunities and programs.

Iraq enjoys a rich resource base of arable land. Expansive areas of rangeland with copious capacity for livestock production exist in Iraq. Capacities of range units are limited due to severe, prolonged drought, soil salinity and desertification conditions often symptoms of mismanagement. Land reclamation project are in the works and can be successfully completed in as little as a single year; yet unless reclaimed, this land is virtually useless for effective production efforts. Many ill advised practices continue to plague Iraqi soil quality; poorly executed flood irrigation methods, absence of soil testing practices, misuse of agricultural chemicals and fertilizers and disrepair of water handling and delivery systems are major contributors to soil based maladies. Production is often constrained due to the allocation of soils; not the lack of productive soils. The need for conservation reserve type programs and land tenure reform in Iraq is of utmost importance in solving constraining issues related to production efforts.

Summary

The purpose of this study was to synthesize emergent agricultural development reports related to post-conflict needs assessments in eight southern Iraqi Provinces. A single case study was utilized, in part due to the unique nature of the case. According to Yin (1994), single-case studies are ideal where an observer may have access to a phenomenon that was previously inaccessible. These studies can be holistic or embedded, the latter occurring when the same case study involves more than one unit of analysis, and in this case multiple provinces.

Both post-conflict Iraqi social and technical knowledge skill areas and agricultural theme areas examined by this study reveal dilemmas. Issues are often exacerbated by lacking agricultural production and processing technical knowledge and competency, marginal and often inadequate production inputs, antiquated agricultural infrastructure, markets, storage and policy.

Additional societal issues relating to production noted in this post-conflict study include; high unemployment, under employment, lacking educational opportunities – including Iraqi youth access to basic and career/technical and higher educational opportunities, lacking or ineffective governmental services and communication. Parallel issues affecting agriculture production include; land tenure policies and interpretation, ongoing security issues, apathy, and corruption.

Conclusions

The following conclusions were drawn based on the findings of this study:

It was found that Iraqis have historically valued education and the related societal benefits education provides. This remains true today. Although education remains out of reach for a majority of people, provision of modern educational facilities and programming that will assist in provision of basic and higher learning as well as vocational/technical opportunities for producers, youth, women and minority groups are paramount. Provision of applicable modern intra-curricular and extra-curricular opportunities and related educational activities will likely boost school attendance and reduce Iraqi youth exposure to unnecessary and unwarranted negative and potentially dangerous influences. Iraqi youth are likely and willing implementers of change. As Iraq braces to transition from a command economy to a market

economy; many older producers will likely look to younger more progressive producers for new leadership.

Opportunities exist for agricultural associations to become principal actors serving as educational, procurement, service and distribution agents; offering their services to producers at a fair market price and returning profit for reinvestment to the association for procurement of future goods and services to be leveraged by agricultural association members; this transforms agricultural associations into a pseudo co-operative for farmer members, with return distributions to be allocated on farm size and enterprise.

It is known that continued conflict and unsettled economic and political turmoil may be the largest impediments to development in many provinces of Iraq. An undereducated, young and impressionable menial-skilled workforce stands to be a major impediment to the long-term development and potential well-being of Iraq. Rural to urban migration and the potential for related social unrest caused by unemployment may threaten security and stability. Insurgent and other related belligerent forces stand to be irresistible prey to unskilled youth who have little option or opportunity in a technical based workplace.

Promising Practices

For this study a promising practice is defined as a specific action or set of actions exhibiting inconclusive evidence of success or evidence of partial success. It may or may not be possible to replicate a promising practice in more than one setting (USAID, 2010).

Promising practices identified by this study were as follows:

The application and utilization of proven, applied basic theories in guiding development and sustainability is extremely beneficial in providing focus and continuity. Maslow's Hierarchy of Need is fundamentally universal yet very poignant in grounding and facilitating the awareness for basic human needs; especially in dire, post conflict communities. In addition, Roger's Diffusion on Innovation Theory serves as a beacon to help guide the effective practice and effective use of opinion leaders and their application in gaining and guiding popular opinion. Such applications are paramount in helping provide conflicted communities with newer more efficient and productive agronomic efforts and practices via awareness and guided opinion.

The strategy utilized by Team Borlaug (2008e) to frame their data collection utilized the six knowledge domains identified in the field of agricultural education by Shinn, Baker, and Briers (2008) and Shinn and Briers (2009b) including planning and needs assessment, instructional design, delivery strategies, evaluation and accountability, research and development tools, and context, culture and diversity.

The triangulation of AO data and comprehensive approach utilized by the team leaves little doubt to the identified needs, priorities and methods to be utilized in the development approach. No single event or action was viewed as inconsequential and arbitrarily removed form the project or report.

The utilization of a multi-discipline team approach to identify and address complex issues is effective. Issues are often clouded and concealed by self-perception. Iraqi producers may fail to see issues, due to their unique and linear perspective. A

team comprised of multi discipline researchers given appropriate techniques and time, may very well see and provide unique alternatives to nontransparent issues.

The inclusion of local university, extension, and farmers/producers in the developmental process not only assists in guaranteeing researchers local access, but fosters and builds clientele trust, it also empowers these local entities in identifying needs and provision of related services; it also building local trust and camaraderie.

The utilization and inclusion of unique social and cultural audiences and their norms and values is important. Food security and related issues should be inclusive of all, including minority and underrepresented audiences, as in this case Bedouin and women; especially when they are intimately involved in the agricultural production process.

Agricultural education is a major spoke if not the hub of the large wheel of disciplines that play major roles in international food provision and security. All too often the societal aspects of production agriculture are overshadowed or overpowered by the production sciences. We must take care to balance the most important element in successful development – people, from the production equation, as they are the driving force in progressive agriculture.

Recommendations for Further Study of Practice

In conducting this study, several related questions relating to agricultural development assessments and strategies in post-conflict settings surfaced. Some of the related questions that emerged during the course of this study include:

The need exists for additional, detailed information and explanation relating to the specific approach and execution of the rapid rural participatory appraisal process/assessment utilized for this study is recommended.

Incorporation of a means to help quantify or measure the return on investment relating to international efforts of this magnitude and type would be of benefit to justify future efforts, potential alliances and funding agencies.

The need for additional research and provision of issues related to technical assistance provision for critical agronomic crop and livestock enterprises that benefit Iraqi producers. Iraqi producers are in need of additional training in best management practices related to livestock and crop production scenarios. The identification of producer needs would be of benefit to extension and university personnel in the development and provision of producer needs.

A need for further research relating to modern electrical and water infrastructure development and provision strategies would benefit to Iraqi producers. Iraq is blessed with an abundance of productive soil; limiting constrains often include water and electrical service infrastructure and distribution as well as relevant applied educational opportunities.

Immediate research related to current land tenure policy and governance is needed to facilitate change. Many of the issues Iraqi producers face today, including limited access to credit, micro-finance programs, enterprise expansion and growth are all severely inhibited by current land tenure policy and governance.

Further research to support agricultural planning, the strengthening of Iraqi agricultural colleges and bolstered support for structuring a framework for youth

enterprise and leadership development is needed. Iraqis recognize and value education. Critical needs exist for varied opportunities of youth and producer professional development and education related to best management farming and livestock production practices.

Additional research is needed to study the practical economic sustainability of historically important and culturally relevant crop varieties. Specific indigenous crops such as rice, dates, olive, citrus as well as other local cropping systems may prove to be important concerns to producers and their markets. In addition to historic and cultural crops other alternative yet viable options for production of potentially profitable crops include; soybeans, flax, millet and Milo.

Additional research is needed to develop curriculum and training to better inform Iraqi producers of livestock production as prime economic enterprises. Many Iraqis see livestock production as a secondary or tertiary endeavor to their main farming efforts. The opportunities of diversified production strategies may very well prove to be of great benefit as value added enterprises to many producers.

Dairy and central wholesale markets appear to be viable opportunities in Iraq and in need of further research.

It is recommended that Iraqi government, elected and governing officals be involved in all aspects of future developmental efforts.

While this study yielded rich information related to eight southern Iraqi provinces, the researcher contends that additional useful information exist from other provinces not included in this project.

Suggestions for Further Study

In conducting this research, other notable issues surfaced regarding needs affecting post-conflict populations. Related issues that have emerged from this research include:

1. The need for youth development programs. Including intra and extra-curricular applications for agricultural production training, self development and professional development opportunities for Iraqi youth.
2. Additional development and practical application of extension service programming and personnel in Iraq is needed. Including formal university and field based agents and related programming.
3. Land tenure and related policies are often identified by Iraqi producers as a major impediment. Further study relating to land use policy and its effect on Iraqi production is warranted.

Next Steps

For continued success and to promote Iraq in achieving self sufficiency and food security, modern sustainable resource and productions practices must be taught, promoted and readily adopted/embraced via trusted and capable extension and university personnel.

Private and public agricultural based entrepreneurial efforts and partnerships should be sought and fostered via collaborative governmental and private industry funding. Assistance in identifying and alternative marking scenarios for locally produced goods, including niche and value added markets and will help promote a larger production clientele and consumer base.

Antiquated, ineffective production and marketing policies restrict producer motivation, effectiveness and livelihood are in need of immediate revision.

Grassroots producer education efforts are sorely needed. Such efforts need to embrace all interested producers regardless of gender, age or handicap.

Promote the use of rural Technical Service Centers. Such centers may prove to be instrumental opportunities for fostering grassroots producer confidence in applied agricultural education opportunities, as well as the adoption/implementation of improved production practices, methodologies and inputs.

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