

REPORT DOCUMENTATION PAGE**Form Approved**
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Washington Headquarters Service, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188) Washington, DC 20503.

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1. REPORT DATE (DD-MM-YYYY) 05-14-2010		2. REPORT TYPE Master of Military Studies Research Paper		3. DATES COVERED (From - To) September 2009 - April 2010	
4. TITLE AND SUBTITLE Agriculture Development in Afghanistan: A Systemic Assessment Approach				5a. CONTRACT NUMBER N/A	
				5b. GRANT NUMBER N/A	
				5c. PROGRAM ELEMENT NUMBER N/A	
6. AUTHOR(S) Major Joel L. Garrison III				5d. PROJECT NUMBER N/A	
				5e. TASK NUMBER N/A	
				5f. WORK UNIT NUMBER N/A	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) USMC Command and Staff College Marine Corps University 2076 South Street Quantico, VA 22134-5068				8. PERFORMING ORGANIZATION REPORT NUMBER N/A	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) N/A				10. SPONSOR/MONITOR'S ACRONYM(S) N/A	
				11. SPONSORING/MONITORING AGENCY REPORT NUMBER N/A	
12. DISTRIBUTION AVAILABILITY STATEMENT Unlimited					
13. SUPPLEMENTARY NOTES N/A					
14. ABSTRACT Value chain assessments combining open system theory and value chain analysis offer a systemic assessment method capable of framing the complex problems that limit effective long-term sustainable agricultural development and efficient prioritizing of projects in resource constrained environments like Afghanistan. The value chain assessment presented in this study meets the intent of thorough problem framing. It offers a broader, more holistic understanding of the current conditions that hamper agricultural development. Value chain analysis combined with open systems theory captures all requirements necessary to most effectively frame a problem and make a thorough assessment that will support decisions leading to a self-perpetuating system capable of replacing the current antiquated and drug yielding agricultural economy.					
15. SUBJECT TERMS Problem Framing, Open Systems Theory, and Value Chains					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT UU	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON Marine Corps University / Command and Staff College
a. REPORT Unclass	b. ABSTRACT Unclass	c. THIS PAGE Unclass			19b. TELEPHONE NUMBER (Include area code) (703) 784-3330 (Admin. Office)

United States Marine Corps
Command & Staff College
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2076 South Street
Marine Corp Command Development Command
Quantico, Virginia 22134-5068

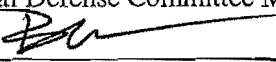
MASTER OF MILITARY SCIENCE

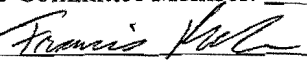
**AGRICULTURE DEVELOPMENT IN AFGHANISTAN:
A SYSTEMIC ASSESSMENT APPROACH**

SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF MILITARY STUDIES

**MAJOR JOEL GARRISON
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Executive Summary

Title: Agriculture Development in Afghanistan: A Systemic Assessment Approach

Author: Major Joel L Garrison III, Army National Guard

Thesis: Value chain assessments combining open system theory and value chain analysis offer a systemic assessment method capable of framing the complex problems that limit effective long-term sustainable agricultural development and efficient prioritizing of projects in resource constrained environments like Afghanistan.

Discussion: The Army National Guard's Agribusiness Development Teams are the United States Government's tactical level assets tasked with increasing Afghans' confidence in their government and increasing agriculture sector jobs and income. This task requires Agribusiness Development Team leaders to make difficult decisions in a complex environment. Members of Agribusiness Development Teams are some of the world's best farmers, ranchers, and horticulturalists, but like most members of the military they are not properly trained to frame the type of complex problems facing agricultural development in Afghanistan. Additionally, the current assessment procedures meant to support problem-framing are partially presented and lead to a narrow understanding of the problem. Tactical level success depends on efficient and effective project assessments. This study provides deploying Agribusiness Development Team leaders an assessment process based on the new concept of problem framing. The sample assessment demonstrated in this study uses a combination of open systems theory and value chain analysis to support problem framing. The Center for Army Lessons Learned published the first *Agribusiness Development Team Handbook* in November 2009. This study is a supplement to this handbook. The handbook uses terminology and provides several practical examples based on the concept of problem framing, open systems theory, and value chain analysis; however, the handbook does not provide a proper introduction to these concepts and continues to direct ADT leaders to use the current assessment procedures with little instructions.

Conclusion: The value chain assessment presented in this study meets the intent of thorough problem framing. It offers a broader, more holistic understanding of the current conditions that hamper agricultural development. Open systems theory allows practitioners to more fully frame the problem by first identifying and then connecting all the necessary resources (inputs) required to reach agricultural sustainability or any objective end-state. Value chain analysis allows each segment of a problem to be analyzed in terms of strength or in terms of the value it adds to the profit margin of the final crop, produce, or commodity. After framing the problem, ADT leaders can assess the cost of repairing value chains to one other value chains they construct in problem framing. They may decide that a project for one portion or several different parts in a value chain is not worth the investment cost or is too risky for various reasons. The example assessment based on systemic problem framing supported by open systems theory and then assessed using value chain analysis is easy to replicate for any crop, produce, or commodity targeted by tactical development leaders for revitalization. It is adaptable for any size project and customizable to any locality. Value chain analysis combined with open systems theory captures all requirements necessary to most effectively frame a problem and make a thorough assessment that will support decisions leading to a self-perpetuating system capable of replacing the current antiquated and drug yielding agricultural economy.

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Preface

This paper reviews a number of government documents, media articles, and academic studies in an attempt to identify the dominant historical, attitudinal, and structural factors limiting Afghanistan's agricultural develop. One of the primary source documents is the Center for Army Lessons Learned's *Agribusiness Development Team Handbook* published in November 2009. The handbook focuses on friendly operational matters to include purpose, training, security, command structure, lines of communication, support structure, and a section on general Afghan culture. It also provides an example of a village assessment tool referred to as the Tactical Conflict Assessment Framework. After conducting an extensive review of literature concerning the Afghan agricultural situation, the Tactical Conflict Assessment Framework seems to only partially suggest problem framing as a tool for understanding the complex environment facing Agribusiness Development Teams. I soon came to believe this project should focus on supplementing the shortcomings in the handbook, namely a full understanding of the new concept of problem framing. This thesis is worth reading for two reasons. First, I believe the assessment process presented in this project will help Agribusiness Development Team leaders think more deeply about the problems they face. Second, the assessment method built on open systems theory and value chain analysis is capable of assisting Agribusiness Development Team leaders in selecting Afghan development projects that offer the highest probability of long-term success.

The magnitude of this project required a large amount of time and a high level of expertise. It could not have been completed without the support of several individuals. The primary guidance was provided by Dr. Rebecca Johnson, Assistant Professor of National Security Affairs, at the Marine Corps Command and Staff College, who served as my mentor for

this project. I am very thankful for Dr. Johnson's knowledge and for keeping me on the right track. I further appreciated the advice and recommendations offered by Major Michael B. Singleton and Ms. Claire Henline. Major Singleton serves as a member of the National Guard Bureau's Afghan Agribusiness Development Team Program and Ms. Henline serves as a Strategic Communications expert at the Army National Guard Directorate. I am also thankful for the input provided by Mr. Greg Bates. Currently Director of Operations for FedSys, Inc., Mr. Bates served as a member of a Provincial Reconstruction Team in Iraq during the 2006 surge and is a subject matter expert on assessment planning for development projects. Finally, I would be remiss if I did not acknowledge the support of my family: my wife Leigh Ann, and our two wonderful children, James and Jacob. I am very grateful to each of you for your patience and support.

Agriculture is the dominant factor in the Afghan economy, in food security, in livelihoods, sustainable resources, and national security. Agriculture will determine whether Afghanistan will succeed or fail.

—Mohammad Asif Rahimi,
Afghan Minister of Agriculture, Irrigation, and Livestock (MAIL)

COMPLEXITY BEYOND TRADITIONAL PROBLEMS

Value chain assessments combining open system theory (OST) and value chain analysis (VCA) offer a systemic assessment method capable of framing the complex problems that limit effective long-term sustainable agricultural development and efficient prioritizing of projects in resource constrained environments like Afghanistan. A vicious combination of historical, attitudinal, and structural factors limit Afghanistan's agricultural development. Many of these destructive obstacles began with the Soviet Union's invasion and subsequent occupation. Soviet intervention initiated a long and painful decline in the agricultural system throughout Afghanistan. Severe drought, civil war, and oppression by the Taliban followed the Soviet withdrawal.¹ The pre-occupation Afghan agricultural system produced enough food to feed the population with excesses netting sizable export sales in 1978. Most Afghans now cite economic needs as their top concern. The Government of the Islamic Republic of Afghanistan (GIROA) studies state the revitalization of agriculture remains the most promising sector for the long-term economic stabilization of the country.²

The United State Government (USG) has provided the GIROA almost \$8 billion for development assistance in Afghanistan. Approximately five percent of USG Afghan funds go towards improving agriculture. As the lead USG agency for non-military development aid, the United States Agency for International Development (USAID) works with the GIROA's Ministry of Agriculture, Irrigation and Livestock (MAIL) to set strategic goals and policies for all

agricultural programs in Afghanistan. The strategy supports agricultural economic development in Afghanistan by:

1. Training farmers in modern farming, storage, and marketing methods as well as modern animal husbandry and livestock management techniques.
2. Building roads and investing in power-generation and expansion programs.
3. Constructing and rehabilitating wells; improving irrigation.
4. Sponsoring programs to improve the health of people, livestock, and crops.
5. Distributing high-quality seeds and fertilizers.³

The USDA lists close to 100 international implementing partners on their Afghanistan development website.⁴ Even with the large number of partner agencies, the USAID is understaffed in Afghanistan and depends on military support to conduct a high volume of tactical, day to day, hands on development work.

The primary US military component providing formal support to the USAID is the Army National Guard (ARNG). In 2006, the ARNG began organizing Agribusiness Development Teams (ADTs) based on previously specially designed units deployed throughout Central America in the 1980's and 1990s.⁵ The number of ARNG ADTs serving in Afghanistan grew from one team to nine teams that now cover 17 provinces. As a result of this growth, the Center for Army Lessons Learned (CALL) published the first *Agribusiness Development Team Handbook* in November 2009. Written by ARNG ADT subject matter experts, the handbook offers valuable and practical information meant to guide ADT operations. A list of ADT guiding principles, goals, and top-five MAIL projects populate the handbook. Descriptions of each of the key organizations directing ADT efforts and an explanation of how they relate to the ADT program round out the handbook. This paper supplements the CALL publication by offering an

introduction to a systemic assessment method capable of achieving agricultural revitalization in Afghanistan.

The *Agribusiness Development Team Handbook* references many of the terms and concepts discussed within this paper to include systems, inputs (resources), and value chains. The *Agribusiness Development Team Handbook* stipulates of every ADT project incorporate value chains but does not provide sufficient instructions or examples for such integration.⁶ This supplement goes into more detail, offering background material and a value chain assessment that allows ADT leader to better understand and utilize these concepts. The handbook directs ADT leaders to work hard to develop relationships with local farmers and to seek local opinions. Relationship building is an important task, but the handbook further directs using a village assessment model referred to as the Tactical Conflict Assessment Framework (TCAF) to determine current development projects. The TCAF leads to development projects focusing on framing the problem of one particular village. Compromise between village elders or key local indigenous leaders and the ADT leaders often shapes many project decisions. One of the limitations of this approach is the lack of program design. The TCAF is unable to properly identify, connect, and analyze the systemic issues transcending a single village. TCAF does not instruct team leaders how to prioritize, develop, and connect projects throughout their area of operations (AO). This inability to frame problems in an interconnected and complex environment leads to a high number of village centric, isolated, short-term, and potentially non-sustainable solutions.

To avoid the sand traps of short-term development projects, ADT leaders must turn to comprehensive and holistic problem framing that leads to long-term sustainability. The operating environment requires immediate impact or quick wins ingeniously orchestrated to overcome

decades of destruction while providing the foundation for a lasting peace. The challenges in developing a stable and sustainable agricultural system in Afghanistan are complex and beyond traditional problems. Three decades of negative events rendered almost all aspects of a once burgeoning agricultural system inoperative including access to international markets. An illicit and corrupt system centered upon opium production now fills the vacuum created by these broken links. Replacing Afghan's drug industry requires properly framing the problem. The proposed assessment presents a broad understanding of the array of requisite missing or misused vital resources (inputs) and attributes necessary to support successful legal agricultural commerce.

INTRODUCTION TO OPEN SYSTEMS THEORY AND VALUE CHAIN ANALYSIS

Ludwig von Bertalanffy first postulated the concept of OST. He believed many realities resemble living systems characterized by interdependent structures functioning together to survive. These interrelated parts move through a life-cycle linking together to form a non-linear system for the purpose of adapting to the elements of their external environment.⁷ Three important properties of OST are negative entropy, congruence, and life cycles.⁸ Negative entropy is essential for sustainment because it enables a system to "overcome the universal law of nature in which all forms of organization move toward disorganization, or death."⁹

Entropy is the measure of randomness and disorder in the universe. According to the Second Law of Thermodynamics, "closed-systems" move toward increasing disorder or higher levels of entropy. However, "open-living systems" display an opposite tendency; they move toward order, thus generating negative entropy.¹⁰

Achievement of negative entropy stems from the renewal of resources or inputs needed for a system to sustain itself and grow. Congruence is synonymous with fit, alignment, and synergy. Good congruence is evident when a system experiences high performance. High performance requires each part of the system work in mutual support. The system is most efficient when the

subcomponents support each other. High performance systems require the least amount of negative entropy.

A generic OST life cycle includes: (1) gestation; (2) growth; (3) maturity; and (4) transformation (see figure 1).¹¹ The gestation phase is the beginning point for a new system. For instance, in 2001 the country of Afghanistan entered a gestation phase. The new system may be as complicated as a collection of ideas or goals for building a nation or as simple as an idea to plant crops, grow some produce, or develop a commodity. The required resources must be acquired to move a concept into a functioning system. Once these resources are obtained (i.e. USAID dollars), the outlines of the system are in place and it moves into the growth phase where it takes initial form. During the growth phase, inputs immediately begin to detract or add value to the system's efficiency. At the growth stage, "the adolescent nature of the organization limits the group's [system's] ability to differentiate alternatives, assess outcomes, and orchestrate functions that consistently reflect purpose."¹² As the surge moves forward, the hope is that Afghanistan is rapidly advancing through the OST growth.¹³ If the system survives, it moves from the growth phase to the maturity phase. The maturity phase is the point when the system is most efficient or the most profitable point for a crop, produce, or commodity. The final stage, transformation, occurs when the system experiences a rapid change leading to the system's death, near collapse, or rebirth.

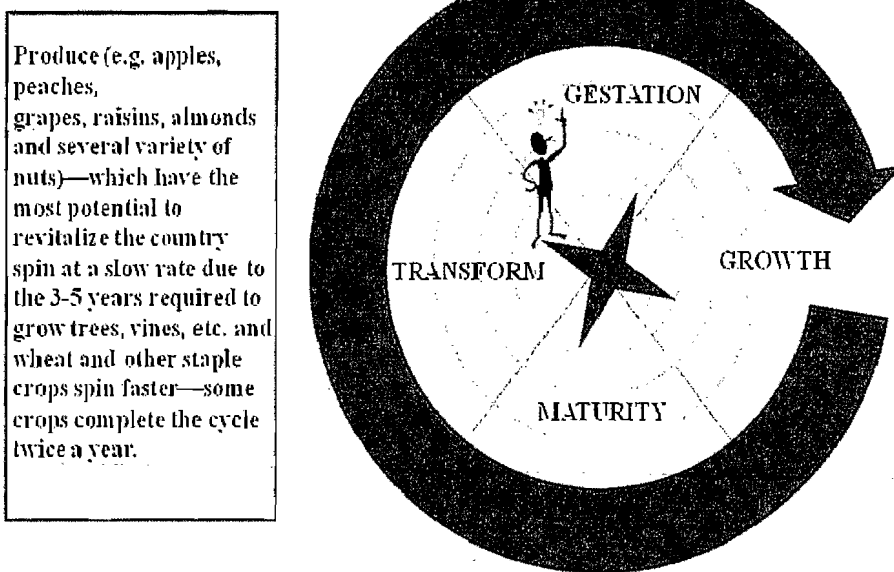


Figure 1. OST Life Cycle Diagram - adapted from Thomas and Casebeer

Understanding OST is helpful to complex problem-solving because it allows the problem-solver to frame the problem into an ordered network. The framed problem presents a blueprint or model that the problem-solver can access.¹⁴ VCA allows assessment of the three important properties of OST and their qualities. VCA allows for evaluation of each aspect of the system according to the value the part or component adds to the process. These evaluations are most crucial in the OST growth phase. VCA is extremely valuable to assessments in Afghanistan as the country moves through the OST growth phase Afghanistan. Michael Porter introduced a generic value chain model in his 1985 book *Comparative Advantage*.¹⁵ Similar to problem framing using OST, the rationale behind VCA is based on dividing a company or firm's major activities into subcomponents. The parts are then analyzed for quality, quantity, efficiency and competitiveness. The cost of each activity should be lower than the value added toward the final amount a customer is willing to pay for the finished product.

Porter identified ten drivers that add cost to the value chain cycle: (1) capacity utilization; (2) institutional factors; (3) economy of scale; (4) linkages among activities; (5) degree of

vertical integration; (6) geographic location; (7) learning; (8) interrelationship between units; (9) policy of cost or differentiation; and (10) timing of market entry.¹⁶ If ADT leaders want to maximize effectiveness, they should incorporate these VCA drivers into their assessments. These drivers add a measure of quality management to OST problem framing. Afghanistan agricultural revitalization is a dynamic and complex problem requiring both a systemic (OST) problem framing and the ability to assess the quality of smaller subcomponents (VCA) in order to determine and prioritize the resources and efforts an ADT team should devote to a development project.

CRITICAL QUESTIONS FOR COMPLEX PROBLEM SOLVING

Given the dynamic and complex agricultural environments created by over 30 years of conflict in Afghanistan, the key questions which guide this study are: What are the problems facing ADTs entering Afghanistan? How does OST frame these problems? What are the main areas (inputs) influencing the agricultural system (outputs) in Afghanistan? How do the parts interact to support ADT efforts and what is the quality of these parts when assessed using VCA drivers? How might these parts be displayed using VCA drivers? What are the best actions likely to add value toward the Afghan agriculture system becoming a coherent self-organizing system that can grow and sustain itself in the face of its ever-changing environments? Problem framing, OST, and VCA will not provide a right answer to each of these questions, but arms the ADT leader with a general framework to conduct stronger assessments.

INTRODUCTION TO COMPLEX PROBLEM SOLVING

OST is perfectly suited to frame non-linear problems or what scientists refer to as an interactively complex system. Lieutenant General Paul Van Riper, (US Marine Corps, Retired), a leader for innovative problem-solving techniques, refers to the unorthodox environment present

in Afghanistan as an ill-structured, or a “wicked” problem.¹⁷ As a “wicked” problem, Afghanistan agricultural revitalization does not have one solution. Ill-structured problems require a systemic approach to ‘most fully’ understand them. The term ‘most fully’ is used because the fluid dynamics of the situation make complete knowledge an impossible task. The US Army and Marine Corps are both currently debating the method which provides the best systematic understanding of the operational problems warfighters face. The new concept common to both components is referred to as Operational Design.

Both services are working through internal disagreements over Operational Design implementation. One change assured survival is the notion of problem framing, tabbed to become the first step in a revised problem-solving process. Problem framing requires commanders engage key staff members, and others with knowledge of the problem, in dialog to most fully understand the problem situation. Problem framing is the preferred approach because today’s issues are too complex and often involve myriad competing variables versus a single issue. In a 2008 memorandum entitled, Assessment of Effects Based Operations (EBO), General James Mattis (US Marine Corps), Commander of US Joint Force Command, describes his support for the concept of problem framing and outlines the danger of analyzing complex environments too narrowly. EBO is indicative of linear, cause and effect, and ordered effects thinking. EBO studies a system to identify a center of gravity or root variable:

Elements of these [EBO] concepts have proven useful in addressing “closed systems,” such as targeting where their effects can be measured [center of gravity analysis] per USAF’s deliberate analysis and targeting methods. However, the concepts have been misapplied by others to operations beyond their original intent, resulting in overextension and confusion. Therefore, we will change course and provide the joint warfighter with a more balanced and understandable framework in which to plan, execute, and assess operations.¹⁸

General Mattis believes, “the underlying principles associated with EBO...are fundamentally flawed and must be removed from our lexicon, training, and operations.”¹⁹

The reductionist approach is not limited to military operations. Many academic studies and articles written concerning Afghanistan unfortunately offer a root cause. This type of narrow reasoning suggests if the United States could fix one area of concern completely then the country would fully recover. Caution should be taken in following the advice offered in single issue studies. Valuable time may be lost on a single issue with little self-perpetuating results. For instance, water management, although extremely important, is only one part of a multi-tiered system with many important inputs. General Mattis closes his EBO memorandum with the following guidance for the way forward:

We must clearly define the problems we are trying to solve and propose value-added solutions that have been properly explored, validated and vetted. Our solutions must include clear language and terminology that promote shared understanding and enable subordinates to act, per Commander’s Intent, without single point of failure reliance on technology or burgeoning headquarters. Lastly, decentralized decision-making with emphasis on empowering subordinate’s initiative in accordance with intent, clearly defined objectives, and executable tasks is the best approach to achieve our goals.²⁰

The agricultural system in Afghanistan, as with most systems, is in a constant state of change. Properly managing this fluid environment requires establishing a thorough understanding of the problems framed by OST. Identifying necessary inputs to support legal agriculture requires OST. ADT leaders need an example of macro-level problem framing to support their understanding of the challenges faced in Afghanistan. Macro-level problem framing starts with an understanding of how historic conditions are shaping the current Afghan agricultural system.²¹

FRAMING THE AFGHAN AGRICULTURAL PROBLEM

Historical studies or a compilation of lessons learned provide the benchmarks for OST problem framing characterized by a number of conflicting, interconnected, and equally culpable

inputs or absence of needed inputs which hold back progress.²² The one commonality is the negative inputs associated with the Soviet occupation which led to a period of drastic transformation (part four of the OST lifecycle):

Although pre-occupation Afghanistan had fertile soils, ample irrigation water, and a hard working labor force, due to poor management, inadequate policy, and insufficient staff, little attention was paid to the improvement of agricultural, social, and economic standards of living in the country. Nevertheless, in spite of inadequate farm machinery, insufficient agricultural credit, limited agricultural extension, agricultural education and crop protection, poor transportation, and low farm income, Afghan agriculture was developing impressively before the occupation. Had the Soviets not invaded, Afghanistan would most probably have been on the list of developing nations, if not the top developing nation, in the region.²³

Ten years of war with the Union of Soviet Socialist Republics (USSR) destroyed livelihoods and resulted in an estimated one million Afghan deaths and nearly five million refugees:

...the dislocations of war over a very long period of time—destruction of traditional livelihoods, displacement of people, massive population growth, urbanization (including long stays in refugee camps or cities of neighboring countries), large-scale monetization of the economy, growth of informal and illicit economic activities, and environmental degradation—meant that return to the pre-war economy was not possible.²⁴

When the Soviets withdrew, the country turned to civil war as rivaling powers struggled for dominance. The country continued to decline between 1989 and 1991 when severe drought compounded the internal conflict. Instability in rural areas spread and the remaining fragile infrastructure fell apart and agricultural production lost most remaining negative entropy.²⁵ In 1992 the Population Crisis Committee surveyed 141 countries for human suffering and Afghanistan ranked third in the world under the title of “Extreme Human Suffering.”²⁶

The problem in Afghanistan cannot be properly framed without acknowledging how a lost generation impacts the country’s ability to recover and rebuild services and infrastructures. Many educated Afghans fled, which resulted in a “brain drain” of the most educated and skilled workers. This consequence still fosters a “knowledge gap” and contributes to the country’s

inability to rapidly rebound from decades of instability. ADTs are bridging this gap through education and training program designed to build capacity through knowledge transfer. The war was especially cruel for Afghans who remained. The Soviets destroyed a large number of villages, increasing the number of refugees crowding into the few settlements spared from destruction. To make matters worse, the Soviets purposefully targeted the Afghan agricultural system. Food shortages spread and exacerbated the humanitarian crisis. Facing massive overcrowding, destruction of the once burgeoning agricultural system, and lacking knowledgeable leaders, many farmers turned to the lucrative opium drug trade. The poppy profoundly changed life in rural Afghanistan. These changes differ from locality to locality. Discussion of many of these changes follow, but it is important to emphasize ADT leaders should begin their local problem framing by understand the local social structure to include people's skill levels and their crop preferences.²⁷

The depleted and desperate conditions left by the Soviets interconnected with other emerging important events to support the illicit drug trade in Afghanistan. Understanding this congruence is important, because similar events must occur in ADT directed development projects in order to fill the void of markets for legal crops, produce, or commodities. The 1979 Islamic Revolution in Iran led to a crack down on poppy farms in that country. As a result a large number of opium dealers fled from Iran to Afghanistan. Concurrently, improved governance in East Asia culminated in a world-wide opium shortage. The international mafia soon developed new trade routes that took advantage of rapidly growing Afghan opium production and first world markets.²⁸ "With the complete breakdown of the Afghan state and its writ, never fully respected or enforced, the poverty-stricken farmers turned to poppy cultivation in great numbers to sustain themselves, as it paid far better than the regular legal farming."²⁹

Low maintenance, high yield opium became the crop of choice. It grows well in dry climates, requires almost no water, grows on slopes, needs little fertilizer, and little technical skill. The disorder created by the Soviets coupled with regional and global forces brought creditors, traders, and transporters to the doorstep of desperate farmers and offered enough profit to buy food stuff imported from outside of the country. After the Soviet withdrawal, civil war increased instability and further entrenched reliance on drug production:

Collapse of the state in Afghanistan in the wake of civil war in the country was the final blow to a state-based authority structure. The war removed all governmental presence, which was already nominal in the peripheral regions. The drug producers took full advantage of the state vacuum and began to establish wide and deep linkages with the poppy-cultivating farmers.³⁰

The Taliban vowed to end opium trade based on religious principles and began a campaign against the local warlords. The sincerity of Taliban policy is debatable. Regardless, they either discovered the country's economic addiction to production, realized they lacked power over the warlords to end the opium lifestyle, and/or ultimately saw the profitable benefits for themselves in spite of any fundamentalist principles. Acceptance of these realizations by Taliban leaders fostered their complicity in opium production and export. The warlords continue to back the drug trade with credit and the force of their local militias. Warlords are former Mujahedeen commanders and anti-Soviet fighters who continue to maintain private armies to profiteer on the drug, weapons, and smuggling. The Taliban joined warlords and both entities offer credit, seeds, and fertilizer to farmers who grow and cultivated opium. The current system of credit traps farmers under the endless weight of debt. The OST problem framing is displayed in figure 2.³¹

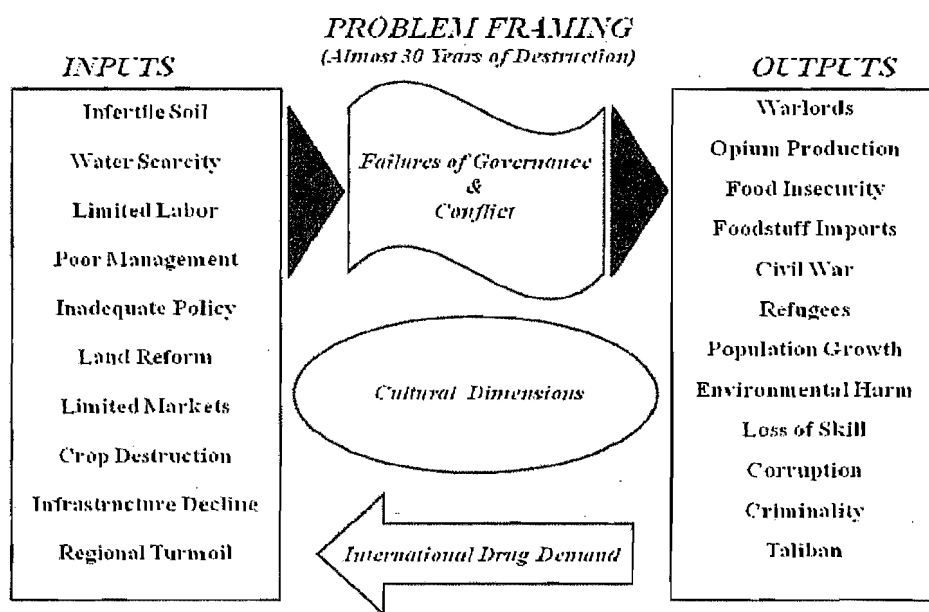


Figure 2. Problem Framing - adapted from Thomas and Casebeer

In 2006, poppy cultivation consumed 165,000 hectares.³² This represents only 3 percent of arable land.³³ Nearly half of the 364 farming districts reported no poppy farming. Opium exports made an estimated \$3.1 billion in 2006.³⁴ Still, 448,000 families, 2.9 million persons, or 12.6 percent of the Afghan population are employed by the poppy sector; poppy farmers grossed an estimated \$780 million or 11 percent of the country's total GDP. For such limited production, Afghanistan grows 90 percent of the world's opium crop. Cultivation peaked in 2007 with a harvest estimated at 8,200 tons grown on 193,000 hectares. The United Nations Office on Drugs and Crime estimates that 6,900 tons of opium was produced in 2009 on 123,000 hectares.³⁵

Since the US led overthrow of the Taliban regime in 2001, the country entered a new phase of gestation. This phase consists of a of trial and error process with some successes. The portion of illegal profits shows a decline since 2002 from 62 percent to 38 percent as the overall Afghan economy moved from gestation into the growth phase.³⁶ The informal economy, including the agricultural sector (33 percent not including 35 percent gained by opium production), accounts for an estimated 80 – 90 percent of total gross domestic product (GDP).³⁷

The value of agriculture to the economy now must be fully realized and moved into the OST maturity phase. The main barrier to reaching system maturity is the challenge of moving illicit farmers into legal growing activities. One lesson learned is with the right cost effective inputs, other cash crops, including those that formerly sustained Afghanistan, are capable of replacing opium production even if they do not offer a higher return.

APPLYING VALUE CHAIN ANALYSIS

OST problem framing presents a difficult and complex problem with many lost inputs and a number of new negative inputs. With key elements of the national-level problem framed, we are able to construct and assess a sample value chain using the key drivers of VCA. The sample value chain assessment is based on macro-level wheat production. A total of ten inputs were identified as most critical to a wheat crop value chain (see figure 3).³⁸ These are inputs necessary to produce wheat in Afghanistan. Some of the analysis is generic and is applicable to other crops, produce, and commodities. By looking at inputs from the perspective of system drivers, ADT analysts will be able to better understand how to leverage the most critical inputs to increase sustainable productivity – that is to say, how to strengthen the wheat sector's growth. This study could use VCA to assess a number of lesser identified inputs such as seed, fertilizer, pesticide, storage, processing, and packaging; however, a review of the most challenging inputs validate the proposed assessment process.

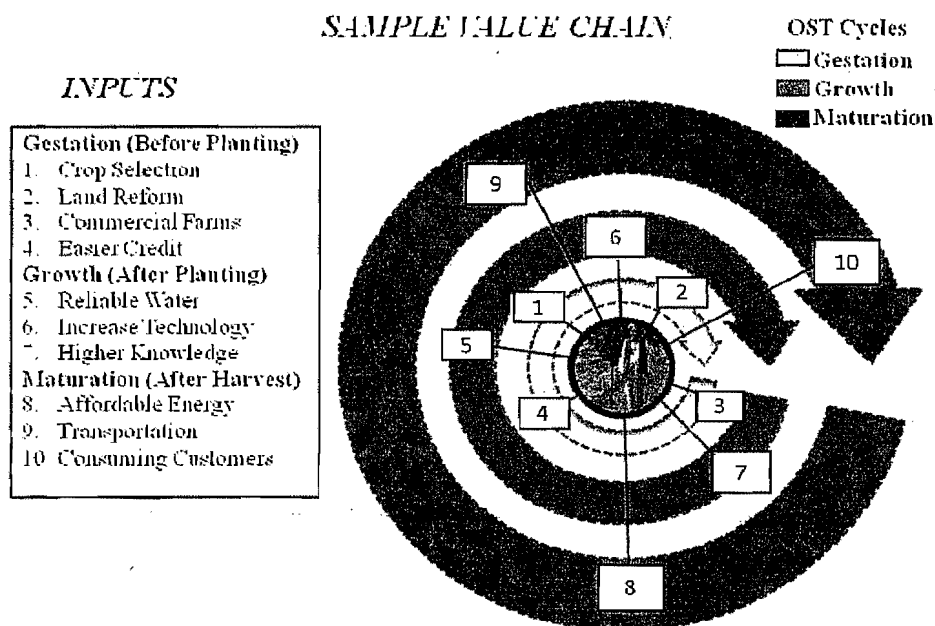


Figure 3. Sample Value Chain - adapted from Thomas and Casebeer

Porter's ten VCA drivers pair-up with ten of the inputs listed in figure 3. A questionnaire in the *Value Chain Analysis (VCA) Assessment - Input - Driver Chart* in Appendix A helped match input and driver. The input undergoes cross-analysis by the selected driver to determine if the relationship's impact is direct or indirect. The relationship is direct if a driver is able to cause an immediate influence in the quality, quantity, efficiency, or competitiveness of the input. The relationship is indirect if the driver's impact, in terms of value to the input, is delayed or not immediately able to be realized. The second factor is the strength of the relationship between the paired input and driver. The relationship is strong if the input and driver produce a project or projects that offer long-term stability and weak if all possible projects lead to a temporary solution. A weak relationship does not mean the input and driver relationship is not important or even too difficult. It is only a reflection of the current situation and it may require more analysis, outside assistance, or assessments at a higher command level. The following ten examples illustrate analysis between input and driver.

OST Input Crop Selection and Capacity Utilization as a VCA Driver

Wheat is the most important subsistence crop, providing the country with the food security required for long-term stability. Wheat is grown on nearly 79 percent of the cultivated land but yields are low by regional standards:

...1.5 to 2.0 tons per hectare on irrigated land and less than 1 ton per hectare on rain-fed land, substantially less than in neighboring countries. Yields in Iran, Pakistan, and Uzbekistan of 2.6 to 2.8 tons per hectare are about 50 percent higher than in Afghanistan, indicating substantial potential for increasing productivity.³⁹

While the rest of the region indicates the yield capacity Afghanistan can achieve, history also bears testimony to success. In 1974 Afghanistan reached self-sufficiency in wheat production for the first time. Four years later the country generated a combined \$221 million in agricultural exports. The downside was only 30 percent of the farmers generated these exports; however, they did use improved methods and modern equipment.⁴⁰ Prior to the 1979 Soviet invasion, Afghanistan's farmers produced enough food and food products to provide for the people, as well as to create a sizable surplus for exportation.⁴¹

US involvement ending the civil war and several sequential net rain years produced the largest wheat harvest in 25 years in 2003, estimated at 58 percent higher than in 2002; however, the country remains a long way from self-sufficiency. Afghans continue to smuggle an estimated one million tons of wheat each year from Pakistan. VCA concludes the poor crop choice contribute to weak yields. The combination creates low capacity utilization that invites smuggling and drive prices low. A majority (80 percent) of Afghans are competing for farm jobs on only 12 percent arable land. In the US only 3 percent of people work in the agricultural sector where arable land comprises 18 percent of the country (although only .2 percent of US land is permanent farms).⁴² VCA assessments are perfect to assess the potential of any crop choice with the VCA driver of capacity utilization maximizing efficiency and system maturity. This

utilization directly and strongly relates to crop selection input. ADT leaders play a major role in assisting Afghans in their choice of crops and enjoy a high VCA effect.

OST Input Land Reform and Institutional Factors as a VCA Driver

The key to enhancing consumption, markets and livelihoods rests in land reform, but impediments to land reorganization are strong. Farmers who own land are hesitant to sell because it is one of the only commodities in Afghanistan easily passed from one generation to the next.⁴³ Additionally, the GIRA owns large amounts of land, but fails to properly manage its use. Another contributing factor is the lack of courts and other government infrastructure to settle land disputes and manage title transfers. The typical Afghan farmer is risk adverse because of these institutional factors. Subsequently, farmers already resource limited, have little agility to experience even a small set back. The current Afghan agricultural system is self-defeating:

The amount of farmland determines the crop choice. If the farm is small, farmers will focus on flowers and large surface areas will encourage farmers to grow food crops. The size of the farm also has to be compared to the number of people in the family to feed. For a small farm, the farmer may find it advantageous to grow commercial crops, which have a higher added value and will enable him to buy more wheat than he would have harvested if he had sown the same area with wheat. On the other hand, if the farm is big enough to satisfy his own family's food needs and also grow a small commercial surplus, in general, the farmer will not specialize too much and thus limit the risks.⁴⁴

These risks are a direct product of farm size. The communist backed government in Kabul instituted massive land reforms in 1980. A predominant characteristic of today's Afghan agricultural system is that land use and property rights remain a contentious issue. There are too many people competing for too little land. "Most farmers are engaged in subsistence or near subsistence farming systems, often on plots of less than 2 jeribs (0.4 hectares), contributing to a high number of farming families with risky livelihoods often combined with chronic debt."⁴⁵

The majority of farmers do not own land, opting instead to rent or practice sharecropping. The lack of institutional policy forces local farmers to enter into all types of informal cooperative

agreements such as sharing or renting labor, equipment, and other resources from multiple parties. Farmers with small, low yielding land plots do not produce enough for their family's subsistence. They are most likely to engage in farming particular profitable cash crops, with poppy being prime that can be sold to purchase food, As ADTs begin their own VCA, they are sure to find similar difficulties caused by institutional factors. There needs to be a national (GIROA) push on land reform and resource conservation programs. Without proper institutional support, ADT leaders should work to understand local networks and encourage informal systems that maximize value. The input of land reform holds an indirect, albeit strong relationship to the VCA driver of institutional factors. In other words, this is a powerful and potentially transformative idea, but government or any other proper entity insufficiently lack power and influence to reform land. This leaves the ADT team facing mixed effects in pursuing this VCA driver.

OST Input Commercial Farms and Economy of Scale as a VCA Driver

Many small lot farmers work in other economic sectors. The interjection of capital and secondary jobs helps agricultural production:

If the alternative income is small, farmers can focus on food crops as opposed to commercial crops. On the contrary, if there is a significant alternative income, some can be reinvested into the agricultural production system, enabling the family to see farming not as a source of food but as another income-generating activity. Thus, the family will invest in farming activities, and production choices become speculative rather than a security net.⁴⁶

Medium size farms are more likely to practice subsistence farming that provides a family with direct food stock. The largest farms are most often commercial. Programs that increase farm sizes to commercial production also lead to hiring workers who ultimately earn income based on agribusiness while not vying to compete for farming rights to the limited available land.⁴⁷ These workers may find employment in education services, maintenance, trading, transporting,

processing, or marketing. VCA suggests expansion of the Afghan agribusiness industry to include these sectors solves the land management issue by increasing farm size and maximizing usage of each arable acre through enhanced farming techniques. Commercial farms leverage economy of scale not only in production, but also support services. Similar to the previous assessment, the input of commercial farms indirectly relates to the VCA driver of economy of force; however, a strong relationship exists between this input and driver. Results of these types of projects may be mixed for ADT teams.

OST Input Easier Credit and Linkages among Activities as a VCA Driver

The lack of financial institutions is a major barrier to the development of all economic sectors. The current informal credit system, comprised of the Taliban and warlords, keeps farmers in debt. Without a well-regulated and insured banking system any future system maturity is in doubt. The *Agribusiness Development Team Handbook* explains that ADT leaders do have the option to use Commanders Emergency Response Program (CERP) funds to fund micro-grant programs:

Micro-grants represent a modification to earlier CERP policy that prohibited direct payment to assist private businesses. The micro-grant program expands the flexibility of CERP and authorizes commanders to provide cash, equipment, tools, or other material support to small businesses that lack available credit or financial resources. Micro-grants are not a “free money” program. Micro-grants must be used with strict disciplinary measures in place to ensure the economic development objectives of the command are being advanced. The intent of the program is to increase economic activity, particularly in areas where small businesses have suffered because of insurgent or sectarian violence.⁴⁸

ADT should proceed with an additional caution to ensure these programs are understood to be short-term. The long-term needs of the system require an Afghan banking system that is free of corruption and capable of reaching the main agricultural producing areas. This situation will limit future international investors once the current level of American support is reduced. Any aid decreases without an in place revenue source will force the GIRoA to look inward to raise

capital. With no one, other than lawless warlords, possessing money there is no base for the government to tax. With no means to levy taxes, the government can neither generate revenue nor provide for the collective interest of Afghanistan. Jobs over time will secure taxable sectors for the government. Creating vital links between a banking and tax system may seem outside the scope of an ADT, but it would help grow and maintain agriculture and industry systems. The input of easier credit through micro-grants creates a direct relationship; however the relationship is weak to the long-term VCA driver of sustainable linkages among activities. Unfortunately, the current system faces tremendous disconnects that leave the long-term impact of any projects in doubt.

OST Input Reliable Water and Degree of Vertical Integration as a VCA Driver

Without a stable banking program or local creditors, after land, water is a currency. The war with the USSR resulted in the destruction of most power and irrigation systems in Afghanistan. The most reliable water input for today's farmers is erratic winter snows and spring rains. The remaining ad hoc irrigation system is primitive and leaves most farmers heavily constrained by water shortages. The current irrigation system provides less than 30 percent of the water than did the system in existence before the Soviet invasion. Despite such dire circumstances, Afghanistan does possess significant water resources and the potential to maximize upon these resources:

Average annual precipitation is equivalent to about 165,000 million m³, yielding an annual surface runoff water volume of about 57,000 million m³...This would be an adequate amount, except that precipitation is primarily in the form of snowfall and without adequate catchments systems the resulting snowmelt runs off in a matter of a few months; precipitation is also not evenly distributed geographically. Supply therefore depends on groundwater extraction that is not sustainable; an insignificant amount of surface water storage exists currently. Deep water drilling without adequate investment in recharge basins or storage structures degrades the aquifers on which most traditional irrigation systems depend. Despite considerable assistance in rehabilitating irrigation

systems, progress towards establishing a comprehensive plan with prioritized and costed investments is still in the formative stage.⁴⁹

Further structural problems related to water management will need to be resolved to achieve full rehabilitation. ADTs should evaluate future irrigation projects based on the VCA driver of vertical integration. Vertical integration guarantees farmers a constant source of water. A business achieves vertical integration when it is able to control access to a reliable source of a critical input like water. The input of reliable water has a direct and strong relationship to the VCA driver of vertical integration. Afghanistan is not deplete of water and projects connecting the greatest number of beneficiaries to assured water sources would maximize this VCA concept.

OST Input Increase Technology and Interrelationship between Units as a VCA Driver

Any increase in technology relates heavily to the interrelationship amongst business units. The infrastructure (roads, power, etc.) are not in place to support the transition from subsistence to full commercial farming, but the potential exists:

Afghanistan needs to construct an efficient agricultural economy that capitalizes on the opportunities offered by the globalization of agricultural markets and new technology developments, not merely to build back the agriculture of the past but to develop a dynamic, growth-oriented, market-driven agricultural sector capable of meeting food requirements and providing broad-based employment and income opportunities. With improved availability of and access to modern technologies and rehabilitated infrastructure, Afghan farmers can meet food sufficiency requirements. With enhanced business skills and linkages to markets, Afghan producers, service providers and processors can also develop to meet demands for high-value commodities and processed products. This kind of development, linked with the internationally-supported counter narcotics plan for Afghanistan, should eventually replace the opium-poppy dominance of the rural economy.⁵⁰

Further structural problems related to water management need resolution in order to achieve full rehabilitation. ADTs are working to build knowledge support systems for larger commercial farming, but understanding the interrelationships among business units should be included in the curriculum.

This will include the formation of farmers' organizations, capacity development and the introduction, adaptation and adoption of new low-cost and low-risk technologies. The goal is to help farmers move to semi-intensive and commercial agriculture. Competitive, commercial agriculture can accommodate a fairly wide range of scales and beneficiaries.⁵¹

In the global market, business and technology are now inextricably linked. ADTs should incorporate the VCA driver of interrelationship of business units into future assessments, especially those that increase technologies through farmers' organizations.⁵² The relationship between the technology input and interrelationship of business driver are both direct and strong because a number of immediate impact projects with long-term benefits are feasible.

OST Input Higher Knowledge and Learning as a VCA Driver

To get more out of the land, the skills of the workforce must improve. The Soviets practiced slash and burn tactics that eliminated agricultural extension services, institutions, and infrastructure.⁵³ "Provincial governments do not have the authority, budgetary resources, or technical skills to facilitate development. This situation is even more severe at the district level."⁵⁴ One of the primary purposes of the ADTs is to create system inputs such as training and access to markets. This restores equilibrium, offers a viable solution for economic stability to Afghans, while wiping out the nefarious cash cow of the Taliban. "Afghanistan's human capital has been severely depleted by destruction, loss, and most important, dismally low investment in human capital during the past thirty years."⁵⁵ The greatest need is for training and investments in learning. The current inputs of knowledge are lacking:

...incentives to invest in training are limited; size of business enterprises tends to be severely constrained; sustained export development is hard to generate (quality standards, getting around non-tariff barriers, insurance, etc.), and the learning by doing associated with formal sector activities does not occur...⁵⁶

The low levels of learning prevent the Afghan agricultural system from reaching maturity. The VCA driver of learning is critical to any competitive business. With a lost generation of

knowledge in Afghanistan educational resources are in critical need and the relationship is both direct and strong. This is perhaps the area ADT teams are most able to influence.

OST Input Energy and Policy of Cost or Differentiation as a VCA Driver

Many of the provinces indicate energy supplies as their top priority. There is good reason for this demand. Increased access to energy leads to higher crop yields and enables the use of greater technology, but the costs are extremely high. Unfortunately, energy does not offer the Afghan agricultural sector a competitive advantage. As an input, energy adds the least amount of value and will continue to be a net loss for the foreseeable future:

Many of our small cities and towns have poor or no grid-power. In the rural areas, overall coverage is less than 7% of our total population. Household tariff charges, in covered areas are mostly based on the number of light bulbs in use. Given the very low coverage, in spite of potential demand, there is virtually no productive use of electricity especially in our rural communities. It is estimated by MRRD [Ministry of Rural Rehabilitation and Development] that, there are over 38,000 villages in Afghanistan; their collective demand can be estimated to be quite high. We recognize that electrifying rural areas offer daunting challenges. This is due to: dispersed populations, often difficult terrain; high initial capital and operating costs of power systems, poor load profiles (evenings only) and competing priorities. Remote areas present additional difficulties. Furthermore, developing country experience shows that rural electrification often requires subsidies.⁵⁷

The GIRoA plans to increase the amount of energy (electricity) imported from neighboring countries. "Only 13% of the rural population has access to electricity at some time during the year (through generators, micro-hydro power or solar) and only 2% own a phone."⁵⁸ Diesel generators are and will likely remain the primary source of rural power. They produce electricity at high-cost to farmers. The energy situation impairs competitiveness. Differentiation is the ability for a business to provide a higher quality product for a lower price. Even if the costs of other inputs drop to within competitive ranges, energy costs are likely to remain a massive barrier to overall Afghan competitiveness especially in international markets.⁵⁹ The combination

of indirect input-driver relationship and the weakness of possible solutions leave this an area where future projects are likely to be the least effective and short-term.

OST Input Transportation and Geographic Location as a VCA Driver

Existing and planned road networks are largely in disrepair and do not reach the best irrigated areas; such locations are more difficult for road construction. Because the GIROA lacks an internal creditor for long term bonds or tax revenue, roads are tolled, or fee for use assessed, to help fund repairs. Because of the security situation, numerous bandits and even insurgents establish checkpoints and charge travelers to pass. The road network is extremely critical to future growth. The recent GIROA Afghanistan National Development Strategy (ANDS) suggests that proximity to roads is one of the leading determinants of poverty.⁶⁰ Farmers living in remote areas are poorer and many cannot afford to move goods across the difficult terrain to even reach the road network. Farmers who live near road networks still face significant challenges when attempting to deliver their goods internationally.

The system does not allow for timely movement of goods internally to larger markets. Connecting to international markets requires planners to actually travel and study the potential supply routes during their VCA. For instance, shipments going to India must be sent through Pakistan and must be unpacked for inspection at the Pakistan-Indian border.⁶¹ Poppy dealers are able to ship their product due to the long shelf-life, network of safe houses, bribed accessed points along the board, and the compact nature of packaging. To construct a viable value chain, ADT leaders cannot underestimate the movement of crops, produce, or commodities. These assessments would favor projects nearest to major road networks or with a well proven supply route to a nearby market. The ADT leaders might support projects to build local markets nearest

the harvest or production site. These possibilities prove a direct relationship, but it is also weak because of the long term realities of road infrastructure.

OST Input Consuming Customers and Timing of Market Entry as a VCA Driver

Today a very small international market exists for legal Afghan goods. ADTs are working to increase markets for Afghan goods. With the changes in neighboring countries' farm practices, Afghan wheat cannot compete or is at least not in demand. With lack of demand, prices for exports are very low and costs to export high due to the poor transportation system. US strategists need to study the regional area looking for a product that is in demand with high prices that would not be expensive to transport. Some studies suggest grapes or raisins might be a good product; others options may exist.

As you consider the dynamics of a potential project, look at its place in the agrifood chain process. Where does it fit? What will be the benefit of the project? What are the impacts of that project on the other parts of the agrifood chain process? For example, inputs and production are the start points, but are the processing and distribution parts of the chain in place to support at the right time and place? In most cases the consumption is there, but if the products cannot reach the consumer, the project may be the wrong project.⁶²

Reaching the customer may be the most critical aspect of any VCA. ADTs should study the surrounding markets to identify needs that can be matched to growing trends. If ADTs worked to build the poultry industry, Russia could be a potential market. In Russia, "...Imports were frozen at the beginning of the year after long-planned regulations went into effect that forbid the import of poultry treated with chlorine — a production method used by many US producers...the measure's starting date as later pushed back to January 1, 2010. US poultry supplied 750,000 metric tons or 20 percent of the market."⁶³ Forecasters predict that Russia is unable to make up this amount domestically and Russia is looking for a new international supplier because it is unlikely to allow US producers to return. Timing is critical and ADT leaders must keep on the lookout for new markets and move quickly to meet emerging demands. The availability of

interested consuming customers has an indirect, but strong relationship to the VCA driver of market timing.

WAY FORWARD TOWARD SYSTEMIC ASSESSMENT

VCA indicates areas where ADTs are able to have high effects. One of these areas includes helping farmers select crops with a direct and strong VCA and a high probability of successful yields. Additionally, ADT teams are capable of providing high effects through increases in technology, spreading knowledge, and the expertise lacking throughout most parts of Afghanistan. The areas indicating mixed ADT effects are also crucial. The revitalization of Afghanistan's economy largely depends on more commercial farms. This goal does not solely depend on fixing the irrigation system or managing the land better. Fixing irrigation and producing higher yields is useless if commercial farmers do not have honest creditors, reliable transportation method and consuming customers. These are areas where ADT teams are likely to have mixed effects (see figure 4).⁶⁴ Land is scarce and many reforms are needed to increase farm size and long-term productivity. Energy is a part of this need, but the part of the agricultural system most outside the influence of ADT teams. Energy is where ADT teams are most likely to have the least effect. The best outcome would be for new industries to emerge in urban areas where access to existing energy and energy producing projects are most feasible. This would assist in reducing pressure on land use.

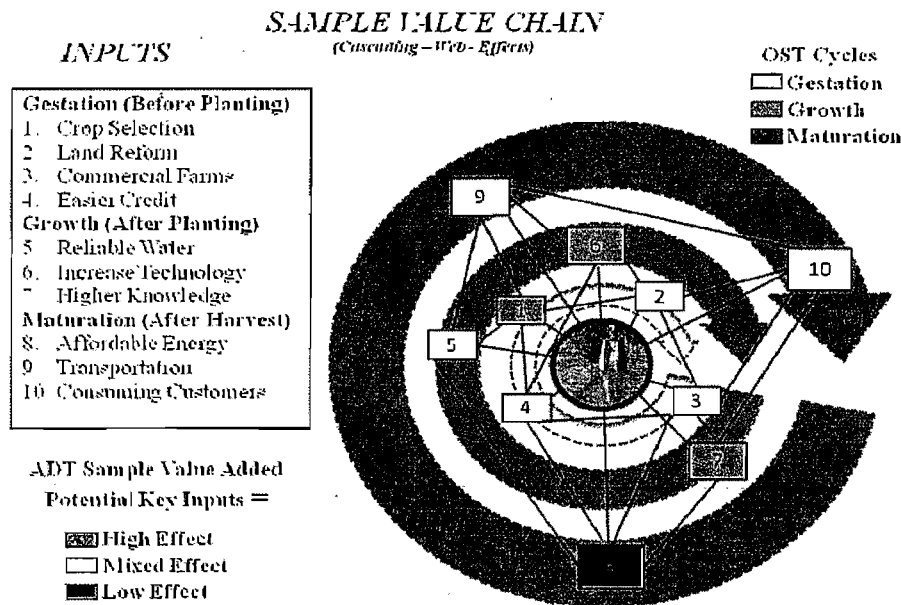


Figure 4. VCA Effects Diagram - adapted from Thomas and Casebeer

The interconnection among these various areas in Afghanistan seems to establish predictable cause and effect relationships. In actuality, the sample value chain assessment illustrates the concept of cascading effects creating a complicated web of cause and effect relationships with both positive and negative outcomes possible. The *Value Chain Analysis (VCA) Assessment - Input - Driver Chart* in Appendix A sorts out these cascading connections. The sample value chain assessment demonstrated using OST and VCA illustrates the need for ADT leaders to approach the problem framing and assessments with holistic and systemic thinking. A *Value Chain Analysis (VCA) Assessment - Worksheet* in Appendix A assists ADT leader in prioritizing projects based on relationships between input, driver, and opportunity. It also gives ADT leaders a section to recommend the actor most capable of completing the task.

The Afghan people need a lot of expertise outside of the agriculture sector. The ARNG and other Reserve Components of the US Armed Forces should consider developing more teams to support areas outside the ADTs control. These teams might include experts in energy,

transportation, marketing, and/or international trade. The California ARNG, assuming a number of Guardsman work in transportation, might be capable of providing a transportation development team or the Tennessee ARNG may have members that work for the Tennessee Valley Authority capable of serving on energy development teams. All ARNG states are capable of contributing teams based on the skills of the Soldiers in their ranks and their reach-back capabilities to state-side partners. Solving the complex problems are beyond traditional ways of doing business. Today's battlefield requires new skills set not commonly viewed as important in warfare. Lastly, this project makes clear the present and future of war requires new ways of framing and assessing problems.

APPENDIX A

Part A. Value Chain Analysis (VCA) Assessment - Input - Driver Chart

Fill in the blanks spaces with the input. Check the box underneath **RELATIONSHIP** if there is a relationship between the input and the driver (see Part B. if you are unsure about the input – driver relationship). After checking a box, circle the correct choice to indicate if the **TYPE** relationship between the input and driver is Direct or Indirect, then circle the correct choice to indicate if the **STRENGTH** relationship between the input and driver is Strong / Weak. If more than one driver is selected, **RANK** the order of importance by entering a number, with the lowest number as the most applicable VCA Driver.

INPUT _____		RELATIONSHIP - TYPE	- STRENGTH	- RANK
Driver - Capacity Utilization	☐	Direct / Indirect	Strong / Weak	_____
Driver - Institutional Factors	☐	Direct / Indirect	Strong / Weak	_____
Driver - Economy of Scale	☐	Direct / Indirect	Strong / Weak	_____
Driver - Linkages among Activities	☐	Direct / Indirect	Strong / Weak	_____
Driver - Degree of Vertical Integration	☐	Direct / Indirect	Strong / Weak	_____
Driver - Interrelationship between Units	☐	Direct / Indirect	Strong / Weak	_____
Driver - Learning	☐	Direct / Indirect	Strong / Weak	_____
Driver - Policy of Cost or Differentiation	☐	Direct / Indirect	Strong / Weak	_____
Driver - Geographic Location	☐	Direct / Indirect	Strong / Weak	_____
Driver - Timing of Market Entry	☐	Direct / Indirect	Strong / Weak	_____

	Indirect	Direct
Strong	Mixed Effect	High Effect
Weak	Low Effect	Mixed Effect

Value Chain Assessment Instructions:

Complete an assessment for each critical OST input identified during problem framing. Use questionnaire from Part B to assist you in matching inputs with the appropriate driver. Once Part A is complete, proceed to Part C in order to prioritize the projects and determine which agencies is best able to execute the project. Notify the Chain of Command If appropriate agency is operating in theater.

Input – Driver Relationship Strength Matrix

Part B. Value Chain Analysis (VCA) Assessment - Selection Questionnaire

Answer yes or no to the following questions to determine the most appropriate VCA driver to match with each input:

Driver - Capacity Utilization

- Do utilization of the inputs improve quality or quantity? YES / NO
- Is there an opportunity to improve utilization of the inputs? YES / NO

Driver - Institutional Factors

- Do changes in policy, law, or business practices improve quality or quantity? YES / NO
- Is there an opportunity to improve input with institutional changes? YES / NO

Driver - Economy of Scale

- Do changes to the input's size improve quality or quantity? YES / NO
- Is there an opportunity to improve input's size? YES / NO

Driver - Linkages among Activities

- Do changes in the input's linkages improve quality or quantity? YES / NO
- Is there an opportunity to improve input's linkages? YES / NO

**The change is in the input's relationship or linkages to items partly outside the system.*

Driver - Degree of Vertical Integration

- Do changes in the input's integration improve quality or quantity? YES / NO
- Is there an opportunity to improve input's integration? YES / NO

**The change is in the input's relationship to items critical for several parts inside the system.*

VCA Driver - Interrelationship between Units

- Do changes in the input's relationships improve efficiency? YES / NO
- Is there an opportunity to improve input's relationship? YES / NO

**The change is in the input's synergetic relationship to other parts inside the system.*

VCA Driver - Learning

- Do changes in the input's learning or adaptation improve quality or quantity? YES / NO
- Is there an opportunity to improve input's learning? YES / NO

**This learning may occur in After Action Reviews (AARs), Scientific Method, trial and error, etc.*

VCA Driver - Policy of Cost or Differentiation

- Do changes in the input's cost improve competitiveness? YES / NO
- Is there an opportunity to improve input's competitiveness? YES / NO

VCA Driver - Geographic Location

- Do changes in the input's location improve efficiency? YES / NO
- Is there an opportunity to improve input's location? YES / NO

VCA Driver - Timing of Market Entry

- Do changes in the input's timing improve competitiveness? YES / NO
- Is there an opportunity to improve input's timing? YES / NO

Part C. Value Chain Analysis (VCA) Assessment - Worksheet

Fill in the blanks spaces. Based on the responses in Part A, assess the priority of the project based on the relationships between the input, driver, and opportunity. Recommend the actor most capable of completing the task.

INPUT + DRIVER - **OPPORTUNITY for** - **MOST APPROPRIATE ACTOR**
RELATIONSHIPS - **INPUT IMPROVEMENT** - **IN OR OUT OF THEATER?**

HIGH EFFECT

_____	Yes / No	_____
_____	Yes / No	_____
_____	Yes / No	_____
_____	Yes / No	_____
_____	Yes / No	_____
_____	Yes / No	_____

MIXED EFFECT

_____	Yes / No	_____
_____	Yes / No	_____
_____	Yes / No	_____
_____	Yes / No	_____
_____	Yes / No	_____
_____	Yes / No	_____

LOW EFFECT

_____	Yes / No	_____
_____	Yes / No	_____
_____	Yes / No	_____
_____	Yes / No	_____
_____	Yes / No	_____
_____	Yes / No	_____

Endnotes

¹ Government of the Islamic Republic of Afghanistan, Afghanistan National Development Strategy (ANDS): A Strategy for Security, Governance, Economic Growth, and Poverty Reduction, 1387-1391 (2007/08 – 2012/13), 2008, 1. http://www.embassyofafghanistan.org/documents/Afghanistan_National_Development_Strategy_eng.pdf. (accessed on February 18, 2010). Hereafter cited as A Strategy for Security, Governance, Economic Growth, and Poverty Reduction. "...With the Taliban dominating the political landscape from 1996 onwards."

² Tooryalai Wesa. "The Afghan Agricultural Extension System: The Impact of the Soviet Occupation and Prospects for the Future." (PhD diss., University of British Columbia, 2002), 4-10. <http://www.proquest.com/>.

³ Center for Army Lessons Learned. "Agribusiness Development Teams in Afghanistan: Handbook Tactics, Techniques, and Procedures," No. 10-10 (November, 2009): 9.

⁴ afghanistan.usaid.gov/en/Partners.aspx.

⁵ Jim Greenhill, "National Guard executes President's Afghan agriculture initiative" National Guard Bureau Homepage. December 9, 2009. www.ng.mil/features/ADT/default.aspx. (accessed on December 12, 2009).

⁶ Center for Army Lessons Learned, 46.

⁷ Ludwig von Bertalanffy, General Systems Theory: Foundations, Development, Applications (New York, NY: George Braziller, Inc., 1969), Ch. 2.

⁸ Thomas, Troy S. and William D. Casebeer. "Violent Systems: Defeating Terrorists, Insurgents and the Other Non-State Adversaries." United States Air Force Institute for National Security Studies, INSS Occasional Paper 52, 2004: 15. <http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA435091&Location=U2&doc=GetTRDoc.pdf>. (accessed March 23, 2010).

⁹ Ibid, 15.

¹⁰ Jamshid Gharajedaghi, Systems Thinking: Managing Chaos and Complexity (Boston: Butterworth-Heinemann, 1999), Ch. 1, 15.

¹¹ Thomas and Casebeer, 15-19.

¹² Thomas and Casebeer, 19.

¹³ David Petraeus, Interviewed by David Gregory, Meet the Press, NBC, February 21, 2010.

¹⁴ Paul Van Riper. "An Introduction to System Theory and Decision-Making," (lecture, Marine Command and Staff College, January 19, 2010).

¹⁵ NetMBA Business Knowledge Center Webpage, "Strategy > Value Chain." <http://www.netmba.com/strategy/value-chain/>. (accessed on March 8, 2010).

¹⁶ Ibid.

¹⁷ Paul Van Riper. "An Introduction to System Theory and Decision-Making," (lecture, Marine Command and Staff College, January 19, 2010). More information regarding ill-structured 'wicked' problems is available by reading T.C. Greenwood and T. X. Hammes, "War planning for Wicked Problems: Where joint doctrine fails," Armed Forces Journal, December 2010. available at <http://www.afji.com/2009/12/4252237/>.

¹⁸ James Mattis to US Joint Forces Command, memorandum, August 14, 2008, Subject: Assessment of Effects Based Operation, Posted by Small War Journal Editors, <http://www.smallwarsjournal.com> (assessed April 3, 2010).

¹⁹ Ibid.

²⁰ Ibid.

²¹ Paul Van Riper. "An Introduction to Red Teaming," (lecture, Marine Command and Staff College, January 21, 2010).

²² Richard Neustadt and Ernest May, "What to Do and How: A Summary," *Thinking in Time: The Uses of History for Decision Makers* (New York: The Free Press, 1986), 232.

²³ Wesa, 4-5.

²⁴ William Byrd, "Responding to Afghanistan's Development Challenge," in *Afghanistan: Transition Under Threat*. ed. Geoffrey Hayes and Mark Sedra (Canada, The Centre for International Governance Innovation and Wilfrid Laurier University Press, 2008), 90.

²⁵ Wesa, 8.

²⁶ Ibid, 9.

²⁷ Wesa, 8-15.

²⁸ Pedersen, 35.

²⁹ Rais, 160.

³⁰ Rais, 160.

³¹ Adapted from Thomas and Casebeer Models.

³² United Nations, Office on Drugs and Crime, 2007 World Drug Report (June 2007): 195.

³³ Jonathan Goodhand. "Poppy, Politics, and State Building," in *Afghanistan: Transition Under Threat*. ed. Geoffrey Hayes and Mark Sedra (Canada, The Centre for International Governance Innovation and Wilfrid Laurier University Press, 2008), 52.

³⁴ Goodhand, 53.

³⁵ Veronika Oleksyn UN Forecasts 'Stable' Afghan Opium Crop," *Atlanta Journal-Constitution*, February 10, 2010.

³⁶ Goodhand, 69.

³⁷ Byrd, 92.

³⁸ Adapted from Thomas and Casebeer Models.

³⁹ McKechnie, 113.

⁴⁰ Wesa, 4-5.

⁴¹ Rais, 158-159

⁴² Catherine Laillet with the supervision of Peggy Pascal, "Assessment Post Crisis & Prospects of Urban Agriculture in Kabul: What Place is there for Agriculture in the Rebuilding of a City?" Case Study of Kabul, Linking Relief, Rehabilitation and Development Programme (LRRD) in Afghanistan. 2006, 10. http://www.urd.org/IMG/pdf/LRRD_Survey_Agro_Kabul_CL.pdf. (accessed January 5, 2010).

⁴³ Laillet, 31.

⁴⁴ Ibid, 36.

⁴⁵ Government of the Islamic Republic of Afghanistan, Afghanistan National Development Strategy (ANDS): Agriculture & Rural Development Sector Strategy, 1387-1391 (2007/08 – 2012/13), February 18, 2008, 34. Hereafter cited as Afghanistan National Development Strategy (ANDS): Agriculture & Rural Development Sector Strategy.

⁴⁶ Laillet, 36.

⁴⁷ Laillet, 29-36.

⁴⁸ Center for Army Lessons Learned, 64.

⁴⁹ A Strategy for Security, Governance, Economic Growth, and Poverty Reduction, 84.

⁵⁰ USAID/Afghanistan Strategic Plan 2005-2010, (March 2005): 9. http://pdf.usaid.gov/pdf_docs/PDACF119.pdf. (assessed April 6, 2010).

⁵¹ Afghanistan National Development Strategy (ANDS): Agriculture & Rural Development Sector Strategy, 55.

⁵² Laillet, 18-27.

⁵³ Wesa, 21.

⁵⁴ Afghanistan National Development Strategy (ANDS): Agriculture & Rural Development Sector Strategy, 36.

⁵⁵ Byrd, 92.

⁵⁶ Byrd, 93.

⁵⁷ Government of the Islamic Republic of Afghanistan, Afghanistan National Development Strategy (ANDS): Ministry of Energy & Water, Power Sector Strategy (Draft), 1387-1391 (2007/08 – 2012/13), May 28, 2007, 15.

⁵⁸ Afghanistan National Development Strategy (ANDS): Agriculture & Rural Development Sector Strategy, 35.

⁵⁹ Ibid, 8.

⁶⁰ A Strategy for Security, Governance, Economic Growth, and Poverty Reduction, 32.

⁶¹ Roots of Peace (ROP), Revitalizing Agricultural Markets Program (RAMP) GRAPE Project, 2004–2006, Final Report, USAID Funded Project, Managed by Chemonics International, U.S. \$5,208,756, GRAPE Project, Job Order Number: 29 – Grape Revitalization for Afghanistan Productivity and Empowerment (GRAPE), 13. http://www.rootsofpeace.org/documents/ROP_GRAPE_Project_Final_Report_July-8-06.pdf. (accessed February 18, 2010). Roots of Peace published a Value Chain Operations Manual in January 2010. The Value Chains presented are not based on problem framing, conducting assessments, or open systems theory. They focus on conducting value chain analysis of an already established farming system in order to improve the process. Although

it does not offer guidance for conducting assessments, this document offers ADT leaders a good example of value chain analysis. It is assessable at [http://www.rootsofpeace.org/documents/Grape Value Chain Manual Jan-2010.pdf](http://www.rootsofpeace.org/documents/Grape_Value_Chain_Manual_Jan-2010.pdf).

⁶² The Center for Army Lessons Learned, 2009, 40.

⁶³ Alex Anishyuk, "A Poultry Spat's Homegrown Solution," Moscow Times, 11 February 2010.

⁶⁴ Adapted from Thomas and Casebeer Models.

Bibliography

- Anishyuk, Alex. "A Poultry Spat's Homegrown Solution." *Moscow Times*. February 11, 2010.
- Bertalanffy, Ludwig von. *General Systems Theory: Foundations, Development, Applications*. New York, NY: George Braziller, Inc. Ch. 2, 1969.
- Byrd, William. "Responding to Afghanistan's Development Challenge," in *Afghanistan: Transition Under Threat*. ed. Geoffrey Hayes and Mark Sedra. Canada, The Centre for International Governance Innovation and Wilfrid Laurier University Press, 2008.
- Center for Army Lessons Learned. *Agribusiness Development Teams in Afghanistan: Handbook Tactics, Techniques, and Procedures*, No. 10-10; (November 2009).
- Chandler, Jennifer. "Why Culture Matters: An Empirical Based Pre-Deployment Training Program." master's thesis, Naval Postgraduate School, 2005.
- Coghlan, Tom. "Afghan Military Strategy Doomed Without Big Changes, UN Chief Warns," *London Times*, January 28, 2010.
- Emadi, Hafizullah. *Culture and Customs of Afghanistan*. Westport, CT: Greenwood Press, 2005.
- Gharajedaghi, Jamshid. *Systems Thinking: Managing Chaos and Complexity*. Boston: Butterworth-Heinemann, 1999.
- Gleick, James. *Chaos: Making a New Science*. New York, NY: Penguin Books. Ch 1, 1987.
- Greenhill, Jim (Army Staff Sgt.) "National Guard Executes President's Afghan Agriculture Initiative" National Guard Bureau Homepage. December 2, 2009.
www.ng.mil/features/ADT/default.aspx. (accessed on December 12, 2009).
- Goodhand, Jonathan. "Poppy, Politics, and State Building," in *Afghanistan: Transition Under Threat*. ed. Geoffrey Hayes and Mark Sedra. Canada, The Centre for International Governance Innovation and Wilfrid Laurier University Press, 2008.
- Government of Islamic Republic of Afghanistan, *Afghanistan National Development Strategy (ANDS): A Strategy for Security, Governance, Economic Growth, and Poverty Reduction, 1387-1391 (2007/08 – 2012/13)*, 2008.
- Government of Islamic Republic of Afghanistan, *Afghanistan National Development Strategy (ANDS): Agriculture & Rural Development Sector Strategy, 1387-1391 (2007/08 – 2012/13)*, 2008.
- Government of Islamic Republic of Afghanistan, *Afghanistan National Development Strategy (ANDS): Ministry of Energy & Water, Power Sector Strategy (Draft), 1387-1391 (2007/08 – 2012/13)*, 2007.

- Government of Islamic Republic of Afghanistan, *Afghanistan National Development Strategy: Transport and Civil Aviation Strategy*, 1387-1391 (2007/08 – 2012/13), 2008.
- Haddick, Robert. "Maj. Gen. Flynn Wants Social Scientists, Not Military Intelligence Officers." *This Week at War*. <http://www.smallwarsjournal.com>. January 8, 2008.
- Jervis, Robert. *System Effects: Complexity in Political and Social Life*. Princeton NJ: Princeton University Press, 2003
- Laillet, Catherine with the supervision of Peggy Pascal. "Linking Relief, Rehabilitation and Development Programme (LRRD) in Afghanistan." *Assessment Post Crisis & Prospects of Urban Agriculture in Kabul: What Place is There for Agriculture in the Rebuilding of a City? Case Study of Kabul*, 2006.
- Longley, Catherine, Ian Christoplos, Tom Slaymaker and Silvestro Meseka. 2007. "Rural Recovery in Fragile States: Agricultural Support in Countries Emerging from Conflict," *Natural Resource Perspectives*, no. 105, Developed by the Overseas Development Institute. February, 2007.
- Mattis James. James Mattis to US Joint Forces Command, memorandum, August 14, 2008, Subject: Assessment of Effects Based Operation, Posted by Small War Journal Editors, <http://www.smallwarsjournal.com>.
- McKechnie, Alastair. "Rebuilding a Robust Afghan Economy," in *Rebuilding a New Afghanistan*. ed. Robert Rotberg. Cambridge, MA, World Peace Foundation and Washington D.C., Brookings Institution Press, 2007.
- Neustadt, Richard and Ernest May. "What to Do and How: A Summary," *Thinking in Time: The Uses of History for Decision Makers*. New York: The Free Press, 1986.
- NetMBA Business Knowledge Center Webpage, "Strategy > Value Chain." <http://www.netmba.com/strategy/value-chain/>. (accessed on March 8, 2010).
- Oleksyn, Veronika. UN Forecasts 'Stable' Afghan Opium Crop," *Atlanta Journal-Constitution*, February 10, 2010.
- Patel, Seema. "Laying Economic Foundations for a New Afghanistan," in *Afghanistan: Transition Under Threat*. ed. Geoffrey Hayes and Mark Sedra. Canada, The Centre for International Governance Innovation and Wilfrid Laurier University Press, 2008.
- Pedersen, Frank Skov. "Sustainable Agricultural Production: Providing an Alternative to Opium in Afghanistan." master thesis, Aalborg University, 2007.
- Petraeus, David. Interviewed by David Gregory, *Meet the Press*, NBC. February 21, 2010.

Rais, Rasul Bakhsh. *Recovering the Frontier State: War, Ethnicity, and State Afghanistan*. New York: Lexington Books, 2008.

Roots of Peace (ROP), Revitalizing Agricultural Markets Program (RAMP) GRAPE Project, 2004–2006, Final Report, USAID Funded Project, Managed by Chemonics International, U.S. \$5,208,756, GRAPE Project, Job Order Number: 29 – Grape Revitalization for Afghanistan Productivity and Empowerment (GRAPE).

Remarks by the President [Barack Obama] in Address to the Nation on the Way Forward in Afghanistan and Pakistan, Eisenhower Hall Theatre, United States Military Academy at West Point, West Point, New York, December 1, 2009.

Thomas, Troy S. and William D. Casebeer. “Violent Systems: Defeating Terrorists, Insurgents and the Other Non-State Adversaries. United States Air Force Institute for National Security Studies, INSS Occasional Paper. 52, 2004. <http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA435091&Location=U2&doc=GetTRDoc.pdf>. (accessed March 23, 2010).

United Nations, Office on Drugs and Crime. World Drug Report, (June 2007).

USAID/Afghanistan Strategic Plan 2005-2010, (March 2005).
http://pdf.usaid.gov/pdf_docs/PDACF119.pdf. (assessed April 6, 2010).

Van Riper, Paul. “An Introduction to Red Teaming.” lecture, Marine Command and Staff College, January 21, 2010.

Van Riper, Paul. “An Introduction to System Theory and Decision-Making.” lecture, Marine Command and Staff College, January 19, 2010.

Wesa, Tooryalai. “The Afghan Agricultural Extension System: The Impact of the Soviet Occupation and Prospects for the Future.” PhD diss., University of British Columbia, 2002. <http://www.proquest.com/>.