

**A Framework for Development in Rural Arid and Semi-Arid
Conflict Environments in Africa: The Somalia Case**

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ABSTRACT

This study proposes a framework and a process promoting creation of sustainable jobs and businesses in rural, arid and semi-arid agricultural conflict zones of Sub Saharan Africa, focusing on Somalia's societal stabilization and conflict mitigation. This task requires developing risk-reducing measures for infrastructure and service delivery in rural, post-conflict zones.

Literature reviews identified two economic growth theories rooted in sustainability concepts for localized, pro-poor development. Ecological Economics Theory (EET) and Endogenous Growth Theory (EGT) are the philosophical bases establishing investment priorities. Additional research regarding Somali culture, key conflict factors, and potential business opportunities, provides an understanding of salient facts in Somalia's on-going, 27-years of war and potential culturally acceptable development pathways.

Informal sources, Somali and non-Somali, were consulted to further identify and verify potential avenues for economic growth, sustainability, educational opportunities, allowing Somalia to emerge from the strife it has endured. Visits to Somalia and Somaliland confirmed that livestock, its products and related requirements, are key components for economic growth and job creation. Investigation, via pilot testing and case studies, was undertaken of technologies with potential to improve productive capacity and disrupt existing value chains. Initial framework elements were evaluated for job and business creation, through unstructured, semi-structured interviews, and questionnaire of Somali officials, and Somali and non-Somali conflict zone development practitioners. The pilot test used a small sample size and is a limitation of this work.

Findings from the literature review, informal discussions, and the pilot test are synthesized into the framework presented in Chapter 5. The framework proposes development of an innovative, disruptive, and scalable business model that facilitates the simultaneous implementation of renewable energy production. It targets education for the livestock and agroforestry industry of Somalia, improving job and business opportunities. The model proposes modification of used shipping containers for the creation of modular elements, to satisfying infrastructural building components to initiate skills practice, job, and business growth.

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GENERAL AUDIENCE ABSTRACT

The wars and conflicts of various types in Africa have made the continent poorer and prevented development in many countries. One of the major, and seemingly intractable conflict locations, is Somalia located in the East Horn of Africa (EHA). This research provides an understanding of salient facts in Somalia's 27 years of war by examining culture and key conflict factors. The objective of this assessment is to identify potential culturally acceptable pathways that will lead to business opportunities and development as a means of conflict mitigation. The improvement of job opportunities for youth is viewed as a means to offset the current participation in the ongoing conflict.

Somali and non-Somali sources were consulted to identify and verify avenues for economic growth, sustainability, and educational opportunities. Visits to Somalia and Somaliland confirmed that livestock, and related products, are key components for development and job creation. Technologies with potential to improve productive capacity and disrupt existing value chains were also evaluated.

Findings from informal discussions and a pilot test of a proposed framework are presented. The framework identifies elements for development of an innovative, disruptive, and scalable business model that facilitates the implementation of renewable energy production. In addition, it targets education for the livestock and agroforestry industries, improving job and business opportunities.

DEDICATION

Bismillaahir Rahmaanir Raheem

“In the name of Allah, the most Gracious, the most Merciful”

This work is dedicated to all the people of Africa past, present, and future for their will and determination to forge a better way of life for all life on this planet.

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I am forever grateful to my mother, Lois who provided the love that is the foundation for my life and who encouraged me to question everything to find my own truth. To all my biological relations I am indebted, elders and newborn alike, for the wonderful family interactions that challenged and forged me, and never let me forget from whence I came. I would also like to thank the many ideological family relations who, through the years, have enlightened and encouraged me to undertake this work.

My gratitude goes to my daughters for their courage in pursuit of academic excellence which inspired me to pursue my own studies. I am so blessed to have such accomplished, well educated, and caring young women in my life. They are truly a source of inspiration.

My best and last thoughts go to my wife, Asli, whose contributions require a separate dissertation. Without her presence, nothing makes sense and this journey would never have occurred. I will be eternally grateful for her courage, the loving safe harbor she provides for all of my family, and the relentless drive to do good that she inspires. She makes my world and in it no challenge is too great, and peace perseveres.

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ABBREVIATIONS

AFTD	Agroforestry Database
AHPCO	Advanced Hydrated Photo Catalytic Oxidation
ANISOM	African Union Mission to Somalia
AU	African Union
BIM	Building Information Model
BM	Business Model
BoP	Base of Pyramid
CDM	Clean Development Mechanism
CIA	Central Intelligence Agency
CRA	Country Risk Assessments
CSO	Civil Society Organization
CSSP	Cross-Sector Social Partnerships
EET	Ecological Economic Theory
EGT	Endogenous Growth Theory
EHA	East Horn of Africa
FAO	Food and Agriculture Organization
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
HPP	High Press Processing
ICARDA	International Center for Agricultural Research in the Dry Areas
ICG	International Crisis Group
ICT	Information and Communications Technology
IESA	Industrial Eco-systems Analysis
IFAD	International Fund for Agricultural Development
IFS	Integrated Farming System
IMF	International Monetary Fund
IP	Intellectual Property
IPD	Integrated Project Delivery
ITC	International Trade Centre
K-12	Kindergarten through Grade 12
kWh	Kilowatt Hour
LEB	Life Expectancy at Birth

LiDAR	Light Detecting Radar
MA&D.....	Market Analysis and Development
MECHE	Somalia Ministry of Education, Culture, and Higher Education
MSE.....	Medium Small Enterprises
MW/RF	Microwave and Radio-Frequency Heating
NASA	National Aeronautics and Space Administration
OECD	Organization for Economic Co-operation and Development
OH.....	Ohmic Heating
PCG.....	Post-Conflict Governments (PCG)
PEF	Pulsed Electric Fields
PPP.....	Public-Private Partnership
PV	Photovoltaic
R&D.....	Research and Development
RE	Renewable Energy
REDD (+/++).....	Reducing Emissions from Deforestation and Forest Degradation
ROI	Return on Investment
SSA.....	Sub-Saharan Africa
SWALIM.....	Somali Water and Land Information Management
TVET	Technical and Vocational Education and Training
UAE.....	United Arab Emirates
UN.....	United Nations
UNOSOM II	United Nations Operation in Somalia II
USAID	U.S. Agency for International Development
USD	United States Dollar
VET.....	Vocational Education Training
VET.....	Vocational Education Training
VFM.....	Value for Money
VT.....	Virginia Polytechnic Institute and State University
WHO.....	World Health Organization

PREFACE/ATTRIBUTION SECTION

John Mitchell is a Ph.D. candidate in Environmental Design and Planning, Department of Building Construction, College of Architecture and Urban Studies. Author and principle researcher for all manuscripts and chapters within this document.

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1. Introduction

Somalia or Puntland meaning the land of frankincense is located in the Horn of Africa. It is primarily rural like most of Africa and consists of arid and semi-arid environments. Since its colonial independence in 1960, Somalia's people have experienced every form of conflict identified in literature including an on-going insurgency. The country is a focal point of innumerable studies on various aspects of conflict. The details of the Somali conflict are substantial and warrant a great deal of independent research and are beyond the scope of this research.

Somalia in the current research serves as an example location for which a framework and process to promote creation of sustainable jobs and businesses as a means of societal stabilization and conflict mitigation is developed. Two economic growth theories rooted in sustainability concepts for localized pro-poor development, Ecological Economics Theory (EET) and Endogenous Growth Theory (EGT), were identified in literature as the philosophical basis from which to establish investment priorities. Other relevant, informal Somali and non-Somali sources were consulted to further identify and verify potential avenues for economic growth, sustainability, educational opportunities, and success, allowing Somalia to emerge from the strife it has endured. The framework proposes development of an innovative, disruptive, and scalable business model that facilitates the simultaneous implementation of renewable energy production and targeted education for the livestock and agroforestry industries of Somalia as means to improve job and business opportunities.

2. Manuscript 1: Horn of Africa Economic Development Case Study Somalia—A Conflict Location

2.1. Manuscript Copyright Transfer Agreement

Chapter 2 (manuscript #1) was submitted to *Journal of Agribusiness*, published by the Georgia Agricultural Economics Association at the University of Georgia, Athens, in January 2020. The authors (p. xvi) of Chapter 2 (manuscript #1) warrant that this chapter will not be submitted to any other journal for review while it is under review *Journal of Agribusiness*. Academics, researchers, or practitioners interested in citing any information from Chapter 2 (manuscript #1) should verify the status of this publication in order to obtain the correct citation information by contacting the corresponding author: John T. Mitchell (jtmitchellconst@gmail.com).

2.2. Abstract

This literature review provides a means of understanding the salient facts regarding Somalia's 27 years of war for control of the country. Complex power hierarchies and relationships that define rights to land, access to water and control of agricultural and livestock production to meet Somalia's food needs are key factors of this Horn of Africa conflict. With an understanding of Somali culture and key conflict factors, we propose the combination of economic theories to develop local, sustainable, pro-poor elements of a business framework that uses Somalia's extensive experience in the livestock industry to potentially mitigate conflicts.

Key words: Africa, Agricultural Solutions for Conflict Resolution, Ecological Economic Theory Endogenous Growth Theory, Industrial Ecology, Land Rights, Livestock Production, Pro-poor Development, Somalia, Sustainable Local Development, Water Access

2.3. Introduction: Background Somalia Review

Africa is the world's poorest continent, according to European standards. Eighty percent of the population is living on less than \$2.50 a day. Africa's size and natural resources exceed that of Europe, the United States, and China, combined, but most Africans struggle for bare survival (Seidman, Seidman and Mbana, 2006). Over 75% of the poor in sub-Saharan Africa

(SSA) live in rural areas where many have experienced conflict either directly or from neighboring countries conflict expansion.

The cycle of poverty and war is described as a “conflict trap.” A World Bank study (Collier et al., 2003). identifies several “negative feedback mechanisms” which help explain why so many conflicts persist. The study concludes that war retards development, but conversely, development retards war (Collier et al., 2003; and Bozeman, 2015). Most studies on conflict have been conducted in culturally closed milieus. This leads many people to think of conflicts, their causes, and resolutions in the context of prevalent Western thought. Instead, we should regard the realities on a case-by-case basis. Strategies are needed to enable sustainable development to help stakeholders desiring to escape from this conflict trap. East and Central Africa have had considerably more conflicts than other parts of Africa. Fourteen of the 38 countries in the two regions have experienced conflict. Six of them were major conflicts (Hegre et al., 2011).

One of the most serious, and seemingly intractable, locations is Somalia, in the Horn of East Africa. Somalia is in the longest-running instance of complete state collapse in African postcolonial history (Menkhaus, 2007). As such, it is a focal point of innumerable studies on conflict. Since its independence in 1960, Somalia’s people have experienced every form of conflict, including an on-going insurgency.

It appears that conflicts are embedded in the ecological, socio-economic, politico-cultural, and historical systems of society. Several factors appear to reduce conflict, including education, economic recovery, and employment opportunities (Collier and Hoeffler, 2002). A cost-effective and sustainable means to facilitate improved education, to generate income, and to provide economic improvement for the poor in Somalia is considered critical to regional peace and stability. Improving economic growth in rural post-conflict areas such as Somalia, is a complex problem requiring diverse and multi-disciplinary approaches that fit each specific case. This research identifies factors that would mitigate conflict and develop a framework for sustainable job and business creations in arid and semi-arid, conflict/post-conflict locations, using Somalia as context. To achieve the purpose of this research, the scope of our literature

review includes observations from various disciplines, seeking to address the following questions:

- 1) What tends to perpetuate conflict and inhibit development in Somalia?
- 2) What are pathways that might break the "conflict trap"?
- 3) What are framework elements that can lead to pro-poor economic growth, based on the creation of sustainable jobs and businesses in Somalia?

The literature was reviewed in four steps. 1) Focusing on Somalia's geography, ecology, land use, cultural and livelihood characteristics, and key periods in its socio-political economic history. 2) Identifying development-drivers and key factors to their implementation. 3) Assessing factors in Somali history which have impacted development potential, using geographic, ecologic, and socio-political-economic perspectives to find endogenous and culturally acceptable pathways for sustainable development and economic improvement. 4) Discussing fundamental elements to provide the next steps required to develop a framework.

2.4. Background of Somalia

Somalia (Figure 1) has a long and significant history and culture, coupled with unique geography and ecology. The on-going conflicts are substantial, warranting a great deal of independent research, as do all conflicts. These details are beyond the scope of this paper and, therefore, omitted. The following summary is limited and focused.

Somalia consists of 637, 657 square km of land. It is bounded by the Gulf of Aden on the north, and the Indian Ocean on the east, with a coastline of 3,025 km., the longest of any country in Africa. Somalia shares borders with Djibouti (58 km), Ethiopia (1,600 km), and Kenya (682 km). Archaeological evidence indicates Somalia has been occupied since around 15,000 BCE (Mire, 2015).

There are three primary ecological zones in Somalia: the arid north, the central rangelands, and the south, with two major rivers, the Jubba and the Shabelle. The southern region has higher rainfall and more fertile soils than the other two regions (Conze and Labahn, 1986). Each zone has land-use based on the availability of water. The north has nomadic pastoralism with camels, goats, and sheep. The rangelands have a higher proportion of cattle in

Nomadic pastoralists are migratory and typically move with their entire families. Livestock is the fundamental economic resource, making grazing, forage, and access to water essential. This relationship between man and natural resources incorporates socio-culture and political elements. Cultural variations occur when certain values become primary at the expense of others. Nomadic cultures value a very independent spirit. This is required to survive the harsh, typically arid, environment. Trained to fight for their livestock and pastures, nomads are an armed, autonomous polity not easily controlled by others. These characteristics of the society make it conflict-prone, both between nomadic groups and with sedentary farmers. The basic organization of Somali pastoral nomads is a small group called a *reer* consisting of a few herdsmen with their families and animals. This lifestyle creates the most environmentally sustainable form of adaptation to arid lands with minimal cultivation capacity

The most fundamental differences between nomadic and sedentary groups, and also a source of conflict, are rooted in values regarding the basic uses of land and water. Settled communities attach a great value to the land because they see it as their source of income and survival. Nomadic clans tend to consider land as transient and temporary. This often leads to conflict between the two groups because of fundamentally different views.

There are five “noble” clans (Figure 2) within Somalia today: *Hawiye*, *Dir*, *Darood*, and *Isaaq* who are overwhelmingly nomadic, and *Rahanwiin* (*Digil and Mirifle*), who practice agro-pastoralism (a mixture of dry farming and herding). Each clan is divided into sub-clans, sometimes with many sub-divisions. The clan is a form of political organization, providing territorial security for its members. The clan is essentially a *de facto* military organization based on the nomadic lifestyle. The warrior’s ultimate fighting strength is what determines the right to utilize the resources of a territory.

— Ethnic Groups

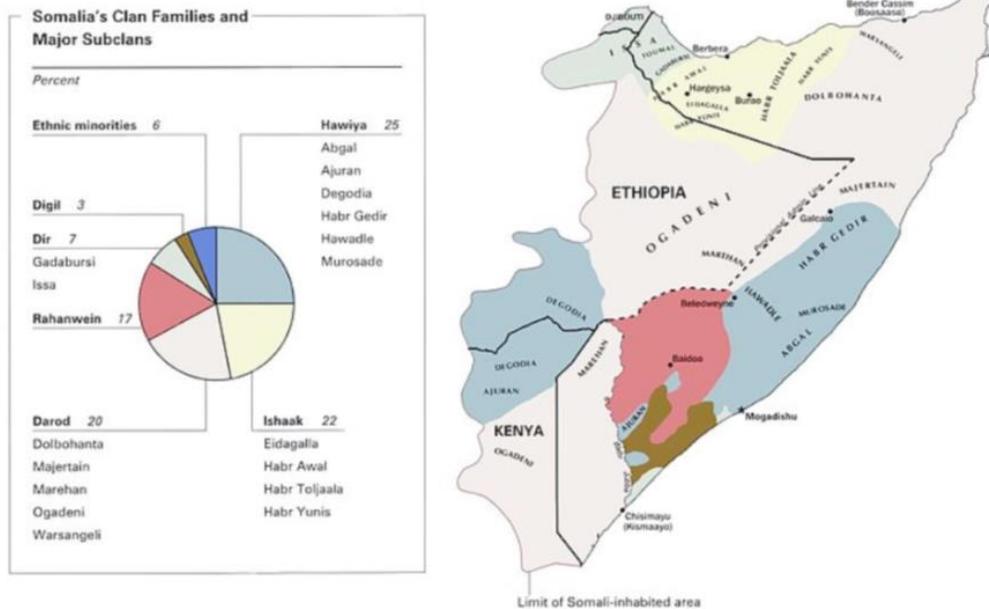


Figure 2, Chapter 2 (Figure 2, Manuscript #1). Ethnic Groups, Somalia Clan Map. Source: CIA.

Islam was accepted by the clans between 800 and 1000 CE, starting in northern Somalia. Islam brought significant influence to the indigenous, socio-political, economic organizations as people became integrated into the spiritual commonwealth of Muslims. This led to their resistance of Christian Crusaders and, particularly, the entire country of Ethiopia. After sultanates developed along the coast conflict erupted with Ethiopia from 1285 CE to the 1500s. As Somalia became more integrated into growing Arab economic expansion, Somalis became more involved in the slave trade. This trade was with the Arab world, China, and India. In 1543, Somalia's Muslim forces, with Arabs and the Ottoman Empire, were defeated by the combined Christian forces of Ethiopia and Portugal.

Portugal occupied the coast of East Africa in the 1600s and disrupted existing business structures. The demand from France, Portugal, the Americas, Asia, and the Arabs for slaves significantly increased caravan trade volume in Somali ports. The ports integrated Somali regional nomadic systems into an extensive caravan system from the continent's interior to supply merchants on the Indian Ocean. Many slaves were sold to Somali people who occupied the Jubba-Shebelle river region to increase agricultural production. While the rudiments of improved

agricultural production took place, its societal benefits were within the clan socio-political structure. Many slaves escaped during the intensified slave period in Somalia. They established ex-slave communities within the central south territories. This created further ethnic and livelihood diversity in the region.

Many conflicts occurred in Central South Somalia during the 19th century producing multiple migrations. While Somalis were dealing with the internal societal impacts of increased international trade, European powers were interested in the commercial potential and strategic location of Somalia. Italy was attracted by the agricultural production potential of the central south region. Britain was attracted to the livestock potential of the North. The opening of the Suez Canal in 1869 increased Somalia's strategic importance, especially for the British and French. Adding to the situation was the African imperial interest of Christian-ruled Ethiopia.

While many of the central south clans resisted colonial rule, the *Darwiish* were significant in their multi-clan composition and links to wider anti-colonial movements. They brought together nomad and farmer, rich and poor, religious and warrior, from all clans, and, unlike the past, they carried the fighting to all parts of Somali. Their leader, Muhammad Abdullah Hassan, had a pan-Somali focus, creating, for the first time, a concept of national Somali identity and cultural integrity. This focus crossed all ethnic Somali territories, with combined cultural, political, and religious unity, until defeated in 1920.

Somalia was the most fragmented society in Africa and was the only society with four different colonial occupiers prior to its independence in 1960. At independence, the Italian colonial areas were united with northern British Somaliland, but the Somali areas of French Djibouti, northern Kenya, and the *Ogaadeen* in Eastern Ethiopia were not included. Different colonial histories, languages, and political systems contributed to the creation of regional distinctions and potential conflicts.

Based on ethnic nationalism and historic conflict roots, Somalia invaded Ethiopia in 1977 in an attempt to gain control of the *Ogaadeen*. While initially successful, they were defeated by Ethiopian forces after Soviet and Cuban support switched from Somalia to Ethiopia. Weakened by the loss in Ethiopia, the end of the Cold War, and the support by Ethiopia of forces within Somalia against Siyad Barre, the military regime eventually collapsed.

With the overthrow of Barre, Somalia degenerated into a war between resistance leaders and their followers. Clan was the basic unit of engagement in the formation of a militia, but the scope of this depended upon contingency and opportunity. This view helps to explain why it was the rural farming regions of the south where much of the looting, killing, and militia wars occurred. Complex power hierarchies and relationships that defined rights to land, access to agricultural technology, and control of production to meet Somalia's food needs, are at the heart of the Somalia conflict.

Since the ouster of Barre, the north has seceded and formed an independent state, although it is not internationally recognized. A chronically weak central government exists in South Somalia because of the presence of troops from the African Union Mission to Somalia (AMISOM). AMISOM, however, lacks the ability to control the business oligarchs who now run the country. These businessmen are so powerful that they are effectively autonomous, from both their clans and the government. They are the real "powers" in Somalia. Both Menkhaus (2007) and Marchal (1996) note that the most egregious crimes committed in Somalia, by far, are "white collar" crimes by these businessmen.

2.5. Development Considerations for Somalia

2.5.1. Literature-based Facts Key to Development

A wide range of studies have investigated factors underlying economic growth (i.e. Upreti, 2015; Easterly, 2005; Rodrik, 2000; Sachs and Warner, 1997; Romer, 1990; and Solow, 1956). Due to the lack of a unifying theory of economic growth, findings are often contradictory and far from conclusive (Arvantidis, Petrakos, and Pavleas, 2008). While the Millennial Development Goals reveal that extreme poverty has been increasing in SSA since the 1990s, sub-regions account for 7 of the 10 fastest-growing economies in the world (World Bank, 2015). Other empirical studies (Sachs and Warner, 1997; Masters and McMillan, 2001; Armstrong and Read, 2004) affirm that natural resources, climate, and topography have direct impacts on economic growth. Specifically, low yield of tropical soils, elevated incidence of crop pests, and ecological conditions favoring infectious diseases affect agricultural productivity, economic structure, transport costs, and competitiveness. The relationship between ecological zones and

per capita income is one of the strongest empirical relationships in economic growth, according to Sachs (2001).

Working-age populations are deemed to be conducive to growth, in contrast to populations with many young or elderly dependents. Increasing population density, in turn, may be positively linked to economic growth as a result of increased specialization and knowledge diffusion (Grier and Tullock, 1989; Pritchett, 2001). Human capital, defined as workers' acquisitions of skills and know-how developed through education and training, has been identified as a substantial factor for economic growth. The majority of studies conducted regarding human capital and economic growth have measured its quality as related to education (e.g. school-enrollment rates, and tests of mathematics and scientific skills). Several studies have found evidence that a trained labor force is a key determinant of economic growth and its sustainability (Barro, 1991; Mankiw et al., 1992; Barro and Sala-i-Martin, 1997; Brunetti et al., 1998; Hanushek and Kimko, 2000).

Innovation, research and development (R&D) activities, in conjunction with human capital, are seen to play major roles in economic progress. This is due to increasing use of technology that enables the introduction of new processes and products. Technological change, as an output of R&D and innovation, constitutes another fundamental determinant of economic growth.

Economic growth in Africa is directly tied to the development of infrastructure. Lack of available infrastructure in Africa is considered a major constraint to business development. Data show it has direct impacts on output, productivity, and overall investment behavior. The lack of infrastructure depresses productivity by about 40% (Escribano, Guasch, and Pena, 2008). Investments in roads, electricity, telecommunications, and other infrastructure are crucial (Straub, 2008) for stimulating growth in agriculture and rural areas, for food security and for poverty reduction.

The importance of institutions in shaping economic performance was acknowledged more than 50 years ago (Lewis, 1955; Ayres, 1962). Easterly (2005) argues that none of the traditional economic growth factors would have an impact on economic performance if there were no stable and trustworthy institutional environments to sustain the economy. Empirical

research indicates economic policies and foreign direct investment (FDI) may impact economic performance. Several variables, measuring the quality of the political environment's impact on economic growth, also have been examined. Sound macroeconomic conditions, while seen as a necessary, are not sufficient for economic growth (Fischer, 1993).

2.5.2. Typical Criteria for Implementation of Development Factors

The following criteria are identified in literature as keys for economic growth and development.

2.5.2.A. Natural Resources, Climate, Topography

Sustainable development requires the integration of natural resource management with improvements and maintenance of ecological foundations. The most significant resources available in Somalia is represented in the phrases *A'd* (meat) and *A'ano* (milk), which represent the primary means of both survival and livelihood. The most reliable resource for Somalia is livestock production. Several factors impact production of livestock, including climate, fodder, forage availability, and pest control.

The most significant climate consideration for Somalia is rainfall. Access to water is the limiting factor in improving production for both livestock and agricultural products. The International Center for Agricultural Research in the Dry Areas (ICARDA) identified two criteria for water improvement: creating more sources of water and water management. New water resources often require capital, energy, and labor. Storing, planning, and managing for effective and sustainable utilization must fit the cultural paradigm, especially in arid and semi-arid regions (Oweis and Hachum, 2003).

Soil conditions represent the second most significant environmental factor affecting economic growth in Somalia. Localized soils analysis is required. Sustainable crop production requires management of sodium or phosphorous inputs when soils have been depleted of plant-available processes (Young, 1997).

Pest control is a very important priority for the improvement of both livestock and agriculture requiring area-wide implementation. Integrated pest management is an option that

uses a range of control tactics, from considerable use of pesticides to bio-intensive practices that rarely require chemical treatments (Vandeman et al., 1994).

2.5.2.B. Demographics, working age population, population density

Life expectancy at birth (LEB) is a common indicator of the health of a population, which is a significant predictor of future economic growth. LEB reflects the economic costs of high infant mortality, high morbidity in the population, and a shorter time-horizon for the accumulation of human capital. According to WHO, 2018 data Somalia ranks 177th LEB (World Life Expectancy, 2019).

Africa currently has the highest fertility rate in the world. High fertility and reduced mortality rates indicate growth of a young, dependent population (15 years and under) which has outstripped growth of the overall population. This condition can lead to a “youth bulge” -- an unusually high proportion of youth, 15–25 years, relative to the total population. Historically this has been associated with times of political crisis (Goldstone, 2018). Urdal (2004), notes that an increase in youth bulges of one percentage point is associated with a 7% increase in the likelihood of conflict.

Youthful populations, as they become older and have fewer children than previous generations, can create a bulge in the working-age population. Reductions in fertility can change a country’s age structure and can profoundly affect the economy. When there are more working-age adults -- usually defined as ages 15 to 64 -- with fewer children to support, it creates a window of opportunity to save money on health care and other social services. Somalia has one of the world’s highest population growth rates, which will likely have significant impact on development (Alexandratos, 2005).

2.5.2.C. Human Capital, Education, Training

An essential prerequisite for sustained economic development is adequate rates of growth in human capacity, sufficient to meet local needs at sustainable levels (Oketch, 2006). Important for economic growth is integration of a large number of people into an economy with a large amount of human capital (Romer, 1990). Investments in human capital increase the level of technological utilization (Lucas, 1988).

The African Union (AU) notes vast numbers of young people are outside the formal education system (AU, 2007). Consequently, integration of non-formal learning methodologies such as interactive training games on cell phones and literacy programs, national technical-vocational schools, and training programs are essential. The emphasis of the curriculum must be on the acquisition of employable skills. Education is even more important as technological changes and new methods of production transform the world economy. Development will depend increasingly on knowledge-intensive industries, agriculture, and services (Haddad, 1990). Rivera (2006) notes post-secondary agricultural education training (AET) requires human capacity-oriented curriculum. Using seven country case studies, it was determined that the objectives for AET systems in Africa should: produce appropriately prepared human resources for public and private employment in agricultural activities, generate or adapt agricultural knowledge through research, and transmit all relevant knowledge to agricultural producers and service providers through continuing education activities (Rivera, 2006).

2.5.2.D. Innovation, Research, and Development

According to the Solow growth model, innovation's contribution to economic growth constitutes about 85% (Solow, 1956). As human capital increases and local data becomes readily available, innovation and locally developed research and development (R&D) can be more effective. Higher levels of human capital enhance the capacity of a country to absorb foreign technology and creates appropriate domestic technologies (Benhabib and Spiegel, 1994). The relationships between innovation, research, technology, and collaboration are critical, interrelated drivers strongly influenced by a country's absorptive capacity (Nelson and Phelps, 1966).

R&D are key components of the innovation continuum and where the majority of funds are spent during initial stages of process design and product development. According to Clive (1996), developing countries invest only 0.5% of agricultural GDP in agricultural R&D, one-fourth the amount invested by industrialized countries. Agriculture and food sectors rely heavily on R&D to increase crop yields, decrease the need for inputs, identify faster methods to detect pathogens, conserve foods to prevent spoilage, and identify compounds in foods with health-promoting properties (Boye et al., 2012).

2.5.2.E. Infrastructure

Infrastructure is typically classified as a public good, the purview of government, due to its social equity and a market's failure to provide it (Pessoa, 2006). When governments are non-existent or extremely weak like those found in Somalia, existing infrastructure deteriorates, and new infrastructure is not provided. Numerous studies have shown the relationship between rural infrastructure and poverty reduction (Kessides, 1993; Canning, 2000; World Bank, 2001). Rural infrastructure is one of the most powerful instruments that governments can use to promote economic growth and reduce poverty.

Studies show over 40% of the infrastructure expenditures needed for societal improvement are within the power-energy sector (Foster and Briceño-Garmendia, 2010). The importance of access to energy for sustainable development is widely recognized as crucial, and is linked to increased income, productivity, better health, education, overall quality of life, and human development. Historically, energy provision has been the foundation of economic transformation in societies.

2.5.2.F. Institutions and Institutional Quality

Institutions with social, political, and legal rules that provide secure property rights, unbiased contract enforcement, and reliance on market prices and profits and losses to guide economic activity, facilitate investment and business. Investments in capital are both privately beneficial to individuals and create a positive return for society as a whole. The unpredictability of laws, regulations and policies; excessive regulatory burden; government instability; and lack of commitment, play major roles in institutional quality. Indicators of institutional quality include voice and accountability, lack of political violence, government effectiveness, regulatory burden, and rule of law (Kaufmann, et al., 2009). Many of these measures of institutional quality are lacking in Somalia.

2.5.2.G. Political Environment

Political stability and risk affect decisions on whether or not to invest in a particular location (Dunning, 1993; Moosa, 2002). Five categories of relevant variables that comprehensively describe a political environment include: democracy, government stability,

political violence, political volatility, and subjective perception of politics (Brunetti, 1997). Several negative aspects of these variables are present in Somalia.

2.5.2.H. Economic Policies

Several factors identified in literature impact growth, with emphasis placed on inflation, savings and capital formation, fiscal policy, budget deficits, exports, government expenditures, foreign aid, FDI, the macro-economic environment, and tax burdens. An empirical study of Somalia's gross capital formation, external debt, foreign aid, government expenditures, exports, and FDI between 1970 and 2012 showed gross capital formation and FDI were the two factors with significant relationship to economic growth in Somalia (Ali, Dalmar, and Ali, 2017).

2.6. Impediments to Implementation of Development in Somalia

2.6.1. Internal Factors

Key impediments to development include: continued insecurity linked to piracy on the high seas, and incursions by al-Shabaab and ISIS; weak state institutions jeopardizing rule of law; high corruption levels and lack of transparency; political unrest; weak public financial management systems; a largely informal economy; large arrears to international financial institutions (AFDB); lack of basic infrastructure; environmental degradation; and limited resilience to environmental extremes. All these factors impede FDI and reduce gross capital formation. Significant instability in Somalia remains a major concern. Although piracy has waned since 2012, al-Shabaab controls supply routes between towns in rural Central South Somalia and pursues a steady campaign of car bombings, assassinations, and other attacks. It also has overrun isolated AMISOM and Somali army bases (International Crisis Group, 2017a).

Insecurity has created over 1 million displaced Somalis, of whom about 400,000 reside in Mogadishu. On-going AMISOM operations and clan conflict over resources and political control increase internally displaced persons so that almost 90% of total spending focuses on security and administrative services (World Bank, 2015).

Just under half of the population is younger than 15 years old, and 75% of the population is under 30. Somalia has one of the world's highest youth unemployment rates at 67%. This

condition not only has adverse effects on the economy but leaves society vulnerable to recruitment of youth by insurgents. Ninety percent of all schools were destroyed during the war. With no functioning public education system, two generations of Somali children missed out on formal education. As a result, adult literacy in Somalia is 38%, one of the lowest rates in the world (World Bank, 2015). Only about 40% of children in Somalia are in primary school, which is one of the lowest enrollment rates in the world.

Factors limiting foreign trade include highway infrastructure insufficient to open isolated areas or to link regions. There is one paved road that extends from Berbera in the north through Mogadishu to Kismaayo in the south. Many of the earthen roads are impassable during the rainy season. The country has no railroad system, only eight paved regional airfields, and a major international airport in Mogadishu. Electricity is obtained entirely from privately owned generators powered by imported fuel. Its quantity and quality are unsatisfactory, making electricity difficult to use for production purposes (African Development Bank, 2016). Telecommunication firms provide wireless services in most major cities, offering the lowest international call rates on the continent; however, there is no regulatory system providing oversight.

Somalia's institutions continue to be extremely dysfunctional. Its government is unable to collect domestic revenue at the federal level. Somalia ranks last in business startup statistics, ranking last in 190 economies. The 2019 "Doing Business Report" provides objective measures of regulations for starting a business. These include obtaining construction permits, getting electricity, registering property, credit access, taxes, contract enforcement, and labor market regulations (World Bank, 2019). Competition for resources such as water, land, and development aid continue because of ineffective state institutions.

According to a plethora of international indices, including Worldwide Governance Indicators, Africa Integrity Indicators, and Freedom House (which measure institutional quality) Somalia ranks last. It is the most corrupted country in the of the 180 global economies examined (Transparency International, 2018). Corruption is one of the leading causes and consequences of political instability. Public officials' misuse of public goods for private gain, solicitation of bribes in exchange for basic services, and clan-based patronage networks are used to obtain

employment and political appointments. Businesses have adjusted to the climate of lawlessness and avoid paying taxes (Marqaati, 2017; Legacy Centre for Peace and Transparency, 2016) further hindering government efficiency and infrastructure.

Somalia's formal economy has yet to expand outside of Mogadishu and a few regional capitals. Agriculture accounts for nearly 60% of GDP, employing at least 65% of the workforce (ReliefWeb, 2016; Ahali and Ackah, 2015). Livestock is the major export commodity, accounting for more than 80% of total exports. Yet much of the population's economic activities remain outside the formal trade sector. The informal sector plays a crucial role in the economy. It consists of livestock farming, camel trade (over 40% of its exports), remittances (a fifth of the country's GDP), and telecommunications. While GDP growth is increasing, the economic reality of the country is dire as it is extremely dependent on international aid, representing more than a quarter of Somalia's GDP. The country's trade imbalance, which in 2017 was USD 2.9 billion, widened since its 2016 level of USD 2.1 billion (International Trade Centre (ITC), 2017). External debt was estimated at 65.5% of GDP in 2017 (International Monetary Fund (IMF), 2017). Somalia cannot access IMF loans to address this situation because it is currently in arrears.

There are no functioning commercial banks in Central South Somalia. The monetary stock is exclusively cash. The U.S. dollar is the most commonly used foreign currency for business transactions in Somalia. The Central Bank of Somalia, however, does not control exchange rates nor money supply, making the exchange rate extremely volatile. The lack of credit facilities perpetuates elite capture as people with resources remain in a better position to invest. Much of the country's international trade is dominated by a small number of wealthy business owners, typically linked by kinship to major political groups or militias (Bertelsmann Stiftung, 2016). This situation discourages the establishment of new businesses and hinders small- and medium-sized ones from growing (World Bank, 2015). Economic growth is too weak to significantly reduce the widespread poverty. More than half of the country's population of about 12 million live below the international poverty line of \$1.90 a day. The risk of famine looms large over the country, driven by both drought and clan-based conflict (International Crisis Group, 2017b). Other threats to the economy include floods, deforestation, overgrazing, soil erosion, and desertification (Central Intelligence Agency, 2017).

2.6.2. External Factors

Somalia's geopolitical location, coupled with its membership in the Arab League, make it extremely vulnerable to external influences. While external actors are not the main cause of conflict in Somalia, according to reports, the United Arab Emirates, Qatar, Turkey, and Saudi Arabia are suspected to have funded election campaigns of certain candidates in exchange for favorable business deals or other geopolitical interests, thereby indirectly fueling corruption (Burke, 2017).

Somalia's main trade partners are Oman, Nigeria, China, Japan, and France (United Nations Conference on Trade and Development, 2017). In 2018, Somalia's primary export markets were Bulgaria, China, Japan, India, and France. It imports mainly from China, India, Turkey, Malaysia, Indonesia, Brazil, Pakistan, and the United States (ITC, 2018). The ongoing trade imbalance does very little to decrease the estimated \$5.6 billion owed to multi-lateral and bilateral creditors such as World Bank, IMF, the Arab Monetary Fund, Arab Fund, and AIDB. While Somalia is potentially eligible for World Bank and IMF debt relief under the Heavily Indebted Poor Countries (HIPC) Initiative, it has not yet initiated the process (IMF, 2019). Meeting the track record required for reform and sound policies and poverty reduction strategies are significant challenges for the existing government.

Somalia's main export, at 80%, is livestock, mostly transported live to the United Arab Emirates, Yemen, Saudi Arabia, and Oman (World Bank, 2015). The dependence on a narrow export market makes Somalia extremely vulnerable to any disruption. Previously one such disruption was the ban on animal imports imposed by Saudi Arabia.

Somalia is highly dependent on development assistance, reaching USD 1.3 billion in 2016. This represents 21% of the country's GDP (Office Prime Minister, 2017). Aid creates a vicious cycle that chokes off needed investment, instills a culture of dependency, facilitates corruption, perpetuates underdevelopment, and guarantees economic failure (Moyo, 2009). While aid is significant, remittances from Somalis abroad is estimated at USD 1.4 billion, 23% of GDP.

2.7. Development Entry Opportunities and Pathways

2.7.1. Issues to Consider

Instances of successful cross-clan central government formation in Somalia are rare. (i.e. *Ajuraan* and immediately after colonial independence). History indicates that the formation of a national government for Somalis faces significant challenges. The current government's situation should not be shocking. The likelihood of it one day becoming similar in form to a western European ideal is limited. State governments historically have organized with Islam as a central tenant; however, they rarely included multiple clans. Islam is an overarching unifying force in Somali culture, effectively bridging clan divides for national purposes. The religious interpretation and orientation of Islam in the central-south region has been contested, and led to conflict in 1835, just as today with al Shabaab. Understanding the nature of this dynamic is crucial to reconciliation efforts and stability.

Somalia should be examined, from a development perspective, as three separate regions. The North, Central, and South each have different governance models. Issues and dynamics, applicable in one region, are not necessarily applicable to all regions. The most glaring example is security, which is the main concern in Central South. The government has not proven capable of defending its population from insurgent attacks. The northern Somali regions of Somaliland and Puntland have been relatively successful in avoiding violence that has consumed most of southern and central Somalia.

While Somaliland is not recognized as an independent state, it does function as one, complete with both economic and political institutions. The same is true for Puntland, which has elected to remain part of the federal Somali government. Both Somaliland and Puntland have established their own banks, unlike the Central South which has no banks.

The telecom industry is significant, with some of the least expensive rates in Africa. The sophistication of the telecom industry has facilitated mobile money payments and transfers for most goods and services, although they provide neither deposit-taking nor banking services at present. This capability is potentially a key facilitator of development given current conditions.

Mogadishu is experiencing a construction boom with many reconstruction projects (i.e. hospitals, government buildings), mostly fueled by Turkish investments. Turkey also has provided scholarships to 2,000 Somali students. Yet the United States has invested the most, and Germany's German Agro Action office is the largest subsidiary of a transnational corporation in Somalia (African Development Bank Group, 2016).

Optimism that Somalia is improving is growing. The legal system, however, is dysfunctional. Property rights are not protected, and the resolution of claims regarding property or business are challenging, often unenforceable. Coupled with the inherent corruption within the government, it makes business in Somalia risky.

Forced migrations, due to conflict, have created significant numbers of internally displaced persons, putting stress on an already-insufficient infrastructure in Mogadishu. Displaced persons are primarily from rural areas. The area where most displaced people live suffers from a lack of clean water and sanitation, with subsequent health consequences. Available energy infrastructure is absent. This increases a dependence on local vegetation as biofuel and leads to deforestation and environmental degradation.

2.7.2. Opportunities and Pathways Identified

A key factor identified in the literature, which reduces the incidence of armed conflict, is the availability of agricultural resources (pastureland, cropland, and forest) (De Soysa, 2000). This reduces the incidence of armed conflict by raising labor productivity. Somalia has substantial potential in natural resources: agriculture, livestock, fishing, and, most recently, hydrocarbon deposits. Somalia's exports include mainly live animals (47.6% of total exports; sheep, goats, and bovine); precious stones and metals (25.7%); fish and crustaceans (7.6%); natural resins and gums (7%); and fruits. The livestock industry has been recovering after a nine-year ban on Somali livestock, to prevent the spread of Rift Valley Fever, was lifted. Yet the sector that attracts the most FDI is food processing (bananas and fish). If the stabilization of the country takes place, this wealth could attract more investments.

Education seems an important avenue for pacifying conflict. Access to higher levels of primary and secondary enrollment by males, greater education expenditures, and higher literacy

levels are associated with lower-risk conflict and rebellion, according to Thyne (2006). Somalia has a young population and a diaspora willing to invest in the country. With the longest coastline in Africa, Somalia is strategically located to become a potential regional economic hub, open to foreign trade, representing 81% of its GDP (World Bank, 2018).

Somalia relies on domestic supplies of wood and charcoal, and imported petroleum products, to meet its energy needs. Recent evaluation from the 2014 African Energy Outlook estimates that less than 25% of the Somalia population has electricity. Electricity in rural areas is nearly nonexistent. In urban areas, it varies across the country. A study by Nunez (2015) notes Somalis and their urban businesses are paying some of the highest tariffs in the world for limited and unreliable services at between \$.80 and \$1.50 kWh. Without electrical power, local business development and productivity are diminished. These challenges have forced businesses to cut back on production, and to consider relocating to neighboring countries with lower costs and higher energy generation. Business closures or relocations not only impact the economy, but also have become a major disincentive for increased and future investment.

2.8. Overview of a Working Framework

The core issues addressed in this paper are not new. Each has produced a large volume of research literature because improving the potential for economic growth in rural, post-conflict areas is a complex problem. A country's institutions are an important factor in explaining per capita income growth. While institutions are critical, in the sense that certain essential functions need to be performed if market-based economic growth is to be sustained, the form in which this need is satisfied is undefined (Rodrik, 2007).

A variety of economic theories exist, so a first step in the framework development process is to identify economic theories supporting research objectives. Economic literatures Endogenous Growth Theory (EGT) identifies the primary source of economic growth being human capital (Lucas, 1988; Stokey, 1991). Developmental processes, based on the use of local resources, are crucial. The endogenous resources offer the participatory approach to setting goals, procedures, and implementation.

Another theoretical economic view of Somalia's situation is through Ecological Economic Theory (EET), which includes many elements deemed applicable to the Somali situation. It notes politics and economics are combined and inseparable. Value is the essence of economics (Ropke, 2004); therefore, economic theories and analyses are influenced by values. EET propounds that human behavior in a globalized setting, to avoid conflict, cannot be framed as a consumer. It must emphasize socio-political and moral perspectives embedded in broader social and cultural systems as ecological systems, economy, society, and culture co-evolve (Røpke, 2005). This leads to a political and social being with many roles, motives, and interests embedded in a network of relationships. Ecosystems are viewed as the life support system, without which human activity could not be possible. Human economy is a subsystem of a thermodynamically closed, and non-materially growing, global ecosystem. The biophysical is limited because fundamental uncertainty is large and irreducible. Certain processes are irreversible, requiring careful evaluation of practices employed by humans with the environment. In EET, a decisive element for regional development is the spatial distribution and geographical patterns of knowledge diffusion, and the barriers to access knowledge.

Industrial Ecology (IE) also can be considered as it studies the flows of materials and energy in industrial and consumer activities through economic and industrial environments (Allenby and Richards, 1994; Fischer-Kowalski and Weisz, 1999). IESA asks how resources might be optimized, including both material and energy as inputs, and eco-systems, including biochemical cycles, to provide crucial services to human existence. Using IE, one might look at the flows of materials and assess the energy in industrial and consumer activities. According to Carlsson et al. (2002), a system in IESA can be considered as a set of interrelated components, working toward a common objective. Necessary pre-requisites for sustainability, especially in a conflict-prone zone, are robustness, flexibility, and the ability to generate and respond to change, promoted by greater interaction and feedback between entities.

The second step in developing a proposed framework for Somalia includes the identification of the initial literature-defined development pathways and potential framework elements. Sustained and inclusive growth for poverty reduction must include employment creation. This framework encourages the use of labor-absorbing growth paths. In the case of Somalia, these paths are livestock- and agriculture-based investments. Livestock production,

related infrastructure, fodder production, vaccinations, and treatment services are considered essential. Modernizing the livestock and agricultural sectors, which employ most of the population, is key to increasing exports suitable for additional markets. Livestock and agriculture production are important sources of food and livelihoods for most rural Somali families. If these activities are strengthened, effects of erratic climate can be offset. Once activated, the potential for the return of displaced persons to productive activities can increase, as long as conflict subsides.

Facilitating employment requires development of a business model that can navigate the dysfunctional institutions and existing socio-cultural, political, and business realities of Somalia. The objective is to produce pro-poor, sustainable business creation. To succeed, socially responsible motivations are required for selection of initial key participants. Specified roles and responsibilities in an operational structure need to be developed. The business model must strive to improve marketability of existing products by adding value and creating opportunities for new product development in new, and in existing, markets. Producing social value and economically viable products for an expanded market are deemed to be a sustainable means to create jobs and businesses. In order to be accepted and utilized, however, the concepts and processes must be based on the local society's inherent value system to promote local peace, trust, and stability. Improving local income through this business model requires the complete value chain, ultimately, to be locally owned and operated through a participatory process. These businesses must be profit-driven and aid free, given the significant use of crippling aid in the society. And creating a community-based business model complements the Somalia reality of clans.

Transitioning to higher productivity, by modernizing livestock and agricultural sectors, is important. Investment in human capital must be significantly improved to maintain growth. The youth must be provided access to livestock and agricultural education as well as entrepreneurial skills to facilitate the transition of these sectors and to expand its capabilities. Education is deemed a critical element due to its impact on skills development, its influence on productivity, and human capital requirements. Education is noted in many studies as having a pacifying effect on conflict. Greater options and levels of economic opportunity for potential rebel recruits makes the economic inducement for joining more costly, therefore, conflict becomes less likely. To be effective, delivery methods for education that reach both rural and nomadic populations need to

be explored and defined. The capacity to train in technology-utilization and to generate innovative research and development approaches must be evaluated and defined.

It is essential that business mechanisms be found to finance, construct, and maintain required infrastructures. Rural improvements face significant challenges because much of the population is dispersed in relatively small concentrations. This increases the cost of delivery for many sectors. Increased delivery costs, coupled with low density and very low incomes, offering few prospects for income-generating alternatives, complicate the creation of viable solutions. While these barriers are significant, history shows that without changing access to alternative forms of energy, significant productivity increases are not probable. Sustainable, rural-based renewable energy sources are considered key elements required to generate business and job development that is pro-poor in Somalia.

2.9. Conclusion

A multidisciplinary literature review to better understand the factors facilitating conflict and affecting development in Somalia, specifically, and the HOA, generally, was undertaken. Key findings, problems, research thrusts, and potential paths to resolve these issues are identified, along with economic theories that support research objectives. Given the breadth of the review, the analysis is problem-centered, aimed at identifying and distinguishing among varying problems, separating them into groupings and sources, in order to identify potential pathways for mitigation.

To unravel and resolve Somalia's conflicts and to generate pro-poor societal development, this assessment is based on the premise that solutions are endogenous. To be effective, they must reside within the local context. This paper is the first step in developing a framework to address conflict in Somalia, and to develop locally applicable means to implementing long-term, pro-poor, sustainable, conflict-mitigating development using its largest economic sector—agriculture. The underlying theory is that human motivation and behavior are molded by social structures, institutional arrangements, cultural norms, and ethics, requiring a multidisciplinary approach to uncover and assess them. The continuum of evolving changes to the aforementioned elements dictates interactions with their physical environments, and with “others” requiring a dynamic and flexible development approach.

To facilitate a working understanding of the conflict dynamics in Somalia, geo-ecological, socio-political, ethno-demographic, and livelihood aspects of Somalia were examined. Key background, mobilization strategies, triggers, and catalysts of worldview conflicts, socioeconomic transformations that generate class conflict and political change are identified. Economic growth factors and their requirements were identified to establish key elements that might help break the conflict trap. Internal and external conditions that affect the implementation of Somalia's economic growth were found. Where potential was manifest for these growth factors to potentially optimize opportunities for pro-poor business and job development, they became key elements of the framework. One of the most important issues to overcome in developing long-term stability and economic growth is the development of trust among all parties. Identification of possible causes of distrust and conflict is, therefore, critical.

Throughout the HOA, the same dynamics that have affected Somalia and produced both interstate conflict and long-lasting intrastate conflict in various forms have plagued other countries in the region. These conditions are rooted in a range ecological zones and climate across the HOA, which is the connector to the Great Lakes Region (GLR) of Africa and their associated livelihood practices. While producing a wealth of resources and products for trade through millennia, it also put peoples with varying livelihood approaches in close proximity. The values, cultural norms, and political and economic terms of pastoral and agricultural societies are inherently different, and in many dimensions, antagonistic.

If Somalia and the other HOA states are to avoid the ongoing cycles of conflict and not fall into worsening regional stages of broader state collapse, they need to examine the interrelated factors affecting the whole region. They must reconsider the existing framework of government structures that underly these perpetual conflict conditions.

The objective of this paper's framework is to produce sustainable, pro-poor businesses. Economic literature was evaluated to determine what would be the most suitable theory to meet the objective. Two economic theories, EGT and EET, are combined with the sustainability theory of IESA as the philosophical underpinnings of the framework. These underpinnings will be the tools by which the framework elements will be evaluated. Framework elements include: culturally compatible innovative, disruptive and scalable business model creation; modernization

of livestock and related agricultural development; targeted education and training to foster agriculture and livestock management capacity; and renewable energy electrical power for rural areas.

The next step in this framework development is to gather additional information to better understand and comprehensively evaluate the potential and the requirements for implementation of each of the identified elements in the Somali context. The elements must be structured to accomplish pro-poor business, job opportunity improvement, and evaluated for its impact. Collier et al. (2003) noted that war retards development, but conversely, development retards war. The authors anticipate the design of this framework will foster development programs that could mitigate the longest-running conflict in Africa to date.

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3. Manuscript 2: Somalia: Bringing Order, Hope, and Prosperity to a Country in Strife

3.1. Manuscript Copyright Transfer Agreement

Chapter 3 (manuscript #2) was submitted to the Council for the Development of Social Science Research in Dakar Senegal, in March 2020. The authors (page xvi) of Chapter 3 (manuscript #2) warrant that this chapter will not be submitted to any other journal for review while it is under review by CODESRIA for consideration in one of its 10 academic journals. Academicians, researchers, or practitioners interested in citing any information from Chapter 3 (manuscript #2) should verify the status of this publication in order to obtain the correct citation information by contacting the corresponding author: John T. Mitchell (jtmitchellconst@gmail.com).

3.2. Abstract

Somalia, located in a region known as the Horn of Africa, is a nation in need. Since 1960, when it became an independent country, Somalia has been involved in civil wars, insurgents, poverty, drought, famine, corruption, religious conflicts, disenfranchised youth, crumbling or non-existent infrastructure, few educational opportunities, poor leadership, and international interference. Yet, with the longest coastline in mainland Africa, a clan-based society that supports democratic organization, with broad agricultural areas, grazing lands, livestock, forests, rivers, limestone deposits, populated with people who want to be part of the 21st century, living in peace, Somalia has the potential and the capacity to move ahead. This paper examines realistic avenues for economic growth, sustainability, educational opportunities, and success, allowing Somalia to emerge from the strife it has endured since 1960. Observations of Somalis, juxtaposed with its State collapse and seeming inability to reconcile conflict, is the impetus for this research. Effective, positive options must be developed for the existing dire human conditions, or local, regional, and international peace will suffer. Beginning with rural agricultural inroads, then infrastructure, power sources, education, and job opportunities, this paper explores the potential and the means to achieve a comfortable, lively, and peaceful Somalia.

Key words: Agriculture, Clan, Diaspora, Economic Growth, Education, Electricity, Infrastructure, Pastoralists, Post-independence, Pro-Poor, Somalia, Sustainability

3.3. Introduction

The Horn of Africa (HOA) is home to different cultures, ethnic groups, and religions with livelihood approaches dating from ancient times. Historical, demographic, geographic, cultural and geopolitical considerations define the HOA. For this paper, all member countries of Intergovernmental Authority on Development (IGAD) are included in HOA: Eritrea, Ethiopia, Somalia, Djibouti, Sudan, Kenya, and Uganda. There are variations among peoples of the region, but they also are interconnected. Coastal regions of the HOA are the periphery of Africa where international exchange, occurring over millennia, shaped social, political, and economic dynamics.

During the post-independence era, countries have fought multiple civil wars and experienced chronic strife. Most have witnessed one-sided violence of varying magnitude, from state and rebel groups alike, confronted by insurgencies and expressions of opposition.

There seems to be a clear connection between intra-state and inter-state conflicts. Any spill-over from these conflicts takes a range of forms, including migration, border ethnic groups, poorly defined and contested boundaries, and proxy wars through reciprocal interventions. Using intra-state protagonists remains one of the major instruments of foreign policy among countries of the HOA (Cliffe, 1999; Abbink, 2003). Through this practice, neighboring countries within the HOA can be locked in vicious circles of mutual interventions.

While the HOA is fraught with conflict, Somalia (Figure 3) has become the longest-running instance of complete state collapse in African postcolonial history (Menkhaus, 2007), with spill-over affecting Ethiopia, Kenya, Eritrea, Uganda, and Sudan. Frantz Fanon warned against the ramifications of a Somali-Ethiopian nationalistic war (Fanon, 1970). True to Fanon's prediction, after its war with Ethiopia, Somalia degenerated into its current state, from which it has yet to emerge.

The people of Somalia have experienced every form of conflict identified in literature since independence in 1960. After secession of the northern territory, known as Somaliland,

occurred, Somalia became a Federal Republic with six autonomous member states, with a weak central government fighting on-going insurgency, primarily in the central-south region. Internally displaced persons (IDP) are estimated to be 1.1 million, with 36% in Mogadishu, the capital. The IDP represent 68% of people in the country with acute food shortages. Approximately 69% of Somalia's population lives below the poverty line. A significant concentration of these people live in the south-central agricultural, inter-river areas, which have great economic potential. (Asylum Research Consultancy, 2018).

Map of Somalia



Figure 3, Chapter 3 (Figure 1, Manuscript #2). Somalia Map. Sources, United Nations.

The Organization for Economic Co-operation and Development (OECD) reported that about 70% of Somalia's population of 12 million are under the age of 30 (OECD, 2017). Youth unemployment at 67% is one of the highest in the world. Somalia's overall unemployment is estimated at 47.4% (OECD, 2017). Muhsin Hassan noted that 50% of youth have said that unemployment was the main reason they had joined al-Shabaab, generally recognized as a terrorist organization. While they had wanted to pursue more education, lack of its availability inhibited them from seeing a better future (Hassan, 2012; Ahmed, 2018). Somalia has the third-lowest literacy rate among 10 of its sub-Saharan Africa (SSA) neighbors with primary enrollment at 30% and secondary at 26%, the lowest in the region (Federal Government of Somalia (FGS), 2016).

Infrastructure in Somalia is in significant disrepair or non-existent. Only 58% of Somalis have access to improved water sources, and only 10% have access to improved sanitation. These numbers are compared to 69% and 25% in low-income SSA countries (World Bank, 2017). The combination of these conditions has significant impact on health, disease, and life expectancy. With most health provisions concentrated in urban and peri-urban areas, rural populations and IDPs are the most impacted (WHO, 2017). Air transport to the capital of Mogadishu exists internationally. There are connections to other locales with airstrips in South Central; however, commercial traffic is limited. Only 13% of the country's roads are paved and the rest in significant disrepair, susceptible to flooding and insurgent roadblocks (FGS, 2016). The high cost of energy is noted by the government as a major constraint to economic growth. Somalis have extremely limited access to electricity, which constrains productivity. Public supply of electricity in cities is limited in quantity, quality, and reliability, with frequent voltage drops and failures (African Development Bank, 2015). The over-utilization of locally available charcoal and firewood, as the core sources of energy, results in excessive exploitation of these resources (FGS, 2016) and degrades the fragile eco-system.

The need exists in Somalia to mitigate conflict by creating and facilitating sustainable jobs and businesses. Research identifies agriculture as one of the most beneficial sectors of economic growth, with potential impact for conflict mitigation, improved food security, reduced poverty (U.S. Agency for International Development (USAID), 2007). A 10% growth in agricultural production in Africa leads to a potential reduction of rural poverty by at least 6% (Irz

et al., 2001). The agricultural sector is an ideal entry point for poverty and conflict-reduction initiatives in the region (Karekezi et al., 2005).

Pastoralist communities inhabit the arid and semi-arid land throughout the HOA. The HOA contains the largest group of pastoralists in the world, with a population of over 20 million. In Somalia, pastoralists represent 60% of total population. In Sudan, they are 20%, 12% in Ethiopia, 23% in Uganda, and in Kenya they are 10% of the national population of 40 million. They possess a significant part of livestock wealth: 30–40% in Ethiopia and 70% in Kenya, where livestock production accounts for 24% of total agricultural output (Ahmed, 2002).

Somalia's history, culture, and economic realities indicate the most critical agricultural economic sector is specifically livestock husbandry and the mechanisms that support it. Livestock, for survival, require water, forage, feed, and protection from infectious pests. Gaining a better understanding of factors that impact improvement in livestock is a next step.

Philosophical economic growth theories and tools of analysis, underpinning the framework, have been presented in an initial paper by Mitchell et al. (2020). Two economic theories, Ecological Economics and Endogenous Growth, addressed economic growth factors in a sustainable and pro-poor manner, focusing on local resource utilization and improvement (Lucas, 1988; Stokey, 1991; Costanza, 1991; Røpke, 2005). These two academic theories were selected by Mitchell et al. (2020) to provide the framework's philosophical underpinnings. Viewing multi-disciplinary literature helped to filter identification of essential elements for a framework. Economic theories selected incorporate concepts of ecological sustainability and pro-poor economic growth development, harmonizing well with eco systems analysis.

Industrial Eco Systems analysis harmonized with selected economic growth theories. Needed are improved sustainable opportunities in SSA for agricultural production, pro-poor income generation, energy provision, and education access. It is necessary to understand complex interrelationships of physical and social realms, optimizing material and energy resource flows for economic development (Fischer-Kowalski and Weisz, 1999; Schiller, Penn, and Basson, 2014).

The initial conceptual framework analysis examined literature on key environmental, cultural, social, political, and demographic drivers of Somalia's conflict and potential pathways for its mitigation. Conflict factors for Somalia and the HOA have been reviewed. Publications identified economic growth factors and philosophical theories of economic growth. Factors affecting economic growth in Somalia were identified. Through initial examination of the Somali conflict, environmental concepts emerged (Mitchell et al. 2020).

Bozeman (2015) notes that studies on conflict in culturally closed milieu, have a tendency to think of conflicts, causes, and resolution in context of Western susceptibilities instead of implied realities of the situation. To offset bias, this paper incorporates indigenous perspectives with Somalia as a focal point. Information was gleaned from informal observations, interviews, and practices. Literature also indicates information provided by others facilitates basic understanding of the external world and knowledge of ourselves (e.g. Sedikides and Gregg, 2003; Ozgen and Baron, 2007). Informal learning happens through observation, trial and error, asking for help, conversing with others, listening to stories, reflecting on a day's events, stimulated by general interests (Cross, 2007). Hall (2009) suggests that formal and informal learning should be connected. This optimizes and activates effective learning (Dabbagh and Kitsatas, 2012).

3.4. Methods

To facilitate framework objectives, relevant informal sources were consulted to:

- 1) Increase the chances of generating novel, workable solutions;
- 2) Select activity focus and acquire knowledge within the relevant domains; and
- 3) Identify possible constituents.

Sources include Somalis and non-Somalis. With on-going conflict, restricted access to data and informed participants is Somalia's reality. Initial information was obtained primarily from the diaspora, who provided additional insight into the environment. The primary author identified non-Somalis in the network who could provide additional information on potential

activities and technical options to improve identified pathways and to propose answers to the following research questions:

- 1) What is a key economic sub-sector improvement path for Somalia's development?
- 2) What are key elements to provide impact to that sub-sector development?
- 3) What are criteria, and who are individuals who should be engaged, to produce high-quantity and high-quality ideas to improve the sub-sector?
- 4) How can the seeming inability to reconcile conflicts in Somalia be resolved?
- 5) What effective, positive options must be developed for eliminating the existing dire human conditions?

Informal discussions in naturally occurring environments and events seemed the best way to observe new insights and gather information from the point of view of the participants (Musante and Dewalt, 2010).

Participant observations were conducted in two stages. The initial stage occurred prior to determination of this dissertation topic, providing the impetus to initiate current research. Conversations occurred which lacked structure and control. The primary author categorized conversations and interactions that provided information on Somali culture and history in a non-research mode, providing a foundation for the literature review.

The second stage of data-gathering continued by investigating conflict mitigation in Somalia as another focus of dissertation research. During this stage, more questions were asked during conversations, leading to topics of research phenomena. The second stage provided a better understanding of specific points being made during conversations. In both stages, pure observation and informal participant discussions were led by the informants. The following section summarizes participants' observations and comments, both prior to and subsequent to the resulting literature review.

3.5. Initial Findings

Visits to Somaliland and Somalia, and discussions with Somalis were undertaken.

3.5.1. Somaliland

In 2011, the primary author visited Somaliland for the first time to give a presentation on school construction. The presentation was part of a conference addressing student and teacher educational needs in Somalia. While specific to Somaliland, the conference was attended by Somalis from all locations and the diaspora.

While traveling via road from Berbera to Hargeisa, several issues became evident. The roads were in need of repair. Many places, during the rainy season, became riverbeds. The driver advised passengers that flash floods were not uncommon. What was interesting was the abundance of limestone. The primary author reflected upon the Appian Way and the Inca Road, both built from stone. All building construction is based on concrete masonry units (CMU), yet with all the limestone, there are no cement production facilities or concrete plants. The lack of electricity is probably the most significant barrier.

As a construction project manager of educational facilities, the primary author visited a private school in Hargeisa while at the conference. The owner was a young man living in the diaspora who raised money to provide educational access. The classrooms had both boys and girls, although separated from kindergarten to sixth grade. The lasting impression on the primary author was the eagerness to learn, and motivation of the youth fortunate enough to attend the school. Initial investigations indicated there were opportunities available to provide some level of positive impact regarding education.

3.5.2. Somalia

Prior to initiating dissertation research, initial contact with Somalia occurred in 1994, as owner of a construction business. Personnel for business development, from Mitchell Jackson Construction, were sent to Somalia for two weeks, tasked with providing support for the United Nations' Operation in Somalia II (UNOSOM II). The trip's purpose was to gather information on potential opportunities for the organization to assist in construction and logistics activities in

Somalia. Discussions provided information on the clan structure of Somali society, detailed background on Italy's involvement in Somalia, and learning about factions who were fighting in Mogadishu.

After initial Somalia interaction in 1994, the primary author, through familial ties that had been established with Somalis, gained more contacts in Somalis. The primary author, while non-Somali, had become a family member. As a convert to Islam, the primary author was exposed to Somali culture and customs in settings that included Somali family and non-family members in the diaspora, living in various locations of the United States and Canada.

3.5.2.A. General Observations, Discussions with Somalis

Somalis are an oral people with a storytelling tradition, which is how they maintain their history. It is through storytelling that the clan structure is maintained, keeping track of its lineage by using stories to inform about significant individuals who made impacts on it. Stories of clan conflicts over water and herd animals are a normal part of life. The idea of writing Somali was not initiated until the early 1900s by the leader of the Darwish resistance movement and then debates broken out about whether to use Arabic or Latin script. It was not until 1972 that the decision to utilize Latin script was made. The intensity of these debates was, to some extent, rooted in the fact that the Somali population is Muslim, with significant historic ties to the Arab Muslim world. Historic antagonisms with the Christian and, particularly, Italian, colonial world, existed. Selection of the Latin script was fueled by the intent to show that Somalia, while Muslim, was an African country first. It is interesting to note that Somalia joined the Organization of African Unity in 1963 and did not join the Arab League until invited in 1974.

Islam is a critical element of Somali life and culture. Islam is the bridge and binding force across Somali clans. Through many discussions with Somalis, including scholars, it becomes clear that Islam by itself does not produce homogeneous political outcomes. The practice of Islam in Somalia has variations. Initial observations and discussion indicated branches of Sufi Islam Qadiriyyah and Ahmadiyah had significant historic roots, while that of Salafism (or Wahbism), imported from Saudi Arabia, stands in opposition to the traditional Islam as practiced and understood in Somalia. The primary author came to understand that it is, to some extent, these differences that are fundamental to the rise of and conflicts initiated by al-Shabaab,

followers of Salafism. Internal conflicts of the practice and interpretation of Islam have historic roots. The non-Somali influences are central. The complete failure of the West to understand the realities of Islam in Somalia, and their subsequent misguided interventions, have been key contributors to the on-going conflict that has plagued Somalia.

Islam was founded in the Arabian-peninsula. The primary author learned that Somalis fully embraced Islam, but not necessarily all aspects of Arabic culture. It was pointed out, during one conversation, that the Somali people and their culture are fundamentally democratic. Its structure is male-oriented, similar to Arabs with leadership deference to elders, but all members of the clans have rights that are fiercely protected. The primary author was advised that if one were to examine primarily Arab Muslim states, one would see autocratic family-based monarchies, which is not the case in Somalia, given the inherently democratic nature of its clan structure.

While Somalia often has been cast as a homogeneous society, with one language, observations and discussions provide a different picture. While Somali is the primary language, the primary author found there are dialects that include Oromo and Swahili. According to family members, Somalia has always been divided into southern agro-pastoral clans and northern nomadic clans. They have distinctively different livelihoods, linguistics, and social structures.

Clans of Somalia have regions with which they historically have been associated. Migrations, resulting from both environmental conditions and conflicts, yielded settlement of peoples from differing clans in areas of non-affiliated clans. In some instances, leaders of settlements gained their position because their practice of Islam was deemed spiritually guided and democratic. These leaders intentionally sought to build alliances through intermarriages with members of other clans, thereby strengthening their capabilities for territorial defense. They welcomed outsiders. Building cross-clan relationships is an historic practice, making sub-clans dynamic and flexible in their interactions. Family members the primary author met included a variety of intermixed clans from other regions, including *Rahanweyn*, *Isaaq*, *Ogadeen*, *Shakal*, *Mirifle*, *Digil*, and *Reer Brava*. This mixture of various clan members, which also include Somali Bantu, all reside in one area.

The effects of colonialism within the family are manifest in class differences, primarily based on the education of those who came of age at the end of colonialism and the thrust for independence. Educational differences are manifested, especially in the older generation, based on sex, attributable to the patriarchal nature of Somali culture and Islam. While formal education of women was limited, the business and intellectual capacity of uneducated Somali women is quite formidable and potentially a significant resource.

Exposure to and the ability to learn European colonial languages, prior to independence, was a significant skill. Doors opened for opportunities beyond those of either nomadic or agro-pastoralist livelihoods. In some instances, these opportunities facilitated cross-clan integration as a consequence of unique job opportunities in other clan areas. Many Somalis, during pre-independence, learned administrative and management skills prior to the colonial exodus. Family members relay stories of foreign military or police service, prior to and during the independence movements, wherein remittances for those remaining in Somalia was commonplace. Others convey stories of their forays into business during this period, primarily in the capital Mogadishu.

Many family members were educated, post-independence, in a variety of locations in former colonial countries, as well as in Eastern bloc nations. Youth during that era had centralized government schools and private schools operated by former colonizers. Those with government jobs or businesses received private education where they were taught in the colonial languages and became multi-lingual. There were concerns about education provided by colonizers. From the religious perspective, there was fear of conversion to Christianity. From the nationalist perspective, people feared a lack of teaching about the history of Somalia. While Jaalle Mohamed Siad Barre, president of the Somali Democratic Republic from 1969 to 1991 is, at times, vilified, his administration pushed country-wide literacy, requiring youth to teach non-literate elders to read. The country initiated various activities during the Barre period to expand and develop education. Agricultural and livestock production for international markets, primarily to Italy and Gulf countries, was promoted.

Somalia has the longest coastline of Africa, excluding Madagascar, but, interestingly, Somalis have disdain for fish. The primary author was informed that Soviets constructed a

sizable fish processing plant. The design sent waste blood back to the sea, attracting sharks that killed several Somali swimmers. While there is acceptance of the indigenous tropical fruits and grains, such as sorghum, traditional diets consist primarily of *A'd* (meat) and *A'ano* (milk) with minimal vegetable consumption. The type of meat eaten—goat, camel, or beef—was dependent on location within the country; however, drinking camel milk is a constant throughout.

Most Somali have rural roots. Those with whom the primary author held initial discussions were primarily agro-pastoralist. Post-independence Mogadishu and some other larger towns became hubs of commerce and government activity, increasing cross-clan contacts between nomadic herdsmen and agro-pastoralists.

With nationalism as a theme, there is a clear distinction regarding clans between those people born pre-independence and those born post-independence. Many pre-independence persons, especially those less educated, maintain a clan-centric focus as it is a primary means of identity and survival. Those in the pre-independence generation who were educated, however, maintain a Somali nationalist focus, seeing clan-focused orientation as a retardant to socio-economic development. Debates regarding these differing views in the diaspora abound. The primary author has found these debates are swayed by how the disintegration of the Barre regime impacted the individuals and their pre-collapse situation.

The trauma and psychological impact of the civil war and subsequent collapse of the Somali government has significantly fractured society, disrupting cultural norms. Tales of narrow escapes from death, and processes by which very brave individuals were able to get family members to safety, are numerous. Significant numbers lost their lives. Families were scattered and separated. Almost 30 years later, some families remain separated, scattered around the globe. Many live in settlement camps. What is significant is the resilience of the Somali people. In locations where Somalis have settled, in both the United States and Canada, their entrepreneurial drive has yielded significant results. They have opened businesses, pursued education, showing a great capacity to support each other. The primary authors want effective, positive options developed for the existing dire human conditions, or local, regional, and international peace will suffer.

3.6. Specific Opportunities to Facilitate Change

After initiation of Ph.D. studies, the primary author moved to the United Arab Emirates (UAE) which significantly expanded contacts with Somalis, allowing for more information-gathering, observations, and informal interview activities. A number of Somalis had lived in the UAE as workers in various occupations before the collapse of Somalia. Additionally, a number of post-collapse migrants currently live and work in the UAE.

The Somali family social network allowed the primary researcher access to many social and political gatherings. In the UAE, there was a network of Somalis with members from multiple ethnic backgrounds, clans, and HOA countries. The network included educators, engineers, scientists, medical doctors, managers, government officials, business owners, and religious leaders. Meetings and dinners occurred often, with members discussing conditions in Somalia. Ideas for opportunities to facilitate change include the following 12 topics.

3.6.1. Security

During interviews, security was often a topic of conversation. The most interesting assessment of security operations was summarized by two Somali women, one from Puntland the other from Djibouti. In a Djibouti hotel, they noticed U.S. military and security personnel discussing the Somali pirates, while the pirates, staying at the same hotel, were in the swimming pool and restaurant, enjoying the money they had just been paid. It was noted that Puntland and Somaliland were safe areas, while Central South was insecure due to al-Shabaab and other insurgents.

3.6.2. Livestock

Conditions in 2011 revolved around food security which had been significantly impacted by a recent drought. Family members sold off or destroyed their herds during the drought. Livestock in Somalia provides wealth and the source of meat and milk. Somali eat all animals they raise, although camels are less for food and more for milking purposes. In Somalia, camel milk and goat milk are food staples. The primary researcher was told that livestock of various types were raised throughout the country for local consumption and export, primarily to Gulf State markets. In the Gulf region, Somali goat is a prized commodity. Significant quantities were

shipped live to the UAE and Saudi Arabia. The peak season for goat sales to Saudi was during Ramadan and Hajj celebrations.

Somalia is one of the largest producers of livestock in Africa. In 2012, a former Somali veterinarian and senior government official in agriculture visited the UAE from Holland. During conversations, livestock production in Somalia was discussed. Under the Barre regime, there were significant resources dedicated to livestock production, which became the country's leading export. They provided veterinary laboratories; operating staff, animal health services, including inoculations, disease testing, and inspections; quarantine and holding grounds; port handling facilities; and transportation. A certification system, meeting international standards, was in place for exports. Growth of the livestock business spurred infrastructure development in roads, ports, and associated capabilities. The civil war caused disintegration of relevant legal structures and regulations, health standards, and quality control. The lack of these services led to livestock bans in Gulf States, so economic consequences were significant.

In addition to the restoration of veterinary services, three criteria were identified critical to reinvigorating livestock production.

- 1) Adequate supplies of potable water and the establishment of “accessible” water points;
- 2) A means to improve feed and fodder quality and quantity; and
- 3) Reversing environmental degradation, which impacts feed, fodder, and water.

Somalia previously canned meat for export, and also shipped live animals. The primary author was advised that while plentiful, live animal export via truck and sea takes its toll on animals, especially given their normal nutritive state. The primary researcher asked about other meat processing capabilities, and was told that slaughterhouses had opened in Somalia, and there were providers of chilled meat, acknowledging not knowing the quality of either. The significant sanitary requirements and training for safe operation of a slaughter facility were emphasized.

3.6.3. Milk

The primary author met one descendant of a dairy processor in Somalia. The business had been started by an Italian immigrant who had lived, married, and raised a family, producing

cheese. Using simple processing techniques in his home, he was able to become significantly wealthy by turning the abundance of milk into cheese. While Somalis consume significant amounts of milk, products made from milk, such as cheese and yogurt, are not part of their normal diet.

3.6.4. Agriculture and Agroforestry

The primary author learned from a former Somali official that Sheikh Zayed, founder of the UAE, had quite a significant farm in Somalia. It was during this conversation that agriculture productivity was recounted. Before the civil war, significant amounts of banana, sugar, mango, papaya, and sorghum were exported primarily to Italy. There were tomato canning facilities, as well. In addition to food crops, there was significant production of frankincense, myrrh, and charcoal from Acacia trees, with markets in the Gulf States.

The civil war destroyed all factory production activities, and factories have not operated since. Charcoal production, however, continues, causing increased deforestation to support exports, primarily to Gulf countries. At the time, the UN banned Somali charcoal after it was determined that al-Shabaab was using charcoal as a financing mechanism through taxation of delivery routes. Aside from insurgent support, the felling of trees from rangelands was noted to adversely impact livestock production. Discussions noted that charcoal is the primary energy source throughout Somalia and, without alternative sources of energy, basic needs such as cooking are not possible. Charcoal production, even though inefficient, was a means for the poor to earn revenue. Most understood the environmental degradation aspect but questioned the ban's impact on al-Shabaab.

Conversations with a few business owners identified the potential of poultry farming. It was learned that Somalian troops were fond of chicken. One participant noted that it was a good idea to raise chickens because where livestock went some specific trees would grow, which were considered a nuisance in Somalia. Animals would eat the seeds and often break teeth. Trees had thorns that pierced hides. They seemed impossible to eradicate. When cut, they'd grow right back. These trees were *Prosopis juliflora* (mesquite trees) that were brought to Somalia in the 1980s as part of a soil stabilization project. They turned out to be an invasive species, impacting animals and some indigenous vegetation.

3.6.5. Health care

Through relations with a respected religious sheikh, the primary author met a significant Muslim religious leader being treated for unknown intestinal ailments in the UAE. Treatment in Somalia is very limited and health care in the rural areas is virtually non-existent. The situation in Mogadishu is considered worse, with life expectancy of 56 years, yet many in rural areas can live quite long, often over 90 years.

3.6.6. Water

Somali medical doctors and a chemist, who went to Somalia often, informed the primary author that there are significant water-borne bacteria, especially in Mogadishu, where the population has expanded. There were no water treatment facilities. Most water was from shallow wells. The doctors noted significant numbers of people contract intestinal diseases, and many don't survive because effective treatment is not available.

The chemist noted that education regarding water contamination and processes for purification are minimal. There are no wastewater treatment facilities. Surface water run-off and wastewater contaminate ground water. There is minimal awareness of the health effects of this contamination and laboratories for testing water quality are minimal. There are independent water service providers; however, the majority of the population cannot afford bottled water on a daily basis, and much of it is low quality.

3.6.7. Sanitation

According to those who visited Somalia, septic tanks and pit latrines serve solid and fluid waste in some places, but in many instances, open defecation occurs. There are no sewage treatment facilities. While some private sewage services exist, they are unregulated and open dumping of waste occurs.

Solid waste refuse is often seen throughout neighborhoods as there are minimal containers available. There are a few municipal solid waste (MSW) dump sites, but the primary author was advised there are no regular MSW pick-up services, resulting in high levels of

uncollected solid waste in public spaces. The combination of sewage and solid waste, contamination of water, with inadequate medical facilities, is a recipe for disaster.

3.6.8. Education

Several Somali in the UAE were involved in some segment of education, so discussions regarding the collapse of the educational system occurred often. Many of the Somali the primary author met had known each other through the school system while growing up in Mogadishu. Those educated during the Barre time remembered training adults to read and write while they were students, performing a required national service. They noted that K-12 public schools now do not exist in Central South. Most schools were privately owned, community schools, or affiliated with an NGO. One elementary education teacher from Puntland noted that, when she was trying to recruit students for a summer program, parents would ask how much she would pay for their children's attendance. She was shocked. NGOs had been paying to get children's participation.

3.6.9. Transportation

Several Somali in UAE visited family members in Somaliland, Puntland, Mogadishu and in rural areas. The national airline collapsed, but there were private airlines providing service from UAE and Kenya to Mogadishu, Berbera and Hargeisa, with connections internally. Surprisingly many of the larger towns have functional airports capable of servicing jet aircraft.

No railways exist in Somalia. Transport is via road networks in need of significant maintenance. A highway connects major cities in the north with towns in the south. Many roads are not paved and susceptible to flash flooding, washing away. The primary author was cars with passengers. Mogadishu and other urban areas in Central South had paved roads, but rural roads are dirt or rock based. All are in marginal condition. Travel along these roads is arduous and dangerous. Depending on the place of travel, it was possible to be stopped by al-Shabaab.

Four cities in Somalia—Mogadishu, Berbera, Kismayo and Bosaaso—have operable ports, which are the sources of most government revenue (AFDB, 2016). While there are some warehousing facilities, ship loading and unloading capacity, and operations are not efficient.

3.6.10. Electricity

The price of electricity in Somalia was significantly higher than other countries in the region at \$1 to \$1.25 per kilowatt hour (KWH) in Mogadishu. There are multiple small service providers in urban areas, all using petroleum-based generators to supply power. There also are independent mini-grid connections available to those who can afford it. Connection costs are high, as there is no grid. Each residence pays for its connection. Rural areas have no access to electricity without independent generators, often provided by the diaspora or those with means to purchase their own. Electricity power is not regulated, so power produced isn't level and the frequency is not stable.

3.6.11. Telecom

The telecom industry in Somalia is some of the best in the world. The primary author was told that different companies were started by businesspersons from other ventures, acquiring expertise from China, South Korea, and Europe. There are several telecom organizations in Somalia with *Hormuud* being the largest. Most people, even in rural areas, have mobile phone service and internet access. The most striking function was a mobile banking platform created by *Dahabshill* of Somaliland, the largest money transfer company partnering with telecom SOMTEL. Most Somali utilize phone banking for everything. In 2017, the World Bank estimated that 73% of the Somali population over the age of 16 used mobile money services (Elmi and Ngwenyama, 2019). The telecom companies and their owners wield significant power politically.

3.6.12. Banking, Money Transfers, Remittances

Hawala—a traditional system of transferring money used in Arab countries and South Asia, whereby the money is paid to an agent who then instructs an associate in the relevant country or area to pay the final recipient—is Somalia's economic life blood as remittances from the diaspora represent 23% of the country's GDP (World Bank, 2016). *Hawala* companies provide a valuable service given the absence of a formal banking system in Somalia. Threats by foreign governments to shut down *hawala* because of alleged support of terrorist organizations was a serious source of consternation as it would cut the lifeline to all people in Somalia.

According to OECD, remittances are much more effective than governmental aid, which suffers directly from both petty and grand corruption, bureaucratic delays, and is sometimes invested in poor-value projects (Simiyu, Ismail Omar, and Mugano, 2017).

3.7. Subsequent Findings

3.7.1. Four Case Studies

To facilitate inclusive innovation for resolution of complex issues in a resource-constrained, conflict setting, the concept of *bricolage* is introduced. This concept requires individuals to think of ways to recombine existing, but individually less useful, resources to create value through creative reconstruction (George, McGahan, and Prabhu, 2012). Utilization of existing networks is an effective way to obtain information on requirements and opportunities to create innovative businesses and jobs.

Four case studies are examined to help identify key elements that could provide potential positive impact for Somalia under the concept of *bricolage*.

3.7.1.A. Case Study #1—Education

After the primary author's first visit to Somaliland in 2011, he met a Somali woman who was living in and educated in the United States. In 2009, she had created a non-profit organization to support development of K-12 schools in Somaliland and Puntland. Her motivation came from personal experiences. She had obtained both undergraduate and graduate degrees in the United States and felt the need to give back.

The non-profit's mission is to fund \$10,000 each to five schools a year. To receive funding, the school needed to have 1/3 of the grant's values in matching funds. These funds came from non-Somalis in the United States and from Somali diaspora. Completed projects included solar panels, a female dormitory, classroom addition, and a library.

3.7.1.B. Case Study #2—Mobile Slaughterhouse

Literature and Somali-based informal information-gathering confirm livestock production is the most significant and broad-based economic sector. With minimal knowledge regarding

livestock production processes, the primary author contacted the Virginia Polytechnic Institute and State University (VT) Meat Science Center.

After observing the complete slaughter process of both a cow and a pig, the primary author was given the opportunity to discuss with Professor Mark Wahlberg requirements for the production and processing of meat in a challenging place like Somalia.

Multiple rural livestock production approaches in the United States were discussed. Three factors appear critical.

- 1) The animal, how it was raised, health concerns, traceability, and marketability issues.
- 2) Processes and procedures related to facility and infrastructure, sanitation, clean high temperature water, slaughtering methods, inspection, certification, and cold chain storage.
- 3) Processing options, packaging, and distribution.

In the United States and throughout the world, the demand for locally grown products has increased, due partly to long distance transports' adverse environmental consequences. There is also a growing niche market for forage-fed, natural, and organic meat products. Many of the livestock products' characteristics in these higher-priced niche markets match the typical livestock production approaches in rural SSA. What is needed is a means by which to provide documenting the way animals are raised so they meet the criteria established for certifications and labeling for niche market access.

In the United States, there is a lack of U.S. Department of Agriculture (USDA)- or state-inspected slaughter and processing establishments available to small livestock producers in remote areas, similar to conditions faced in rural locations of Somalia.

There are, however, very stringent sanitary requirements for the slaughtering and processing of livestock. Sanitation Standard Operating Procedures (SSOP) require sanitized facility and clean, high temperature water. It takes a lot of water to process large animals like cattle. Electricity is the means by which the high temperatures are maintained. It also takes electricity to power the refrigeration necessary for meat storage.

Several value-adding processes, including aging and a smokehouse, butchering the carcass, and packaging options, were exhibited. Each option can increase the value of the meat, and each one impacts marketing, distribution, and potential return on investment.

The primary author was advised that, since Somalia is a Muslim country, it was important to look at halal and kosher processing. Given the apparent internal transportation issues, it also would be good to examine mobile slaughter units (MSU). MSUs can serve multiple small producers, allowing them to meet new niche market demands and expand their businesses to create wealth in rural communities. MSUs provide many advantages, including lower processing costs, reduced stress on animals, lower capital investments, and less resistance from municipalities and neighbors due to processing outputs.

Investigation of MSUs in the United States addresses a number of the same constraints that reduce the economic benefits of livestock production in Africa, two of which are transportation access and product quality assurance. MSU operation in the United States is governed in accordance with USDA's Food Safety and Inspection Service (FSIS), regulations in place for whenever products are to be sold across state lines. Operating within FSIS guidelines facilitates food safety assessments. Federal meat certification allows the meat to be sold anywhere in the United States and for export anywhere U.S. meat product certification is accepted. Within the context of Somalia, all this is similar to the conditions necessary for international livestock product sales. And there are requirements specific to the operation of MSUs, all of which would be applicable to the situation in rural Africa.

1) Access to water that meets human consumption standards

The water can come from either a municipal supply, private well, or be transported by tank truck to the slaughter location, as long as there is a report certifying it is potable. Given the conditions of water supplies in Somalia, this becomes a challenge and makes water purification technology an essential element to safe meat processing.

2) Sewage and wastewater disposal

Access to a private septic system can be provided. Most MSUs, however, have holding tanks and haul wastewater for discharge to a docking station. In remote locations of Somalia, this

might not be seen as essential, but the existence of improper waste disposal, leading to groundwater or soil contamination, is a major, ongoing health problem. Proper waste disposal is easily accomplished at a docking station and can also utilize the waste to create value-added products.

In this research, a comprehensive MSU approach incorporating U.S. inspection and certification regulations, are critical. MSU technology and processing are viewed as having great potential for application in Somalia, and could vastly improve product marketability, creating jobs and businesses.

3.7.1.C. Case Study #3—Alternative Technology Options

The discussion with the livestock processing expert at VT identified three key requirements: sanitized conditions, clean water, and high temperature water. These three conditions require electrical power, and a clean environment, which can be provided by an air filtration system and renewable energy.

1) Air filtration

Air Oasis, a company in Amarillo, Texas, was contacted. It uses National Aeronautics and Space Administration (NASA)-based proprietary Advanced Hydrated Photo Catalytic Oxidation (AHPCO) nanotechnology for surface and air sanitation. The technology has been used in hospitals and food processing facilities to minimize exposure to viruses, bacteria, mold, yeast, and fungi. The primary author was given significant documentation, including case studies on the potential applications for facilitating a sanitized environment for livestock processing requiring minimal electricity. As an additional check on the potential of this technology, the primary author ordered a Mobile 250 Air Sanifier for initial testing at VT.

The primary author had access to VT's Food Science and Technology inedible meat chiller area, adjacent to the slaughter room. The goal of this preliminary test was to determine if the addition of surface and air sanitizer would result in a reduction in the number of surface bacteria. Working with Dr. George Flick and Laboratory and Research Specialist Diane Wall Bourne, both of the VT Food Science Department, the initial simplified test was performed. The result was a reduction in surface bacteria (Figure 4).

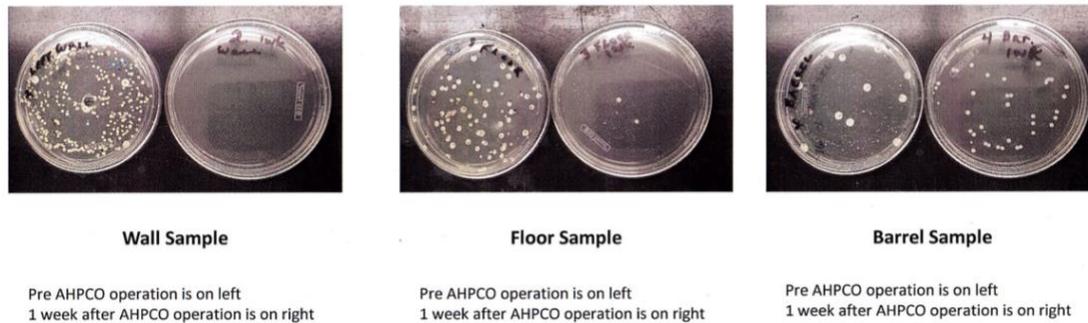


Figure 4, Chapter 3 (Figure 2, Manuscript #2). Preliminary Surface/Petri Dish Results. Source: Virginia Tech Food Science Department

2) Renewable Energy

During the primary author's first visit to Mogadishu in 2012, there were discussions with owners of a hotel, a telecom, and a construction company, an educator, and government officials. All were centered on the need to improve construction capabilities and electrical service.

Somalia imports all its fuel and the high cost of diesel in Mogadishu contribute to the extraordinarily high prices for electricity. Electricity in rural areas is even more expensive than in urban areas and far less available.

Discussions with U.S.-based contacts specializing in renewable energy and investors led to the initial investigation regarding a potential means to provide electrical power. Given the existing price of \$1.10 per kWh, there was interest in examining options for electricity. The pool of potential energy technologies from the United States was quite large. Findings indicated there were two feasible renewable energy options:

- a) Solar PV and
- b) waste-to-energy, combined heat and power (WTE/CHP).

Solar PV was identified as suitable because of the available solar irradiation in Somalia. Relatively speaking, solar PV is high in capital expenditure. Prices have become substantially

lower over time. Also feasible is using waste to fuel the country's energy needs. There are large amounts of municipal solid waste (MSW) and waste located in landfills around Mogadishu available for waste mining. In addition to MSW, there are significant quantities of *Prosopis Juliflora*, a type of mesquite tree, with high fuel potential for use in bio-mass gasification. Despite *Prosopis* being an invasive and noxious plant, it is a good source of fuel.

3.7.1.D. Case Study #4—Initial Renewable Energy Business Venture

An organization, including U.S. manufacturers and investors, as well as Somali partners, was created after initial determination of renewable energy options. A proposal for the system was presented to the Mayor of Mogadishu and the relevant government Minister.

Between the preparation of the final proposal and contract documents, government officials changed. One of the recurring dynamics of the Federal Government of Somalia is changing the prime minister and cabinet by the president at any time. This instability makes it challenging to conduct business and is an oft-cited risk factor identified in research literature.

Another presentation was made to the President. The local Somali business partner sought to change the relationships in the previously agreed business structure. It became clear Somali internal political relations, between business and government incorporated dynamics not allowed by U.S. regulations. The lack of technological knowledge on the part of government employees and the participant selection proved to be significant challenges to final project acceptance. These two issues are cited in the literature as key elements of risk in Public-Private Partnership project development. Ultimately, it was announced that the contract to provide electrical power was given to the largest telecom company in the country.

After the announcement, the primary author was contacted by other Somali businessmen and given a challenge to develop a means of providing electricity to people in rural areas, where the majority of people reside. People in rural areas, particularly the disenfranchised and uneducated young males, make up forces that continue to carry on the conflict in Somalia (Colletta and Cullen, 2000). If there are renewable energy ventures, they could provide training and job opportunities for youth, thereby reducing conflicts.

Since 2013, the Federal Government of Somalia has gone through three prime ministers and numerous cabinet changes. Territorial gains have been made against al-Shabaab insurgency with the help of African Union Mission in Somalia (AMISOM) forces. However, violent insurgencies continue in Central South Somalia and have spilled over into neighboring countries such as Kenya. The secession of Somaliland remains in place. Puntland, while maintaining ties with the Federal Government, is effectively an autonomous region.

A study produced by Nuñez (2015) indicates little has changed regarding electricity since 2013. The majority of people living in rural areas have no access to electricity leading to more deforestation because of continued charcoal use. Deforestation has both adverse environmental consequences and economic ramifications because of the pastoral and agro-pastoral livelihoods.

3.8. Lessons Learned

Development deficiencies in Somalia were identified along with initial framework themes, providing impact pathways including agriculture; livestock production; education; and infrastructure. While literature can provide foundational information for the development of a framework, complex social phenomena existing in conflict zones is linked to multiple bodies of knowledge that belong to different disciplines. In this research, a conceptual framework is defined as a network of interlinked concepts that, together, provide a comprehensive understanding of a phenomenon or phenomena. Qualitative methods are used as the tools to further investigate and better understand the complexities of the framework environment. (Jabareen, 2009).

Understanding Somali cultural dynamics and the relationships they create is critical to working with potential stakeholders. One means of gaining this understanding is through involvement of Somali in the diaspora. Development of approaches to identify and engage potential stakeholders is critical in overcoming existing government, political, and commercial environment challenges. This may require incorporating locally respected religious persons and clan leaders as facilitators.

The security issue is of critical concern. Phasing of project locations is a strategy to avoid zones of conflict until they become more stable. There will be a need for flexibility in any

element of the framework to accommodate various clan and class dynamics and relationships among potential stakeholders.

Somalia has multiple natural resources available with great potential to produce products for development. The existing structure and livelihood practices, however, suggest livestock production improvement should be the immediate focus.

There are several potential synergies associated with livestock development. Telecom can potentially be utilized to enhance training and relevant knowledge access, such as weather, and quasi-banking through mobile money platforms. These synergies expand boundaries for creation of new businesses and job opportunities. The potential for significant growth in livestock production and the processing sector will require several specific existing conditions to be overcome.

Critical elements of infrastructure services, such as water, sanitation, health care, transportation, electricity, and education are lacking. Potable water, transportation, electricity, and education are essential to improve agriculture and livestock. Each of these infrastructure elements will require significant effort to address current conditions. Identification of the elements with the most combined impact on livestock production and processing, and collateral societal benefit, are key. Initial investigations indicate there are new technologies and techniques that can address the existing deficiencies. There are existing businesses and investors willing to try. What is needed is the framework to facilitate the efforts.

3.9. Topics and Criteria for Further Study

Additional information is required to better understand identification criteria for the potential framework. Expanded investigation is needed to develop means for community-based, business formulation that will overcome existing political and commercial conditions. Development of a business structure, capable of navigating the current conditions, supported and sustainable by the community, is essential.

Further investigation of technologies to overcome the water access and a UV water purification challenge is needed, with more systematic testing of the systems, identified in this paper, to determine feasibility. Renewable energy options indicate two potentially viable sources

in the Mogadishu area. Additional rural options, however, need to be explored, based on local conditions. Utilization of existing information and communication technology infrastructure as a means to improving educational access needs further investigation as a delivery mechanism for technical training.

The diaspora is a potentially significant contributor to developing additional markets given their geographic diversity and business acumen. Organizing diaspora to focus on contributing to Somalia's development should be channeled to interact with non-Somali.

To address these concerns and further develop the framework, a pilot study is proposed. The study will include people with knowledge and experience of Somali culture, politics, and commercial practices at the federal government and local levels. In the process, input will be received from people with experience in implementing pro-poor development projects with infrastructure and agriculture components in conflict zones.

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4. Manuscript 3: Conflict and Development in Somalia: Findings from Stakeholder Interviews

4.1. Manuscript Copyright Transfer Agreement

Chapter 4 (manuscript #3) was submitted to the Council for the Development of Social Science Research in Dakar Senegal, in March 2020. The authors (page xvi) of Chapter 3 (manuscript #2) warrant that this chapter will not be submitted to any other journal for review while it is under review by CODESRIA for consideration in one of its 10 academic journals. Academicians, researchers, or practitioners interested in citing any information from Chapter 4 (manuscript #3) should verify the status of this publication in order to obtain the correct citation information by contacting the corresponding author: John T. Mitchell (jtmitchellconst@gmail.com).

4.2. Abstract

Somalia's political and economic success and future depend upon various factors. Among these are the reduction of conflicts, fair land and water distribution, electric power in rural areas, collaboration among clans, educational opportunities for youth, sustainable jobs, production and distribution of safe meat and milk, the base of Somalia's diet. To attain these essential factors, funding is imperative. In addition to donations, loans, and investments, a new source, crowdfunding, was introduced via various interview sessions conducted with stakeholders, elites and experts, in the Somalian way of life. Statistical evidence and charts provide us with summative findings from interviews and unstructured question-topics. At the end of this paper, we are provided with suggestions from interviewed stakeholders for future endeavors to secure Somalia's continuing development.

Key words: Crowdfunding, Crowdsourcing, Clan, Diaspora, Elite, Experts, Remote Stations

4.3. Introduction

Somalia is a country that experienced total government collapse in 1991. Since then, it has had various internal conflicts. Information regarding the genesis of the current state of affairs is essential to the development of a sustainable solution. Since disintegration of the national

government, multiple attempts at formation were made, culminating in its first internationally recognized government. The current capital, Mogadishu, is subject to on-going insurrections requiring continued presence of African Union troops. They provide a modicum of security in Mogadishu. While rural South Central Somalia contends with on-going insurrection, spilling over into neighboring countries, other regional areas, such as Somaliland and Puntland, have relative peace and security. Somaliland has formed its own government and declared its independence from the national government in Mogadishu. Somaliland's government is not recognized internationally; nevertheless, it has managed to function, providing security, and initiating infrastructural improvements in the region.

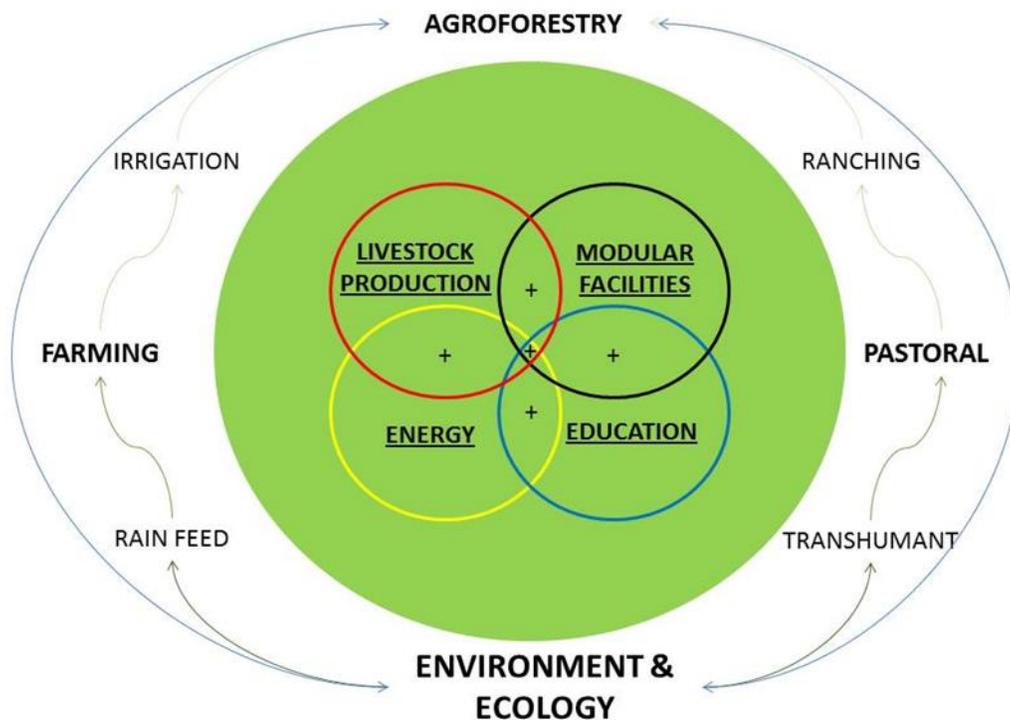


Figure 4, Chapter 4 (Figure 1, Manuscript #3). Initial Literature-Based Framework. Source: J. Mitchell. © 2020.

Current literature-based framework (Figure 5) identifies implementation of renewable electricity and Vocational Education Training (VET), emphasizing livestock production and processing. It is difficult to determine specific needs at local levels without being present in Somalia to interview key informants. Previous research included discussions with Somalis living

in the diaspora who were engaged in development and business activities, needing to return often to Somalia. As discussed earlier in Mitchell et al. in 2020, a national solar and waste-to-energy project was undertaken through the private sector and Somali Federal Government support, using a modified Public-Private Partnership (PPP).

The primary objective of this research is to formulate a framework and process model for locally specified field implementation. This research is not concerned with statistical generalizability nor probabilistic sampling. Both unstructured and semi-structured expert interviews and questionnaire responses are used as primary empirical data, facilitating framework evaluation for field implementation.

4.4. Methods

This paper's objective is to develop a framework and process leading to sustainable business and job creation, to improve socio-economic conditions, and to reduce conflict recurrences in rural arid and semi-arid, post-conflict locations, focusing on Somalia.

Initial framework concepts were examined in an earlier paper (Mitchell et al., 2020). Ecological Economic Theory and Endogenous Growth Theory were identified as the philosophical underpinnings guiding framework development in Somalia. Next, researcher interviews were conducted and synthesized with literature review information. A preliminary understanding of framework research was composed. Finally, this preliminary definition is pilot-tested by previous senior Somali government officials, practitioners and researchers, experienced in interdisciplinary work related to framework elements.

The research utilizes interviews with participants chosen to provide in-depth insights into cultural, societal, political, and economic factors developed during the conflict period and now impacting implementation of the framework and process model. Purposive sampling—also known as judgmental, selective, or subjective sampling, is a type of non-probability sampling. Sample size is established inductively and theoretically, continuing until saturation occurs. Saturation is defined as the point at which interview analysis yields minimal numbers of newly identified themes or codes. This research did not reach sample saturation because research was limited by the number of available interviewees and analysts. Themes of primary interest have

been identified using key informant unstructured interviews, semi-structured expert interviews, and a questionnaire. A limitation of this research is that fewer than 15 people were interviewed, making it difficult to demonstrate the validity of findings. It is difficult to prove that the interviewees are knowledgeable, informed, and representative of their peers regarding their information and recommendations. Interviewee identities are not revealed. Somalia, as a conflict location, could have serious consequences for participants with family residing there.

An executive summary of the generalized literature-based framework was created, identifying key information and potential elements. The summary was shared with a select group. Four former senior Somali government officials, with extensive experience in project development and implementation at the national level, reviewed the preliminary framework and elements proposed. This elite group, based on their executive administrative experience in Somalia relevant to this scenario, provided insight into requirements for potential program development not identified in the literature-based framework. Their insights were obtained through unstructured interviews based on open-ended questions.

After compilation of response data, framework concepts were provided to another pilot test group for review. This group of eight experts, with knowledge and development experience working in Africa or conflict zones, was selected from a larger pool. After review of the document, they responded to Likert scale research questions, assessing efficacy of the initial framework and process model concepts. In addition to the questionnaire, pilot study subjects participated in semi-structured interviews. Responses to open-ended and close-ended questions were obtained to identify constraints, opportunities, and any additional requirements within the framework. Results of the elite unstructured interviews and semi-structured interviews are incorporated into the pre-existing framework and process model, providing a comprehensive final framework and process model.

4.5. Elite Unstructured Interviews

To obtain an initial assessment and generate practical suggestions and recommendations, as applied to Somalia, key informant, “elite” unstructured interviews were conducted. Historical documentation of development across agricultural, energy, and education sectors, implemented in pre-collapse Somalia, was obtained. These key informant interviews helped identify rationale

and motivating factors for behaviors. They provide understandings, or misunderstandings, of major issues (Guest, Bunce, and Johnson, 2006).

This technique was useful for collecting background data. It also is utilized for interviewing well-informed and key individuals in high-profile state administration, rather than low-ranking employees. The interviewee can teach the interviewer about problems that arise, questions, and situations, all within limits of the interviewer's ability to perceive how these experiences relate to the problems being investigated. Information about existing organizations, institutions, and socio-economic conditions—as well as understanding values, beliefs, and occupations of the area—is essential to potential implementation of the framework. An important characteristic of elite interviewing is that it is not usually possible to determine, by any mechanical method, who should be interviewed. The population cannot be satisfactorily randomized or stratified in advance. Different interviewees make individual and unequal contributions to a study. Elite interviews utilize only a small number of informants, selected because they possess information, ideas, and intimate knowledge of the subject of inquiry.

4.5.1. Characteristics of Interviewees

To obtain a better understanding of the cultural context in which the literature-based framework would operate, this research restricted elite interviews to Somali nationals. Since there is no clear-cut definition of the term “elite” in literature, given its broad understanding across the social sciences, scholars tend to adopt different approaches (Harvey, 2011). For the purposes of this research, "elites" are defined as those who occupy, or have occupied, senior management positions in Somali government, minimally at the deputy minister level. Government officials were identified to learn their views on the potential for implementation, achievement, and failure of the literature-based framework and process model. Additionally, they identified key factors necessary for implementation, providing recommendations for improvement. Persons at/above the deputy ministerial level of government in Somalia, it is thought, would possess experience in development planning, design, and implementation. They would understand the issues and through professional expertise, social position, or participation in related projects and programs, were likely to provide needed, culturally relevant information, ideas, and insights, improving the feasibility of the literature-based framework.

Interviewees had broad expertise in developing and producing projects, and had been involved, or had knowledge of similar projects and their requirements for implementation in Somalia. They were able to provide views on the particular framework model under development, offering rich and diverse perspectives on cultural, social, and political phenomenon associated with them.

An initial list of eight elite interviewees was identified through discussions with members of the Somali community in the diaspora. Interviewees were identified with the intention of conducting three to five interviews, part of a pilot study, to review the literature-based framework and process model.

To incorporate lessons learned from more than 20 years of conflict, three groups of federal government officials, key informants, were identified: Pre-collapse, Post-collapse transitional, and New (post 2013). Interviewees represented members of the Siyad Barre government, members of the Transitional National Government, and the post 2013 Somali National Government. Four interviews were conducted from the eight possible subjects. Romney, Weller, and Batchelder (1986) noted: samples as small as four individuals can be extremely accurate, providing complete, accurate information within a particular cultural context. As long as participants possess certain expertise (“cultural competence”) about the domain of inquiry, a sampling of four can suffice. Elite interviewees identified other potential elites, but lack of time and resources did not allow more interviews.

Interviewees were provided with the following information: researcher's name, the purpose and nature of the research, time of the interview, how data will be used, and where results will be incorporated. Respondents also were provided with an executive summary of the framework, providing contextual information for the interview. Both English and Somali language consent forms, approved by Institutional Review Board (IRB) at Virginia Polytechnic Institute and State University, were provided and signed, noting that all information contained in the interviews was confidential, their participation would be kept anonymous, and without compensation.

Interviews were restricted to a maximum of one-hour. Three elite interviews were conducted personally, and one interview was conducted by telephone via Skype. It was recorded

using an integrated Skype recording device. All interviews were recorded with consent of the interviewees. Transcripts of interviews were produced. Interviews with Somali elite were conducted by the author. A Somali native interviewer also took notes, providing assistance with interpretation of concepts when interviewees felt more comfortable with Somali language descriptions. The Somali interviewer provided interpretation of cultural and visual cues during the face-to-face interviews. Copies of transcripts were provided to interviewees for review and revision, should they wish to provide corrections or additional input. Transcripts were returned to the researcher with interviewee approvals. Once elite interview transcripts were accepted, they were compiled and examined, identifying common themes across responses.

4.5.2. Interview Questions and Rationale

Key informant interviews are essentially qualitative in nature. Open-ended questions were deemed appropriate for exploring elite perceptions, and for obtaining comments on the value and implementation prospects of the framework. They provided elites with flexibility in answering questions. One major consideration in deciding on an open-ended approach, rather than one using more close-ended questions, was the degree of prior research. Knowledge about a subject allows the use of close-ended questions. While this study explores concrete subjects, such as livestock production, provision of electrical power, and education, it also incorporates abstract and complex issues in uncharted areas, not necessarily within the expertise of key informants. Integration of conflict analysis, assessment and post-conflict development of bundled, multi-sector infrastructure, coupled with business development in rural, post-conflict zones, is a recent approach to development. Allowing key informants to articulate their views on improving the framework and process was critical. An additional consideration, leading to using open-ended questions, was the desire to maximize response validity. Open-ended approaches provide a greater opportunity for respondents to organize their answers within their own framework. This increases the validity of responses, and is best for exploratory work, though it does make coding and analysis more difficult.

An initial interview guide was created, and from the interview guide, the following, open-ended unstructured questions were created.

- 1) What were the development practices to provide electrical power and education in rural areas of Somalia prior to and during the conflict?
- 2) With the creation of the new federal government, what do you see as the greatest hurdles to implementing electrical power and education access in rural areas?
- 3) What would be your recommendations to facilitate the implementation of education and electrical power in rural areas? Do you think it would impact stability and reduce conflict? If so, how? And if not, what do you think would reduce conflict?
- 4) Do you think job creation and business development in rural areas are important to the recovery of society? How important is providing electricity and education to improving the potential for job creation and business development in rural areas?
- 5) The production of meat and milk is critical to Somali economy and is a significant aspect of Somali culture. Do you think it is feasible to provide a slaughterhouse and milk processing facility in rural locations, taking advantage of local meat and milk production opportunities? What if it involved both local and foreign participants?
- 6) What do you think would be required to make this business opportunity work? Who would be the most appropriate participants to make it accepted and successful? What would you consider to be potential pitfalls? What presents the greatest challenges to successful implementation of this type of business?

These six groups of questions were asked of each respondent, maintaining interview continuity. Follow-up questions varied, depending on initial responses, to elicit more complete information.

4.5.3. Data Analysis Procedure

Conventional content analysis is used in the key informant study design. The aim is to describe the respondent's assessment of the literature-based framework and process model. Through content analysis, it is possible to distill words into fewer content-related categories. It is assumed that when classified into the same categories, words and phrases share the same meanings (Cavanagh, 1997).

There are no systematic rules for analyzing data. The key feature of content analysis is that many words of the text are classified into much smaller content categories (Weber 1990; Burnard, 1996). The basic coding process in content analysis is organizing large quantities of text from interviews, into fewer content categories (Weber, 1990). Categories are patterns or themes that are directly expressed in the text or are derived from them through analysis. First, the data was organized by content coding, according to key concepts of the study (Coffey and Atkinson, 1996). Then data was further analyzed by theme-based categorization (Braun and Clarke, 2006). The interview guide served as the first thematic schema, but additional themes also emerged from the data.

This research used inductive content analysis to organize qualitative data. The process included open coding, creating categories, and abstraction. Open coding means that notes and headings are written in the text while reading it. The written material is read again, and necessary headings are written in the margins, describing all aspects of the content (Burnard, 1991, 1996; Hsieh and Shannon, 2005).

Interview transcripts were read to derive codes (Miles and Huberman, 1994; Morgan, 1993; Morse and Field, 1995). First, the exact words from the text, that appear to capture key thoughts or concepts, were highlighted. Next, notes of first impressions, thoughts, and initial analysis of transcripts were made. As the process was repeated, labels for codes emerged, reflective of more than one key thought. They became the initial coding scheme. Codes then were sorted into categories, based on how codes are related and linked. These emergent categories were used to organize codes into meaningful clusters (Coffey and Atkinson, 1996; Patton, 2002). The relationships between sub-categories were identified. They were combined into a smaller number of categories to identify factors that could enhance the initial framework.

4.5.4. Research Results—Elite Interviews

Analysis of responses from the elite, unstructured interviews revealed several themes. The first theme, which was unanimously referenced, identifies security and development as interlinked and critical activities. The theme is summarized by one interviewee's statements: "If there is no security, there will not be a development; and if there's no development, there will be no security". Security is deemed by many to be a pre-condition for development activities. Its

lack adversely impacts most forms of development and most funding access, especially in contested areas.

It was noted that there are pockets of peace and stability. In those locations, it is possible to initiate viable programs to improve livelihoods. Said one interviewee, “In cultures with primary societal organization in the form of tribes and clans, word of success by one group often provides incentive for other groups to follow models when they are successful. Providing electrical power in rural locations would have a big psychological impact on the young and the local community of the rural area. Providing vocational training also would be very valuable.”

Prior to its collapse, electrical power was provided by the government. Education was controlled and, in most cases, provided by the government. In pre-conflict times, the government explored hydropower, but progress was disrupted by the conflict. Since the initiation of conflict, electricity and education services are provided, in both urban and rural areas, by the private sector. Government provision ceased so private sectors stepped in to fill the voids. Efficient electricity supply is accomplished by small businesses, with small, independently owned generators primarily with only neighborhood capacity. Rarely does it exist in rural locations. Education is via the private sector, “through donor aid and through implementing partners, which are international Non-Governmental Organizations”. There are a few locations where education provision has been somewhat successfully implemented in rural contested areas. Within some rural locations, controlled by insurgents, governance parameters have been implemented by locals in cooperation with insurgent leadership, utilizing NGO funding that allows education programs to exist.

With improved security and stability, the government’s ability to effectively participate in development programs, especially in rural areas, will improve. One interviewee said, “What we need, first, is to establish a regulatory framework for infrastructure.” Providing jobs as an objective and outgrowth of such infrastructure is crucial, especially with a focus on youth employment. Providing opportunities for youth are a major means of decreasing conflict participation. As emphasized by one of the interviewees, jobs give youth viable economic options and allow them a means of providing for themselves and their families. This results in a disincentive to participate in violent extremism.

Although there is an on-going insurgency, most conflicts in rural areas are over access to water and land resources used for livelihood production. Unresolved tensions, stemming from lack of control and access to these resources, can be resolved by creating opportunities for new businesses and jobs. This only will be accomplished through reconciliation at the grassroots level, not from top-down directives.

Most elite interviewees noted that production of milk and meat is crucial, basic to Somali society. Internal production and export opportunities are needed. While many rural areas have access to bottled water, and cell phones, there is no access to facilitate productivity of milk and meat in a meaningful way. Another interviewee added, “Providing access to electrical power, clean water, and education, to improve productive capacity of the meat and milk industries for local and international consumption, would be seen as a good opportunity. When the people in rural areas see there's investment in their local area, they realize that is something they can support as an opportunity for them to improve their lives.”

Implementing such projects would involve collaboration. As mentioned by an elite interviewee, “There are a lot of local people who would be interested in being part of such a project.” The rural areas are run by local clan leaders. Their involvement is crucial. Obtaining consent for the project is the first step. Each clan or tribe has leaders who are known to its membership. They are able to identify those held in esteem by the group because of their historic commitment to their members. They would provide and approve access to suitable areas used to establish projects. Locals would provide security guards for protection, so no one can destroy facilities. Facilitating local involvement in projects means there must be stakeholders, not only as employees, but as partners, sensing ownership in something that will benefit their community.

Most developments occurring inside the country are run by the diaspora. In many ways, they are partners with locals through business and job establishments, as well as by remittances. They play an important role, as highlighted by another interviewee.

One interviewee offered this comment on the current situation. “Since the local government is not strong, you will need clear guidelines for local people who will facilitate this type of business collaboration. Ideally, influential people, respected by their tribes, should be involved in the business if you want success. Businesses, such as those within airlines sector, are

an example of how the diaspora have formed business partnerships in Somalia that have worked well during the conflict. There was no harm to any of their flights. Safety was provided continuously. You need to select business partners who are role models and respected by their community. These individuals have earned respect from their clan, and have supported, financially, members of their tribe when in need. Thus, the business becomes one that belongs to the tribe, for which, in return, the tribe will protect and provide security.”

All interviewees agreed that unifying clans to take advantage of business opportunities is possible and has occurred. Success requires clear definition of roles and responsibilities, and identification of returns for participation. Decisions to deal with one tribe, or multiple tribes, are functions of location and long-term vs. short-term objectives. Partnerships with short-term objectives can be accomplished with one tribe, while long-term partnerships require multiple-tribe participation. Depending on the nature of a conflict that has occurred, location might require project duplication in two sites because of existing post-conflict, socio-political-economic constraints. This duplication of funding requirements reduces the potential for participation in these locations until later stages.

Most interviewees agreed that “most Somali people are aware of the need to have foreign involvement in business development to move forward. They will not refuse such partnerships as it represents a positive way for development from bottom up, starting with the rural people. Locals know their limitations and will welcome a sincere business partnership.” Their roles and benefits in the long-run, need to be clarified at the beginning, including time projection for results. When the project is new, with limited initial revenue, with projected growth results, everyone could win.

Foreign partnership is a positive business opportunity as it provides conditions for technological exchange. Locals typically value foreign knowledge, technical and managerial support. Since funding is difficult to come by, assistance is normally appreciated. Clarifying a potential for expansion up-front is better, making the deal clear. At the beginning, select the players (tribal elders) very carefully. Critical are people who are decent and who will not change values consistent with the project's intent. Making partnership selections carefully, and being connected with the right people, are two keys to success.

4.6. Questionnaire and Semi-Structured Interviews

4.6.1. Characteristics of Interviewees

The semi-structured pilot interviews and questionnaire group included eight experts of various disciplines selected from a larger pool of 15 experts. "Experts" had academic or field experience, or both and field project experience of 10 years or more. This included project design and implementation, business development, sustainable construction, alternative energy, agroforestry, education and training, agriculture in rural Africa, information and communication technology (ICT), sustainable design and construction. One exception was a Somali business person who did not have 10 plus years of experience. In the group the business experts were Somali and had established functioning business operations in Somalia, both during the conflict, and, post-conflict periods.

The sample expert group was comprised of United States nationals and Somali diaspora professionals. Three interviewees were Somalis, two males and one female. Two other interviewees were non-Somali African males. The remaining three were from the United States, two males and one female. All interviewees had experience in Africa. Several had experience, working in post-conflict countries.

4.6.2. Rationale for selection of interviewees

Selection and identification of participants was concentrated on potential respondents from the original list. Purposive sampling was adopted, aimed at encompassing a wide range of experiences and project sizes. To ensure consistent and authentic data collection, the research sample was limited to those with experience in project and business development. The purpose of the research was explained in a letter requesting voluntary participation. A document was given to all respondents incorporating detailed information regarding the framework and process model. After reviewing the document, participants were given 15 survey questions using the Likert scale to assess the efficacy of the initial framework and process model concepts. After the survey was completed, the pilot study subjects participated in semi-structured interviews. Responses to prepared questions were obtained. Results of the survey and the semi-structured interviews have been incorporated into the modified framework and process model.

4.6.3. Quantitative Questions and Rationale

Experts were asked to respond to 5- and 6-point Likert scale (ordinal level of measurement) questions on Survey Monkey, which was used as the data collection mechanism. The survey included: Six importance scale questions, seven agree/disagree scale questions, and two satisfied/dissatisfied questions, to obtain quantitative results from a sample of five experts. These methods are considered suitable for this research as the survey helps identify the level of agreement the experts have with key literature-reviewed framework concepts. Questions also were asked to determine experts' views on proposed risk-reduction strategies and potential for success of the framework, to increase investor participation.

4.6.4. Survey Findings

The Opinion Survey found expert beliefs to be in agreement with the literature-based framework concepts. The Importance Scale questions were used to assess the experts' opinions on the literature-based framework. Importance Scale questions were based on the 5-point Likert scale response format.

1 = Not sure/Not Applicable

2 = Not Important at All

3 = Somewhat Important

4 = Important

5 = Very Important

Importance Scale questions, included in the survey, were:

On a scale of 1 - 5:

1) What importance would you give to rural areas as contributors to the economy, social, and cultural stability of the society?

- 2) How important do you view provision of electrical service to rural areas as a means to stabilize society and reduce potential conflict?
- 3) How important do you view job and business creation in rural areas as a means to stabilize society and reduce potential conflict?
- 4) How important do you view provision of job-focused educational access to rural areas as a means to stabilize society and reduce potential conflict?
- 12) How important do you consider project scale and revenue generation potential to increasing potential investor participation?
- 15) Conflict disrupts previously existing societal norms, both short-term and long-term, depending on the conflict's duration. How critical do you consider the inclusion of these impacts in the formulation of business and job opportunities?

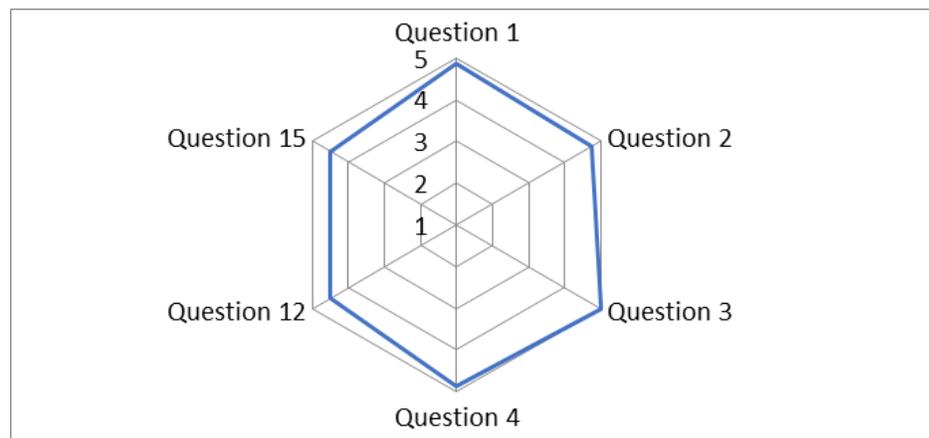


Figure 5, Chapter 4 (Figure 2, Manuscript #3). Importance Scale Responses. Source: J. Mitchell. © 2020.

All Importance Scale questions received responses of either “Important” or “Very Important” (Figure 6), with exception of Question 15, which included one response of “Somewhat Important”. The importance of rural areas to society and stability was “Very Important” in all but one response, which noted it as “Important.” The provision of electrical service in rural areas as a means to conflict reduction and societal stabilization was also deemed “Very Important” by all but two respondents, who indicated this factor as being “Important”. Job

and business creation and education, focused on supporting jobs and businesses, was considered “Very Important” by all but one respondent, who considered it "Important".

Project scale and revenue generation participation, as factors influencing investor participation, was noted as split: “Very Important” from four respondents, and “Important” from four respondents. While the majority of respondents (five) indicated that consideration of a conflict’s impact on societal norms was a “Very Important” consideration in the development of business and job formulation, two respondents indicated the inclusion of conflict impact in job and business formulation was “Important”, and another indicated it to be only “Somewhat Important.”

One Agree/Disagree Question was used to cross-check the Importance Question response regarding the importance of conflict information to framework implementation. The other Agree/Disagree questions were used to determine the experts' views on:

- 1) The concept of simultaneous provision of electrical power and education infrastructure;
- 2) Use of Public Private Partnerships and key ownership and partnership requirements.

The Agree/Disagree Survey questions used 5-point Likert scale agree/disagree response formats where:

- 1 = Not sure/Not Applicable;
- 2= Strongly Disagree;
- 3= Disagree;
- 4 = Agree; and
- 5 = Strongly Agree.

The Agree/Disagree questions are as follows:

5) How would you rate the chances of success in providing small-scale modular power (electrical) service and education access if both were used to support business and job creation in rural areas?

6) The critical factors to be assessed in the framework include key conflict data (Appendix 1). Do you think incorporation of this information is important to the successful implementation of the framework?

8) How would you rate the need to provide both power and education simultaneously to quickly improve productive capacity, job creation, and business development in rural areas?

9) Do you consider provision of electrical service infrastructure for business development and job creation (first), with the ability to scale up for residential service, based on increased customer ability to pay for service (second), as a satisfactory approach?

10) Given the status of government in post-conflict environments, do you agree that unsolicited private sector, PPP proposals can be allowed to facilitate the creation of infrastructure?

11) If multiple funding sources are used to provide electrical service and education, do you consider realistic a 20-year timeframe for ownership transfer to locals?

14) How important do you think creating educational access in rural areas with international universities, to include Research and Development (R&D) and service-learning experiences with local focus, is to stimulating jobs, business, and innovation opportunities for local residents?

Results of the Agree/Disagree questions (Figure 7) showed there was significant strong agreement (5 respondents) that both electrical power and education were required to improve job and business creation in rural areas, while one respondent was not sure if it was applicable (Question 5).

There was significant strong agreement (5 responses) that including conflict data as part of the framework analysis is important to successful implementation, while one respondent was

not sure if it was applicable (Question 6). There was unanimous strong agreement that the potential for success of creating jobs and businesses exist if a project provides both electrical power and job-focused education (Question 8).

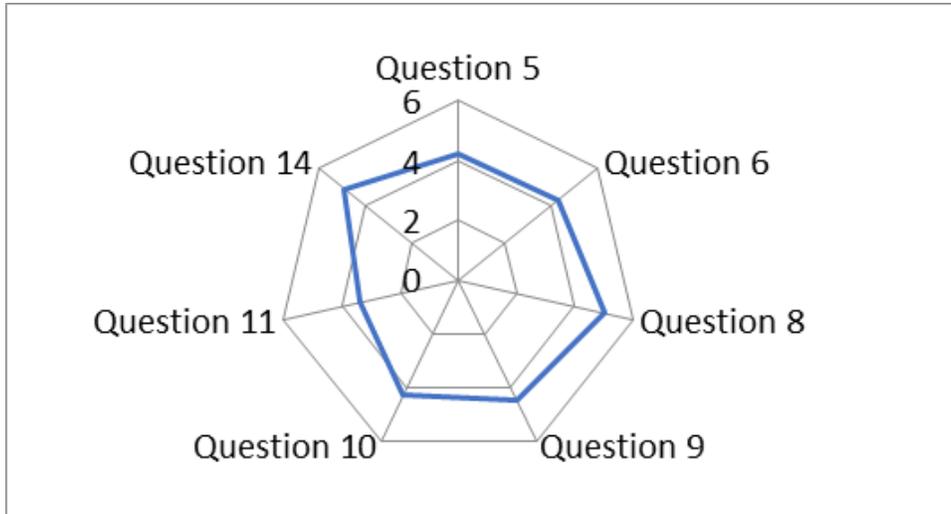


Figure 6, Chapter 4 (Figure 3, Manuscript #3). Agree/Disagree Scale Responses. Source: J. Mitchell. © 2020.

Responses to Question 9, providing electrical power for business first, as an acceptable strategy with residential power provision coming second, were split equally between agreement and strong agreement. There was both strong agreement (4 responses) and agreement (3) that unsolicited PPP proposals were a potential avenue for framework project development given post-conflict government conditions, however one respondent strongly disagreed with this concept. The concept of a 20-year timeframe, prior to the complete transfer of ownership to locals, is “agreed”, however, not “strongly agreed”. Two respondents did not think it applicable. International universities are considered an important partner to the framework. Their potential contribution to R&D and their participation is strongly agreed as a requirement (Question 14).

Two questions in the survey were based on the 5-point Likert scale satisfied/dissatisfied response format. The 5-point format included a neutral response option which was not available in the 4-point scale. The neutral response was not selected in either of the two questions that contained this option.

One question sought the experts' opinions on the potential success of the framework implementation, based on their understanding of the key concepts and implementation strategies (Question 7). The experts' overall opinions were solicited regarding risk-reduction formulas that were incorporated into the literature-reviewed framework and identified in the overall framework document provided to respondents.

Questions asked were:

7) Please indicate, based on your review of the proposed framework and process, how satisfied you are with its potential for success in creating jobs and business opportunities in rural areas.

13) The framework identifies several risk-reduction strategies to increase potential investor participation. How viable do you think they are?

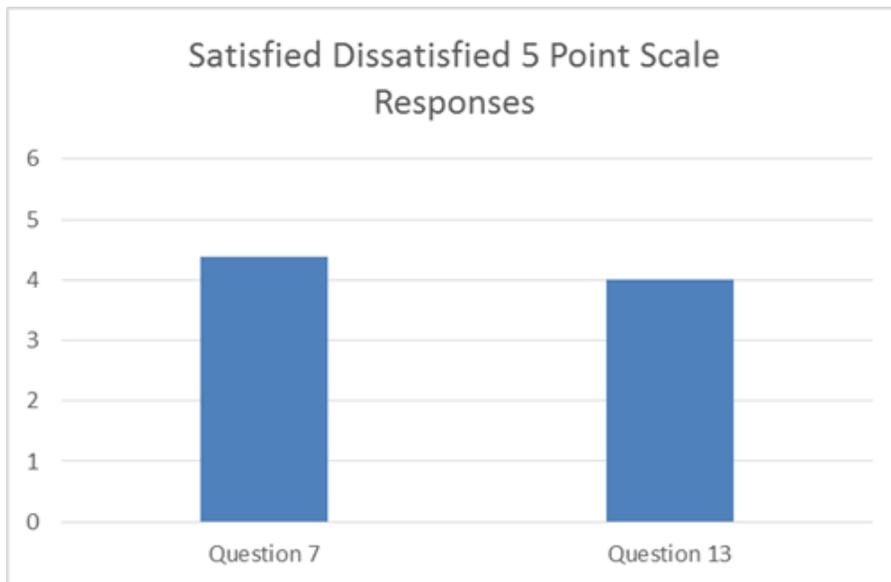


Figure 7, Chapter 4 (Figure 4, Manuscript #3). Satisfied/Dissatisfied Scale Responses. Source: J. Mitchell. © 2020.

Results of these questions indicate that the wording of the questions was possibly not effective as each question generated 40% “not sure/not applicable” responses. The remaining respondents were split between “satisfied” and “very satisfied”, with the potential for success of the framework’s proposed process for providing jobs and business creation. All were “satisfied”

with the risk reduction strategies potential for increasing investor participation (Figure 8) which theoretically increases funding probability.

All "experts" agreed that literature-reviewed framework concepts, of simultaneously providing electrical power with education and training targeted for the improvement of the livestock business using agroforestry as a key, will potentially improve job and business creation.

It is unanimously agreed that business and job creation, as an objective, will reduce potential for conflict occurrence in rural areas. Overall, there was very little difference in opinion regarding the acceptance of the framework concepts. Where a difference was noted was primarily a result of the question not being applicable or that the wording of the question was not understood by the respondents. The authors will rewrite those questions for better clarity, if they are used again.

4.6.5. Semi-Structured Interviews

In Phase 2, qualitative interviews, consisting of five semi-structured interview questions, were conducted to probe significant themes. The same practitioners who answered the survey were invited to participate in semi-structured interviews, providing more penetrating insights into their survey responses. The selection process of interviewees was integral and essential for qualitative data collection supporting the rationale behind the topic being addressed (Strauss and Corbin, 1990). This was conducted purposefully, with the selection of five key experts, considered "information rich", who could provide the most useful insights. Five interviews were carried out to verify the content, structure, and language used in the main questions and related prompts, gaining a measure of its reliability.

An interview schedule was used, providing structure for the interviewer, yet allowing the respondent to talk at length, initiate issues, and share experiences perceived to be important. This approach also allowed the interviewer to ask related questions, following-up some previous answers by interviewees. Permission to be recorded was asked and granted by each participant. The average length interview was one hour. Interviews were transcribed with the salient and

relevant points extracted from the data (data reduction) resulting in a reasonably-condensed text to be organized and analyzed.

Content analysis was used to establish a pattern of participation among those involved. It shows the extent or emphasis placed by each participant and group (nationality) on each concept or factor. This is reflected by the amount of information provided, and the frequency of occurrences within the documents. Content analysis is a quantitatively oriented technique by which standardized measurements are applied to metrically defined units. These are used to characterize and compare documents (Denzin and Lincoln, 2011), which we see in subsequent results.

4.6.6. Semi-Structured Interview Questions and Results

The first semi-structured interview question was a selective ranking question to determine the expert's infrastructure priorities. The survey identified electrical power and education as critical infrastructure elements for job and business creation. This question was used to determine the expert's opinion regarding infrastructure prioritization.

Two infrastructure types were provided: 1) Facilities which include telecommunications, electrical power, water, sewer, sanitation, and transportation; 2) Service which includes health care, education, security, food and agriculture, banking, finance, manufacturing, and Industry. Respondents were requested to identify and rank the top three infrastructure elements, in order of priority, based on their importance to facilitate prosperity and peace in rural, post-conflict locations.

The infrastructure priorities varied among the participants. Clean water provision was identified as the most selected and highly ranked infrastructure requirement. Security was identified with the same frequency as water; however, its overall ranking order was lower.

Provision of health care and development of food and agriculture were included with the same frequency and held the same overall ranking. Electrical power provision and sanitation provision were identified only once, as was education. Electrical power and sanitation had the same ranking, while education was ranked lower.

Semi-structured interview question 2-a, resulted in the experts identifying private sector participation as critical to the infrastructure in rural, post-conflict zones within the next 15- to 20-year time frame, especially for electrical service and education, as there would be other governmental priorities.

In response to Question 2-b, experts saw several limitations to private sector participation, needing to be addressed:

- 1) Cooperation, collaboration, and overall planning among participants;
- 2) Synchronization of values in the private sector with objectives of other participants;
- 3) Profit-sharing mechanisms and expected ROI from private sector;
- 4) Financing access;
- 5) Lack of local human capital; and
- 6) Strong governance mechanisms for fair and equitable decision making.

In areas with nomadic cultures, the mobile nature of the society must be addressed by providing a reason for them to be attracted to a location which would directly impact potential revenue streams. There was no consensus among the experts as to how to overcome these limitations; however, several ideas were advanced. A good governance structure was indicated as crucial, however, the less Government was involved would produce better governance. It was suggested that in order to be successful, project implementation should be phased and flexible, starting small-scale, with incremental elements that include routine evaluations.

Question 3 was based on the assumption that private sector participation would be a requirement of implementation. It sought to identify the experts' views on key participants, ownership, operation methodologies, and roles/levels of government participation. All parties agreed that local community participants were most critical to success. Community business persons and potentially foreign businesses were identified as keys to provide services, needed products, technology, and business expertise.

Government was identified as a key participant to help set environmental framework that would be conducive to business development. One participant identified situations where locals within the community have acted in lieu of the government, essentially establishing and enforcing the business environmental within which infrastructure projects operate. This situation occurred with the use of crowdfunding to build three toll roads in Somaliland. The communities involved facilitated road construction through local contractors, using funds raised over the internet, via crowdfunding. They have implemented a toll-collection strategy through community-based agreements that were enforced by local people.

The study showed that the experts believe ownership and operation methodologies for infrastructure depended on the sector (e.g. mining or agriculture) and the type of infrastructure. The agriculture sector and electrical infrastructure were identified as needing community-based ownership and management. Government involvement in agriculture and electricity was seen more from a regulatory function than as part of ownership and management. Economic, social, and environmental risks were considered priorities to be addressed, varying according to people and location. Rural, post-conflict communities in Africa are dispersed and decentralized, therefore, using small modules, based on community involvement, is an effective and efficient way to develop and implement rural electrical power and education.

Question 4 asked, “Creating infrastructure and business in post-conflict societies can disrupt the social and economic post-conflict status quo. To what level do you view this as a necessity to improve conditions? How do you think a framework process could address this concern? How can the process be improved to mitigate this concern?”

Understanding the status quo was identified as a major consideration, requiring local assessment. This is essential before engaging in any form of infrastructure or business development in a post-conflict situation, otherwise, it could become a force to re-ignite conflict. This requires a three to four step process. As one of the experts highlighted, “Stakeholders need to be involved not just in the planning, but also in the operational organization and implementation of any plan.”

Recognizing and identifying who the stakeholders are, then engaging them in planning, assessment, and implementation, are key. Engaging all the players at the local level, and

determining the need for the proposed effort, are major elements of the initial step. Getting locals involved—especially people who already have done some things in the community, like running schools, building schools or roads by themselves—is essential. These people and organizations are trusted, and trust is crucial. Distribution of the benefits and determination of where the capital is coming from are two variables of influence and control. They determine trust. No one will believe that the other side is putting money into a project to benefit the children of the opposition, unless trust is built.

Two respondents identified crowdfunding as an additional means of acquiring initial support for the framework and process model. Crowdfunding utilizes a large audience to provide very small, individual capital contributions as a source of external financing, typically via equity purchase, loan, donation, or pre-ordering of the proposed product. They vary with the forms of crowdfunding, ranging from an equity-based model, profit-sharing scheme, and lending, to outright donations (Belleflamme et al., 2013). Crowdfunding is most often associated with community-based experiences that generate “community benefits” for participants.

Question 5 sought the experts’ opinions regarding “The most important public acceptance, financial, government/political risk factors associated with implementing infrastructure projects per the proposed framework process. Have they been appropriately identified and adequately addressed?

If not, what would be your recommendations to redress them?” Within the post-conflict environment, several issues exist:

- a) A lack of trust in public institutions makes ownership participation a significant issue,
- b) Weak institutional capacity,
- c) Poor governance,
- d) Political instability, and
- e) On-going conflict or a threat of conflict re-emerging.

The experts, in general, noted that public acceptance is accomplished through proper

identification of stakeholders and participants, and inclusion of these participants throughout the formulation process. While it is acknowledged that introduction of new technology and procedures will come from external sources, it is critical to obtain approval and buy-in with key local stakeholders. This is accomplished by establishing the roles, responsibilities, and expected results with projected timeframes. Small-scale, incremental implementation steps, that bring results, will help to build trust.

One of the respondents noted that there were seven road infrastructure projects in progress in Somaliland that were completely financed by crowdfunding. This indicates the potential for this funding approach for infrastructure projects when properly structured. The process was noted to have spread the financial risk across a broad segment of the society, including locals and persons in the diaspora. Funding contributions of all sizes are documented so that information is transparent and made available via a website. The process not only increased financial participation, but also facilitated collaboration in ownership roles and responsibilities. Communities along the roads agreed to a usage fee structure. All communities participated and provided representatives to enforce the toll charge with very strict consequences for toll violations, regardless of clan or class. Crowdfunding opens an approach to obtain a multitude of ideas on ways to solve complex problems. The process allows for investments at all levels, thereby increasing the sense of ownership.

4.7. Discussion

Compilation of the elite and expert survey and interview responses identified several key requirements for the framework. While it was agreed that simultaneous provision of electrical power and education in rural areas provides a basis for new job and business creation, other issues, such as the provision of clean water and security, potentially would be of greater priority. Security is considered a pre-condition of development. There are instances, however, where infrastructure, such as education, has been provided in some insecure rural zones. The framework identifies conflict analysis and assessment as key components to understanding the impacts on job and business creation. The survey indicates that, while understanding the impact of the conflict is important, it is not seen as crucial to the development of processes to increase jobs and businesses.

With respect to the arid and semi-arid environments of Somalia, livestock production improvement, utilizing agroforestry, is considered an important business focus. The two critical business elements, meat and milk production, are integral parts of Somali society, culturally and economically.

Collaboration for infrastructure service provision means private sector participation and requires community engagement and participation in the design of the implementation process model to build trust. It should incorporate local practices as a baseline, with incremental introduction of new concepts to improve their livelihood. This process, coupled with clearly defined roles and responsibilities, including community participation and ownership, should lead to a successful process model when business output is the focus.

4.8. Recommendations and Conclusions

The following recommendations and conclusions of this pilot study should be incorporated or, where appropriate, modify the framework (Figure 9). The security theme was identified consistently as a critical element, sometimes as a prerequisite to be provided, if development is to be successful. The framework acknowledges that physical security is essential. Development of an approach to provide it, however, is beyond the scope of this research. Security, in the context of this research, involves security associated with the infrastructure. The framework addresses infrastructure security through the ownership structure and the local participation effort in the process model design and implementation plan. There are instances where current circumstances prohibit collaboration between groups, so it is essential to recognize these locations. One of the elite interview recommendations is to identify, early-on, the locations where there will be a need to provide two separate facilities due to the conditions resulting from conflict.

A second factor, access to adequate supplies of clean water, was identified as another important infrastructure component. The largest cause of conflict in Africa is water access. As part of the process model, the framework identifies priority locations for water access to be provided along the livestock migration routes. These locations are where remote stations should be installed. Remote stations are designed to provide not only water, but feed access and shade, as well as access to veterinary services.

Multiple actors were identified in the original framework, elite and expert interviewees did not identify new participants. There was, however, added information on criteria for local participant selection, in the case of Somalia. These criteria incorporate the cultural, social, and political importance of the acknowledged clan leaders. It was noted that there is a pre-existing clan structure identifying those who have worked on behalf of the clan population. Including these clan members as stakeholders will be critical to the success of the process model implementation.

Indicators of potential success are directly related to funds that are raised from semi-donors, R&D research grants, debt financing, as well as Clean Development Mechanism (CDM) opportunities. Additionally, cooperation by the locals in selling meat and milk safely produced, processed, and packaged within the site-specific radius of the stationary processing facility, or the mobile processing units. An additional source of initial funding, known as crowdfunding, has been identified and is recommended for incorporation.

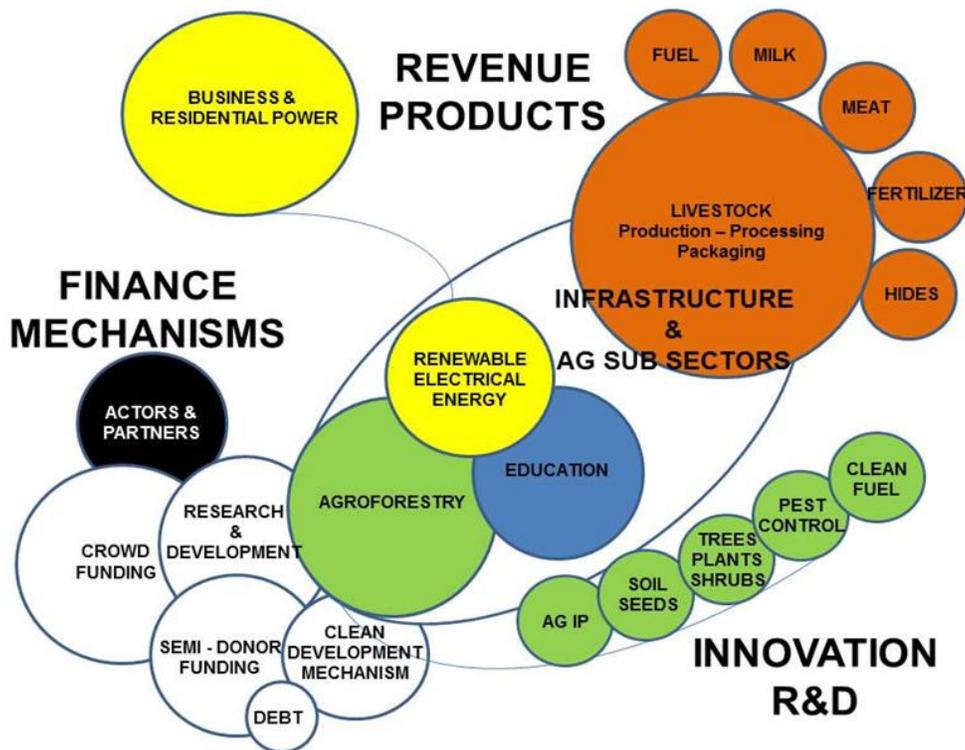


Figure 8, Chapter 4 (Figure 5, Manuscript #3). Revised Framework. Source: J. Mitchell. ©

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The concept of crowdfunding is rooted in the broader concept of crowdsourcing, which refers to using the crowd to obtain ideas, feedback, and solutions to develop corporate activities (Bayus, 2013; Howe, 2008). Crowdsourcing is the "act of taking the job performed by a designated agent (usually an employee) and outsourcing it to an undefined, generally large group of people in the form of an open call." (source for the quote) It is based on universal participation, supporting empowerment of people. As a theoretical approach to improving governance in a post-conflict zone, it assumes broader, unencumbered participation in governance as objectively positive, improving transparency, citizen empowerment, fostering government accountability. Crowdsourcing, as a tool to facilitate governance, utilizes the new and improved forms of Information and Communication Technology (ICT). It has grown exponentially (Shirky, 2008). As a tool, crowdsourcing facilitates monitoring and evaluation through the potential of direct feedback from alleged beneficiaries. In Africa, where ICT is the one infrastructure mechanism that seems to be developing at a normal pace, it can be used to help address the complex infrastructure development strategies in post-conflict zones.

Crowdsourcing not only facilitates good governance, but also provides a means to improve the market efficiency for small-scale producers. ICT tools used (mobile phones and internet) for crowdsourcing can be used for improving education access and knowledge transfer, as well as for better market awareness. Market awareness can reduce low-income producers' risks when making production and sales decisions. Such information facilitates an integrated value chain, enhancing both regional and international export opportunities for poor, small-holder farmers (Livingston, 2011). Through proper training of local participants, crowdsourcing can be a means of inexpensive data collection for research and development projects. The built-in GIS capabilities of mobile telephones facilitate the geo-spatial documentation of collected agro-ecological data. This can be used to devise better location-specific agricultural mechanisms, thus improving food security.

In order to be effective, the purpose or cause needs to be strong, clearly defined, and directly touch the emotions and creativity of potential participants. According to several studies (Sharma 2010; Thuan, Antunes, and Johnstone, 2016) the keys to effective crowdsourcing are:

- 1) **Infrastructure**— quality and reliable ICT access

- 2) **Vision**— well-defined ideas, goals, and objectives flexible to the dynamics of the environment, and entry requirements for the crowd
- 3) **Engagement** without training, minimum intervention with sensitivity to language, traditions, education levels, managerial skills, and national orientation (Carmel, 2003)
- 4) **Financial capital**— low-cost participation requirements
- 5) **Linkages and trust**— links across the proposed stakeholder community can reduce cost, improve knowledge transfer, innovate BMs, and increased trust building
- 6) **External environments**— tasks must be compatible with prevailing practices and cultural norms, goals must be relevant to the crowd’s living environment, recognizing political, economic, business structures, environments, risk profiles, living conditions (Farrell, 2006; Oshri, Koilarsky, and Wilcocks 2009)
- 7) **Motivation**—facilitating conditions, performance, effort expectancy, and social influence as determinants of crowd motivation (Venkatesh et al., 2003)
- 8) **Governance criteria** including:
 - (a) Anonymous participation
 - (b) Decentralized authority
 - (c) Centralization of information
 - (d) Open an equal opportunity of participation
 - (e) Encouragement of diversity
 - (f) Transparent actions
 - (g) Document and record contributions
 - (h) Structure deliberations
 - (i) Access for participants.

Crowdfunding creates an opportunity for a broad spectrum of donors to participate in the development of businesses with social impact that fosters local ownership and governance. Donor participants provide critical participation in various ways, such as funding, training, technical advice, marketing access, and insights. The key to success in crowdfunding is to start at local and community levels, using an inductive approach to process design of the intervention vs. project design. Intervention development progress should be tracked by local community members, providing a continuous interactive map for tracking and monitoring feedback at the local intervention level, which builds social capital, fosters collaboration, and supports trust.

Crowdsourcing is added to the original framework as one of five mechanisms proposed to finance infrastructure projects. If the indigenous population, inclusive of expats, actually supports the project, one clear indicator is their willingness to invest. This is also an indicator of willingness to pay for use (i.e. generate revenues as fees are one of the biggest risk factors in any PPP). This type of investment provides a basis to evaluate the real risks, forming initial project equity capital, against which grant funding can be added to complete the equity portion. It is proposed that the combination of the two funding sources (crowdsourcing and institutional grants) can be taken to lending institutions and leveraged, to obtain debt-gap funding for the project.

Ownership in the entity is proposed to be on three levels.

- Crowdsourcers receive preferred stock along with local providers of livestock at 60%. They will have a combined allocation of 20% for any Intellectual Property (IP) and 30% from CDM revenues.
- Second tier ownership, by both international and local universities, is at a maximum of 30%. They will receive the majority shares of any IP developed as an outcome of the project—70% and 10% from any CDM revenue.
- Third tier ownership is from international, multi-national corporations. They will have 10% ownership available, 10% from IP and 60% from CDM revenue.

Expansion (scale up) of the system is easily accommodated due to its modular design. Power will be for the meat and milk facility, only until production of both become sustainable in terms of revenue generation, enough to pay back debt financing within the agreed time-frame. Profit from meat sales will be shared with local livestock providers on a fixed percentage basis, agreed by all participants. This amount must be, minimally, the value producers currently receive for their meat and milk, preferably 10% to 20% higher. Profits re proposed to be used, initially, to increase water access points for livestock, improve livestock feedstock, biomass fuel sources, provide initial funding for crowd-sourced funds, improve road extensions from the facility to increase product access, and to increase facility production capacity.

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5. Framework for Conflict Mitigation in the Horn of Africa Region

5.1. Introduction

Given the number of conflicts in Africa generally and their negative impacts on the people and their well-being, the research sought to examine the reasons behind this conflict and look for ways to mitigate conflict and improve development in Somalia and Africa. A series of researcher circumstances precipitated engagement with the country of Somalia which is the longest running conflict in Africa. Somalia's geographical location makes it strategically critical as it sits at the gateway between the Mediterranean Sea and Indian ocean. It is and has been a connecting point between Africa and the middle east and its situation has impacted neighboring countries and the world at large.

Development as a concept appears to have been reduced to being identical to economic development or economic growth given the pre-eminence of economic factors on perceptions in the world today. The current economic dominance of former colonial powers leads to the assumption that development in African countries should aspire to become like their former colonizers.

The development model prevalent, is extroverted and fails to take into account the particular local, historical or institutional contexts of Somalia. Thus far results of this approach are at best minimal. The research is therefore undertaken to create an endogenous development framework for development and conflict mitigation.

5.2. Method

To create this framework the initial research method used involved significant literature review of multiple topics thought to have bearing on evaluating and understanding the underlying factors that perpetuate conflict; identify endogenous pathways to break what has been described as the conflict trap and identify elements for a framework that can lead to sustainable pro-poor economic growth and stability.

The literature review identified economic theories thought to be applicable including Endogenous Growth Theory and Ecological Economics which focus attention on the need for

human capital, innovation, research and development, infrastructure, and entrepreneurial development within the context of the local ecological system to be the means to facilitate economic growth. While all human development and historical progress is based on human capital knowledge improvements, humanity taking advantage of natural capital from local ecological zones is inextricably linked to introduction of improved means to generate energy. Industrial Ecological Analysis process evaluation provides a system view lens to minimize waste within the closed systems under examination and thereby improve energy and materials usage.

Industrial ecology (IE) can be considered “the study of the flows of materials and energy in industrial and consumer activities, the effect of these flows on the environment, and the influence of economic, political, regulatory and social factors on the flow, use and transformation of resources” (White, 1994, pp. v.). IE emphasizes the optimization of resource flows from a systems-based view and asks how resources might be optimized including both material and energy as inputs and eco-systems including biochemical cycles that provide crucial services to human existence. Fischer-Kowalski and Weisz (1999) note, an understanding of both the physical and the social realms along with their complex interrelationships is required (Schiller, Penn, and Basson, 2014).

Informal meetings and interviews were the second methods employed. An assortment of Somali actors was used to both assess and verify the literature findings as well as obtain varied and more nuanced information about the history and current situation in Somalia. Specific case studies were also undertaken to further refine framework concepts

With a preliminary framework created, a small sample size of elite unstructured interviews, semi-structured interviews and questionnaires was undertaken to assess the framework and provide guidance for framework improvement opportunities. The small sample size from a statistical standpoint can minimize representativeness however conditions in conflict zones adversely impacts sampling approaches and opportunities. The potential for reprisals due to participation if known can result in physical harm. The research implemented the purposive sampling technique to utilize the available resources (Patton, 2002) and identified and selected individuals proficient, well-informed, available, willing to participate, and share their experiences (Bernard, 2002; and Spradley, 1979) and knowledge regarding the design and

implementation requirements for development and business in Somalia and other conflict zones. As this research includes an untested framework which conceivably will take time to provide conclusive results, hence, expert sampling was employed to further determine if additional study would be worth the effort (Sharma, 2017). Results indicated the framework concepts were thought to have validity and could be improved with modifications.

5.3. Framework Development Process

5.3.1. Literature Review Level 1 Environment and Culture

The result of these research methods yielded a two-level framework where level 1 includes a spatial and temporal evaluation of environmental and cultural elements (see Figure 10), and level 2 focuses on four identified elements and pathways for endogenous sustainable economic growth including: endogenous resource, energy provision to improve the resource, education to exploit the resource, and a business model to utilize it.

Human capital influences national productivity by increasing innovative capacity for new technology adoption suited to domestic production and increasing the capacity to absorb foreign technology (Benhabib and Spiegel, 1994). As human capital increases and local data becomes more readily available innovation and research and development both locally developed and as a result of trade can be diffused more affectively. The complexities inherent in the systems concept and their expanding boundaries make the relationships between “innovations”, “research”, “technology”, and “collaboration” critical.

When examined from an IE perspective livestock in rural developing countries per studies conducted by Gustavsson et al (2011) reveals that wastage levels of both meat (27%) and milk (25%) are the highest in Sub Saharan Africa. The study further notes that the reasons for wastage are primarily the result of conditions that exist early in the associated food chain in developing countries: poor storage capabilities; poor infrastructure for transport and refrigeration; inadequate market facilities i.e. unsanitary conditions; and poor packaging capabilities. Minimizing the waste and developing means for alternative waste utilization within the system is a main objective of IE and this framework. Reduction of waste requires investments in education, cooling chain, improved packaging, and improved market facilities.

Utilization of waste requires facilitation of entrepreneurial focused alternative product and service development within the system.

All cultures and livelihood approaches spring from human interaction with the environment. The literature review examined environmental eco-system and land use information pertaining to Somalia as part of Level 1 framework elements. Several factors seem key to understanding the environmental conditions from which the culture developed and identified their associated land uses. These ecosystem shaping factors, and resulting land uses, are the foundation of cultural manifestations. There are three primary ecological zones in Somalia: the arid north, the central rangelands, and the south, with two major rivers, the Jubba and the Shabelle. All are defined by the availability of water the critical resource of the society. Each ecological zone has spawned a primary livelihood approach: nomadic pastoralism dominates in the arid north; agro-pastoralism dominates in the central rangelands; and farming along with cattle raising dominates the riverine areas of the south.

There are multiple studies using empirical research techniques that show correlation with conflict frequency and have generated theories regarding causes and indicators of conflict (Herbst, 2000; Collier, 2003; Salehyan and Gleditsch, 2006; Raleigh, et al, 2009; Michalopoulos, and Papaioannou, 2013; Ayana et al, 2016). Sources of conflict are multiple, complex and disputed and assessment of the literature indicates a variety of lenses and a multi-disciplinary approach is required for analysis.

There are two approaches to conflict evaluation, conflict analysis which has a more academic approach focused on conflict dynamics and processes, and conflict assessment which is more field based with emphasis on context (Freeman and Fisher, 2013). This framework and process model require an integrated conflict analysis/assessment approach as an initial step in attempting to gain understanding of the root causes of conflict within ecological, temporal/historic, and spatial/geographic context.

The literature also notes conflicts are embedded in the social, economic, political, cultural, historical, identity constructions and experiences of societies. Societies' relations with intra-regional, international actors; and local, national and regional configurations also are a

basis for conflict (Bereketeab, 2013). The framework adopts this view and therefore identifies the categories as noted on the diagram as level 1 elements that require evaluation.

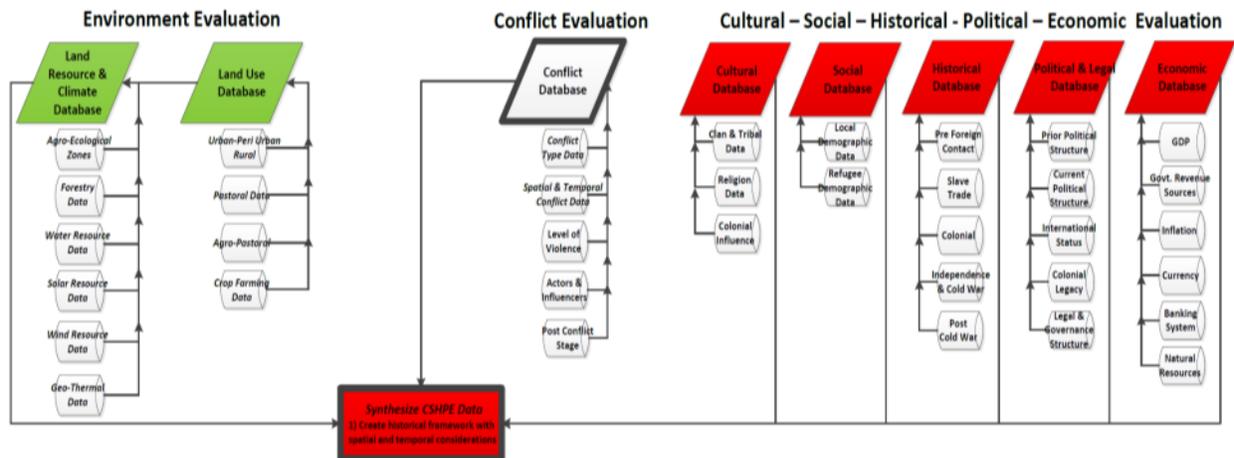


Figure 9, Chapter 5. Conflict Analysis and Assessment Structure. Source: J. Mitchell. © 2020.

The diagram in Figure 10 identifies what are considered to be key sub-elements within each category for examination to identify the potential root causes of conflict within the society. Examination of the identified elements will provide initial insight into the organizational requirements of any proposed intervention. It will provide indications of local values, the level of trust existing between potential participants, and the possibilities of local collaboration, as well as a background assessment for initial, local participant selection and possible pathways to mitigate conflict.

5.3.2. Literature Review Level 1 Development Elements

The literature review to provide the basis for the proposed framework also revealed general pathways that have exhibited potential to break the conflict trap cycle, potential impediments to those pathways, and potential pathways forward. These factors are presented in Chapter 2 “Horn of Africa Economic Development Case Study Somalia”. What follows here are the literature-based development efforts.

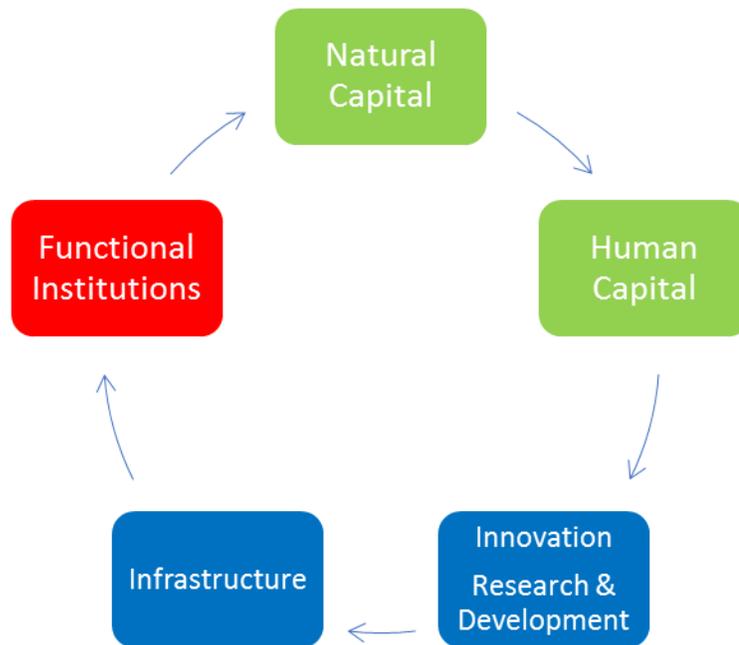


Figure 10, Chapter 5. Literature-Based Development Elements. Source: J. Mitchell. © 2020.

Conflict analysis studies indicate that conflict is diminished where economic growth is improved especially when based in the agriculture sector and human capital development proceeds through education all of which are contributors to a society’s innovation and research and development absorptive capacity. Key literature-based development elements therefore include natural capital, as empirical studies note that natural resources, climate, and topography have direct impacts on economic growth. Human capital of working age populations defined as workers’ acquisitions of skills and know-how developed through education and training. As human capital increases and local data becomes more readily available, innovation and research and development both locally developed and as a result of trade can be diffused more affectively. The complexities inherent in the systems concept and their expanding boundaries make the relationships between “innovations”, “research”, “technology”, and “collaboration” critical. Fu, Pietrobelli, and Soete (2011) however note the benefits of international technology diffusion can only be delivered with parallel indigenous innovation efforts and the presence of modern institutional and governance structures in association with conducive innovation systems.

Provision of infrastructure, which is considered a major constraint to business development, the lack of which reduces productivity by about 40% (Escribano, Guasch, and Pena, 2008) is also considered critical. Investments in roads, electricity, telecommunications, and

other infrastructure are crucial (Straub, 2008) for stimulating growth in agriculture and rural areas, for food security and for poverty reduction.

Easterly (2005) argues that functional Institutions are also essential as none of the traditional economic growth factors would have an impact on economic performance if there were no stable and trustworthy institutional environments to sustain the economy. Empirical research indicates economic policies and foreign direct investment (FDI) may impact economic performance.

Key internal impediments are found to exist for each of the literature-based development elements noted. Physical security impedes access and utilization of natural capital and it impacts human capital development through forced internal migrations. The potential youth bulge impacts the available working populations and they are the source of conflict participants as they have no other options. The conflict impacts on education has resulted in one of the highest illiteracy rates in the world thereby reducing potential to effectively develop or utilize technology. Most infrastructure was destroyed during the conflict and has yet to be replaced with the exception of ICT. Somalia's institutions some of which are showing signs of improvement, for the most part, however, are completely dysfunctional. The high amount of corruption and the elite control of the government exacerbates the situation. It is for this reason the literature-based element of Functional Institutions is colored red in Figure 11. The framework does not include provisions to address the dysfunctional institutions but is based on approaches to work around them.

External factors also impose constraints on development within Somalia. The most significant of these factors include foreign political and religious actors, regional and globalized economic dynamics, and the significant reliance on foreign development assistance. Each of these factors impacts adversely the Somali society at structural levels diminishing opportunities to extricate themselves from the conflict trap.

The pathways forward include improvement of the endogenous natural capital elements such as significant livestock, forest products such as myrrh and frankincense, agricultural products, fishing, and oil and mineral deposits. While there is great potential for fishing there is little history in Somalia of its utilization, and oil in particular has been noted in literature to

increase conflict potential. Improving human capital will require access to educational opportunities for all including nomads, using multi modal methods of targeted vocational training to facilitate employment. The critical infrastructure elements necessary to improve human capital conditions, natural capital production and facilitate innovation, research and development include renewable energy, transport, clean water and sanitation.

5.3.3. Informal Sources and Case Studies

The informal meetings and interviews were used to confirm literature review findings and provide additional information regarding Somali societal structure and interactions as well as infrastructure status in the country. This approach helped identify those that might provide insight on business model development to ameliorate the existing conditions and promote job development. It was noted within Somali culture the significant livestock resources have led to meat and milk being critical to the Somali diet while there is disdain for fish, making livestock related business development more acceptable initially. The diaspora and their remittances provide a significant source of potential investment capital and as Somalia is traditionally an oral society, word of mouth will be the best way to access it.

The information and insights gained from the informal discussions helped to further refine framework concepts. Key subsectors of endogenous based productive resources; the requirements to improve the productive capacity of those resources; the participants needed, and the potential strategies and approaches needed to potentially foster reconciliation and or diminish conflict potential are presented in Chapter 3 (Mitchell et al., 2020).

With this information in hand several case studies were undertaken. The case studies were focused on approaches used to improve human capital, and potential technological approaches to improve production of the identified key productive resource of the society. Additionally, an actual business case was developed resulting from an attempt to provide renewable energy in the country. The case studies provided additional information on the approaches needed, the risk of which to be aware, including the dysfunctional institutions and potential for elite capture, the organizational requirements, and renewable energy technology options that could be effective. The synthesis of this information led to the creation of the overall framework elements that follow.

5.4. The Framework

The overall framework elements are synthesized in Figure 12. At the center is the physical environment which gives rise to the society which manifests through social, political, economic, and cultural actions over time and space. In general Agriculture with its impact on conflict is identified as a primary resource sector, renewable energy is identified as the critical missing infrastructure element, and human capital improvement through education are key elements needed to facilitate economic growth and stability. A business model is then needed to facilitate value creation of the endogenous products created but it must be rooted in the sustainable use of the environment at the center and take into consideration the societal and cultural values that dictate what is considered just economic and political interaction.

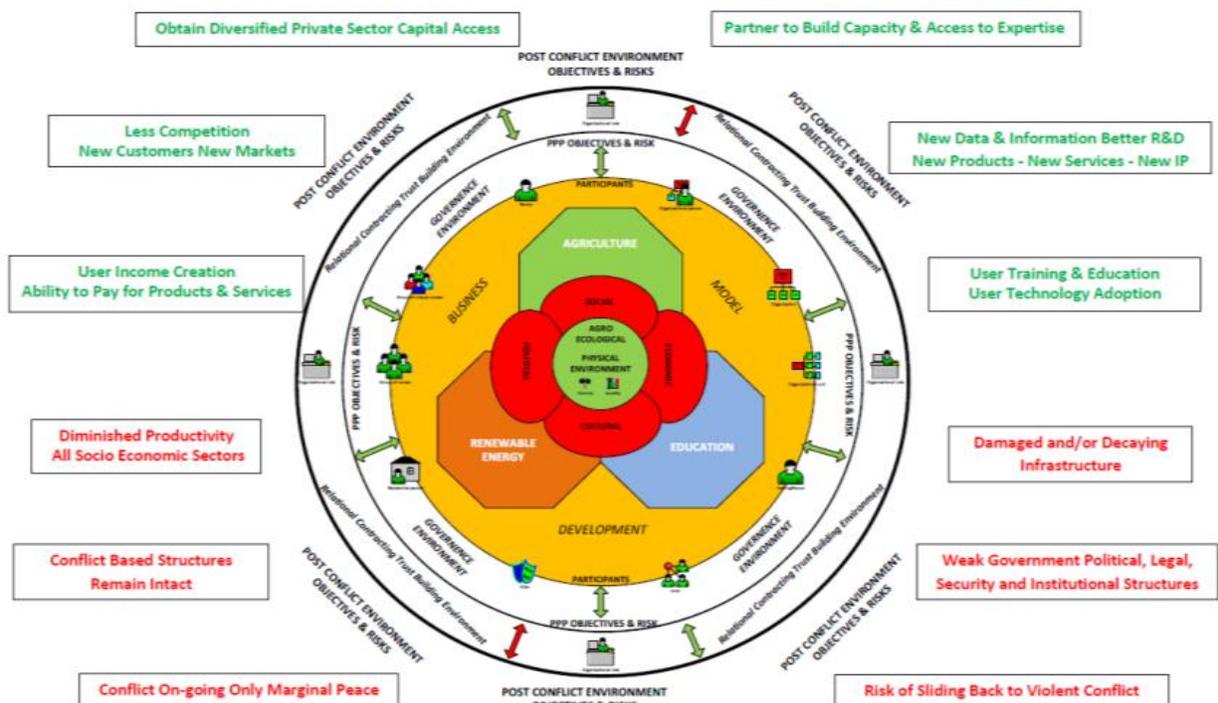


Figure 11, Chapter 5. Skeletal Framework: Post-Conflict Environment Objectives and Risks. Source: J. Mitchell. ©2020

It is noted that all of the enclosed activities require an overall governance environment and an implementation strategy. The strategy proposed in the framework is a modified form of Public Private Partnership (PPP) primarily based on literature findings and the case study for Renewable Energy implementation as well as informal, unstructured elite, and semi structured

interviews with development professionals. Modifications proposed to the PPP approach include more relational contracting approaches that facilitate trust building. Through building this framework structure it is possible to overcome the risks identified in red around the periphery and produce the items identified in green around the periphery of the framework that should lead to improved local business and job creation opportunities.

5.5. Business Model Element

The development of the business model is seen as a key process, with the elements depicted in Figure 13.

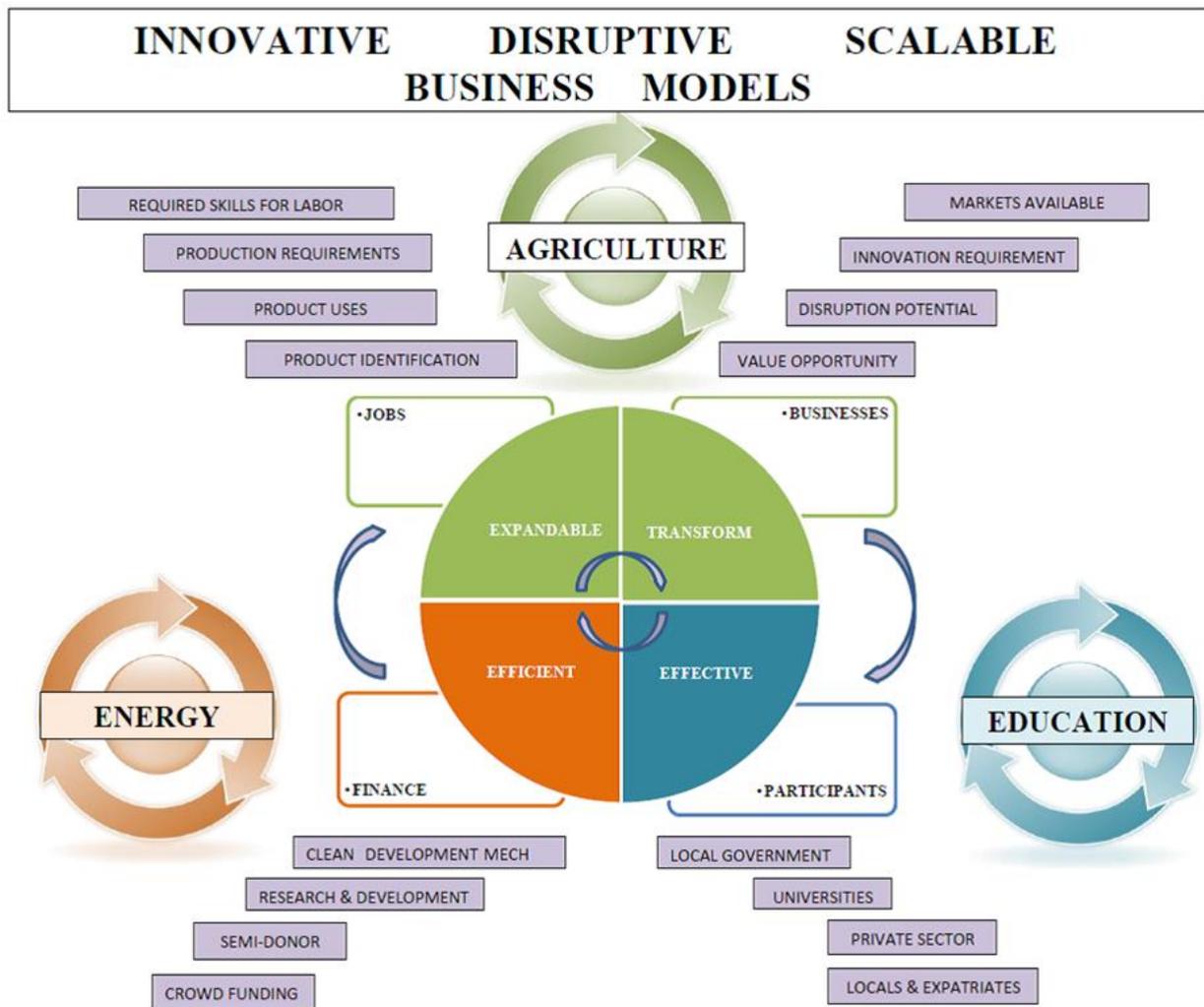


Figure 12, Chapter 5. Innovative, Disruptive, Scalable Business Model. Source: J. Mitchell. ©2020

Three principal level 2 elements of the framework Agriculture, Renewable Energy, and Education when energized can produce an innovative, disruptive scalable business model that enhances value of the products created. Participants and finance mechanisms provide the foundation to create the businesses which must be structured and managed efficiently and effectively to expand and transform societal conditions. New business needs to be evaluated and developed based on the value opportunity they create for the society, their disruption potential to existing business structures, innovation requirements, and the markets available for the product. If the businesses developed are rooted in an endogenous product with multiple uses, with potential to significantly improve production capacity through changed requirements, that increase labor skills the society will be able to take advantage of available innovation and research and development both locally developed and as a result of trade which can then be diffused more affectively in the society.

The literature examined identified existing business model development approaches that were thought to agree with the framework. Extracting and combining The Market Analysis and Development (MA&D) Business Model (BM) is a Community-based approach to develop tree and forest enterprise products. It combines existing knowledge with external markets and technology information, while systematically considering social and environmental concerns, alongside the technological, commercial, and financial aspects of enterprise development. Integrated Farming System (IFS) requirements, area an agriculture approach, that produces synergies by utilizing complementary elements of differing agricultural sub-systems pastoral, agro-pastoral, silvo-pastoral and/or enterprises. In this way they augment total productivity, profitability, gainful employment, efficient resource recycling, and efficient resource utilization (Rathore et al., 2019).

5.5.1. Governance Within the Business Model

An organizational structure that facilitates collaborative partnerships is crucial to overcoming existing trust issues fundamental to conflict. Key elements in design and implementation are identified and described in Figure 14.

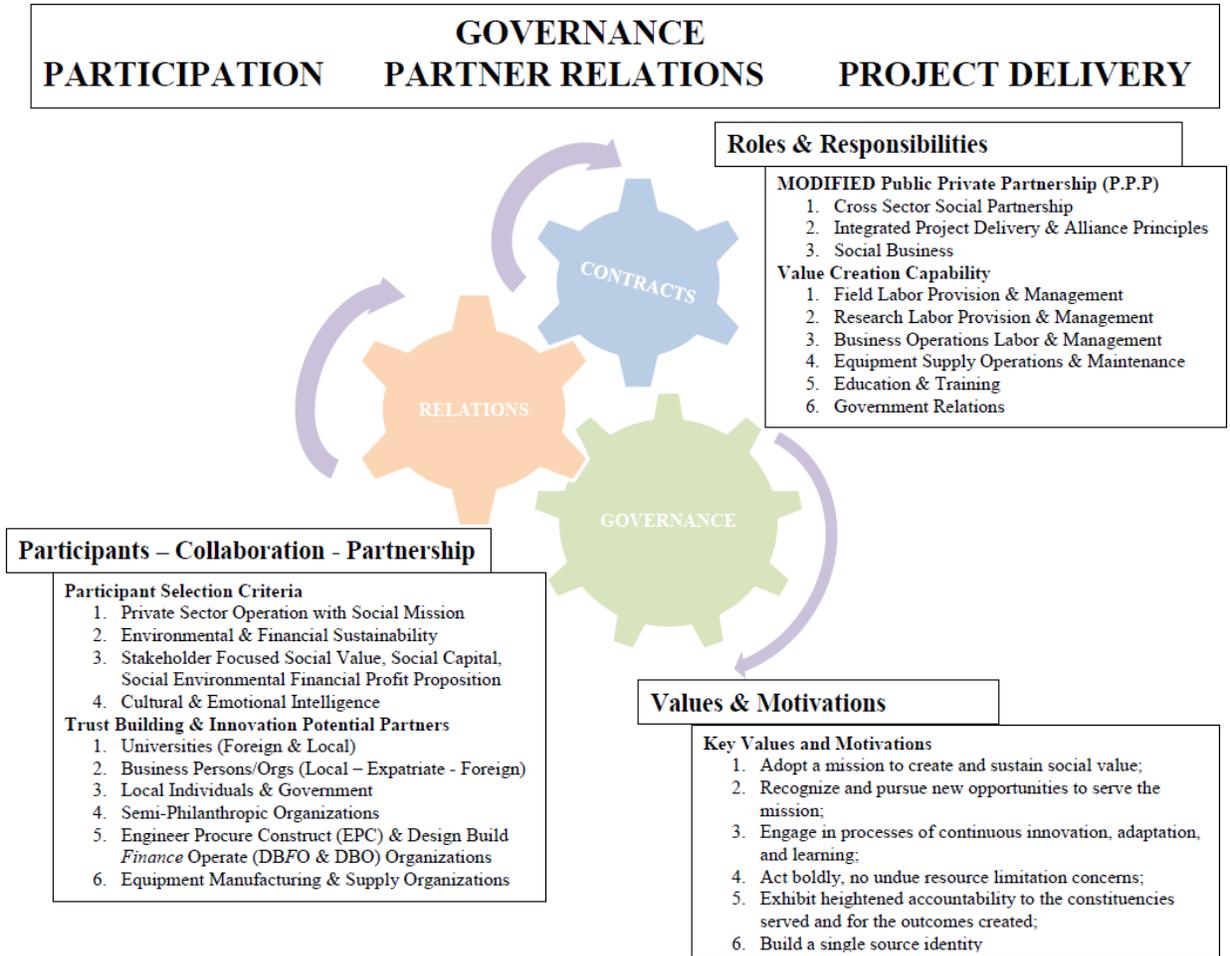


Figure 13, Chapter 5. Governance Participation, Partner Relations. Project Delivery. Source: J. Mitchell. © 2020.

At the center is the governance approach which is informed by the values and motivations; relationships, how they are established and maintained identifies participation selection criteria and potential partners, leading to the contracts of appropriate types for project execution based on delivery approach and value creation capability.

All businesses are intrinsically based on the values and motivations of the participants. Figure 14 identifies the values and motivations thought essential to feed into the next phase of participant selection. Key elements of Partnership selection criteria are noted as are the potential partners.

Stability and long-term economic growth require investments in infrastructure, alternative ways to finance and build infrastructure are needed. Clearly delineated roles and responsibilities

for each participant including the levels of investment, risk, and how financial and non-financial benefits will accrue and be distributed are key components.

The framework proposes a modified version of Public Private Partnership or PPP using Integrated Project Delivery (IPD) and Alliance contract principles. PPP is a collaborative effort between public sector (government) and the private sector (companies) to achieve a common objective (in this case facilitating development) while both meet their own interests. This implies partners share in design; contributes a fraction of the financial, managerial and technical resources needed to execute, and sometimes operate, the project in accordance with each partner's comparative advantage, and partially takes on the risks associated with the project and obtains the benefits, expected by each partner, which the project creates (Pessoa, 2006).

The underlying organizational principles to make this work merge two concepts: social business and Cross-Sector Social Partnerships (CSSP). Social businesses describe a private sector enterprise, whose purpose is not primarily to maximize profit, but to achieve a social mission through outputs from products and services, that include concepts of social value and social capital. CSSP are voluntary collaborative efforts of actors in two or more economic sectors to cooperatively attempt to solve a problem or issue of mutual concern that is in some way identified with a public policy using projects to engage participants in an ongoing manner.

Within this structure value creation is possible. From the value chain perspective, people who live in poverty or social exclusion, can contribute to the creation of wealth for themselves and their community in the following ways:

- 1) As providers of inputs, for example: raw materials;
- 2) As employed or self-employed in the production of goods and services; and
- 3) As clients, making use of goods and services, thereby becoming part of the market.

Social businesses also expand the characteristics of the value chain. They include outputs from products and services, including concepts of social value and social capital. A social value may be created through turning low-income groups into consumers who are able to diversify their purchase opportunities and, thereby, improve their living conditions. Social capital is

associated with personal empowerment (increased authority and power of individuals over the resources and decisions that affect their lives) and community social cohesion.

5.6. The Framework Process

5.6.1. Step 1

The initial framework process step is laid out in Figure 15. The first step involves the requirements noted in Level 1 framework elements to understand the society and the conflict situation. Data and information from the listed societal categories helps establish the background

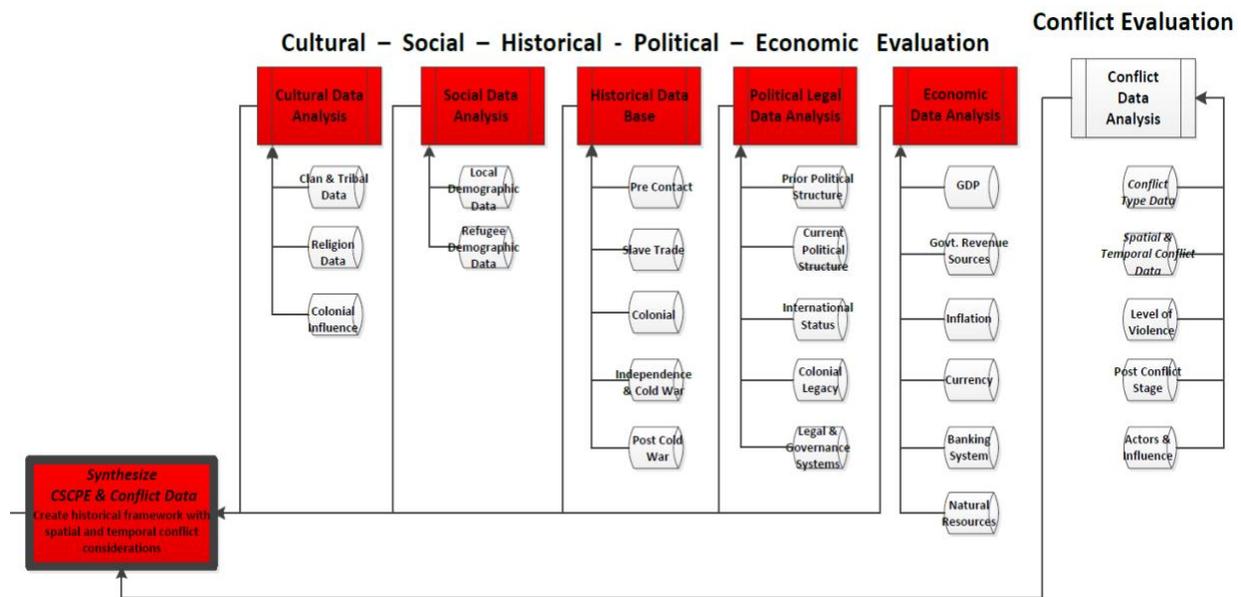


Figure 14, Chapter 5. Framework Process Flow. Source: J. Mitchell. ©2020

causes of societal cleavages; the mobilization strategies or “causes” of the actors that attracts participation; the triggers that provide insight as to why conflict started when it did; the catalyst both external and internal that affect the intensity and duration of the conflict; and the arenas where the conflict plays out (Dessler, 1994, McGinnis, 1999). Ultimately The question is not which cause of conflict is important, but rather how do the different causes interact. Understanding this helps identify potential development strategies.

The framework encourages the use of Rubenstein’s Social Dimensions of Conflict Occurrence Model (Rubenstein, 2017) as a guide for examining and identifying the societal dimensions of conflict. The three social dimensions in which conflicts occur are: a cultural

change that creates worldview conflict, a socioeconomic transformation that generates class conflict, political change that causes identity-group conflict. The framework also recommends identifying areas of conflict based on the three primary areas: values and basic human needs (in this paper these dimensions constitute the socio-cultural factors), power (in this paper the organizational and administrative influence over social groups to direct their action i.e. political), and economic (production method, ownership, control, and utilization of available resources for social groups) noted in Fisher (2006). These criteria are used to assess the conflict factors application to Somali history and their outcomes on social change.

The salient socio-cultural, political and economic factors behind the Somalia conflict identified in the literature, informal interviews, and elite unstructured interviews include the following:

Socio Cultural Factors	Political Factors	Economic Factors
Livelihood Approach	Early State Formation	Resource Development
Societal Structure	Traditional vs. Modern Political Structures	Slave Trade
Values and Norms	Colonial Organization	Plantation System
Land Tenure and Legal Framework	Post-Colonial State Creation	Paid Wages
Territorial Range and Population Density	Horizontal Inequalities	Economic Productivity
Ethnic Composition	Infrastructure Access	Wealth Concentration
Education Access	Cold War Rivalry	Foreign Aid

5.6.2. Step 2

The second process step of the framework identifies Level 1 framework elements focused on the Physico-Biotic Environment Evaluation (Figure 16). As noted previously it is the environment that shapes societal development. The values and approaches to how human needs are met, the societal structures that re-enforce influence over group members and the ownership, control, and utilization approaches of the environmental resources identify the primary areas of conflict. All of are the outgrowth of human response to the environment.

The ecological economics view of the framework that human economy and the ecological systems are much more intertwined than is usually acknowledged helps us understand the connections based on the core principles: the environment is a closed system; that includes large and irreducible fundamental uncertainty where certain processes can be irreversible; which requires a precautionary approach to development, problem solving and action that produces a high quality of life for all species within the material constraints imposed; all actors including institutions and management must therefore be proactive regarding development.

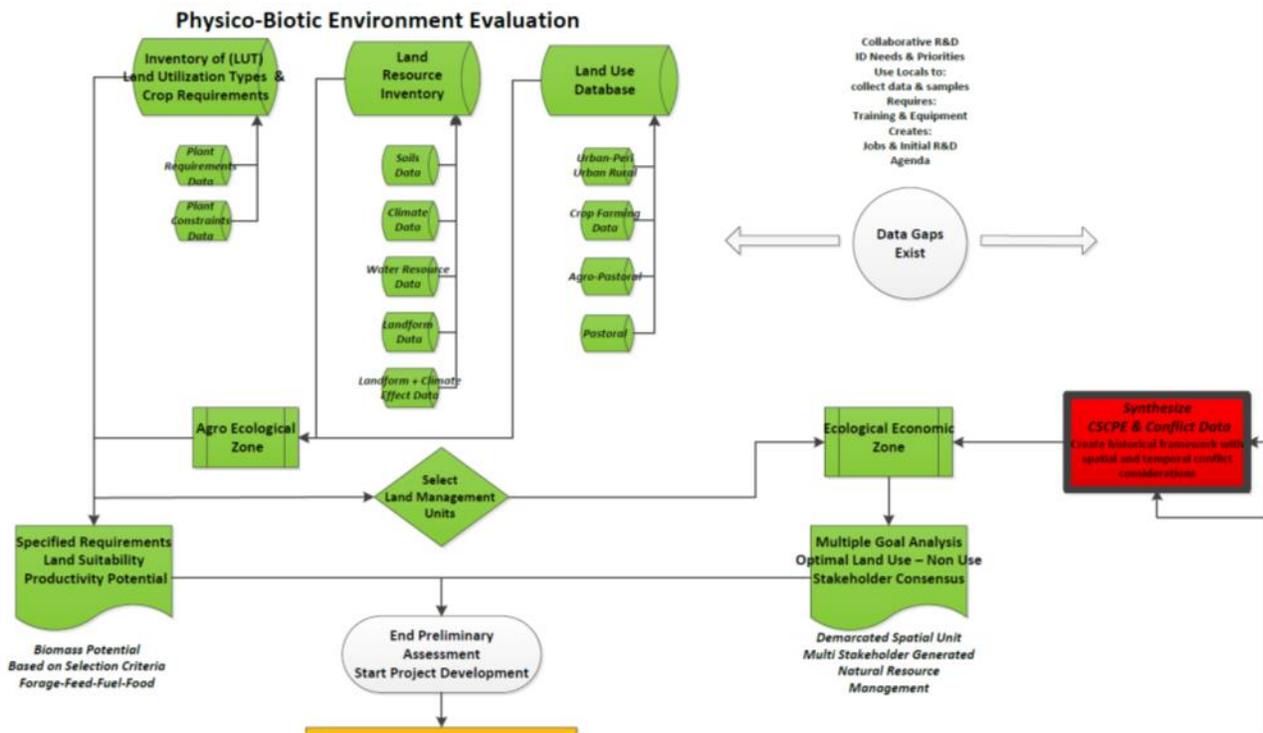


Figure 15, Chapter 5. Framework Process Flow. Source: J. Mitchell. ©2020

The FAO Agricultural Economic Zone (AEZ) (FAO, 1984; 1984a; 1985; 1991; Fischer, van Velthuis, and Nachtergaele, 2000; and Fischer, 2012) is included in the process as a modeling framework Global Information System (GIS) based tool. The AEZ combines evaluation methods of physical factors affecting crop production such as soil, landform and climatic characteristics with socio-economic and multi-criteria analysis to evaluate spatial and dynamic aspects of agriculture.

The AEZ framework is based on evaluating land conditions according to the specific requirements of defined types of land use. Dividing a parcel into relatively homogeneous land management units offers opportunities for a land manager to exploit sites according to their specific capability. Emphasis is placed on physical factors affecting crop production to analyze problems of land resources for planning and management of sustainable agricultural development at regional, national and sub-national levels. AEZ is based on collection of soil, landform and climatic characteristics, and identifies unique combinations related to a particular soil type and the climatic and edaphic requirements of crops and their management systems located spatially on maps varying in scale via GIS. Each AEZ may contain a number of sets of characteristics, relating to different soil types within the same mapping unit. A clear understanding of the functional capability and potential of different soil types is vital for planning and managing the sustainable development of African agro-forestry resources (Jones et al, 2013). Soil and water resources are the foundation for all economic and social activity. The focus of the framework will be to utilize Somali based AEZ data to improve both agricultural and forestry output.

The FAO Economic Ecological Zone (EEZ) Resource Appraisal (FAO, 1996) is also included. EEZ is a tool for natural resources management based on a time frame of 5 to 25 years. It has a landscape or catchment area spatial focus for multiple beneficiaries. The technology seeks to incorporate all elements of a natural resources system with maximum concern for on, and off-site environmental effects. The EEZ appraisal uses a participatory approach to create intergenerational social equity and incorporation of multiple policies. It identifies a wider range of land uses as an approach to land use zoning than the AEZ and includes socio-economic factors. This appraisal can be used to identify areas where development programs, services, financial incentives, and a basis for infrastructural development may be encouraged. It can also

identify areas that have special needs and problems, as well as areas which require protection or conservation (Sombroek, 1994). This will be especially helpful in Somalia due to the overlap of farming and grazing areas and interaction between nomadic pastoralist and farmers which can be a source of conflict.

In principle, EEZ deals with both land and with people and their social organization. It takes into account all elements of the physical-biotic environment on the one hand and the socio-economic environment on the other. It then matches them through multiple goal analysis to arrive at a consensus on the optimal use or non-use of the land to be subsequently executed on demarcated spatial units.

This chapter has presented framework level 1 steps 1 and 2 including the socio-politico-economic and environmental evaluation and the initial requirements for the business model development. These initial steps and their output are deemed essential for framework level 2 elements planning, evaluation, design, implementation, and utilization steps 3 and 4 presented in the next chapter.

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6. Framework Planning Design and Implementation

6.1. Introduction

Literature, informal and formal interviews, questionnaires and case studies have been used to examine Somalia and its current state of conflict to identify endogenous paths of development leading to job and business creation as a means of conflict reduction and mitigation. Previous chapters have delineated the research process to develop the framework and identified what are defined as level 1 elements or preliminary investigation requirements. This chapter is focused on the outcome of the preliminary investigations or level 2 elements of the framework. These elements include potential business model products, business organizational requirements, delivery mechanisms, and infrastructure elements inclusive of needed facilities for the programmatic implementation of the framework.

6.2. Framework Process

6.2.1. Step 3

Framework process step number 3 noted in figure 17 identifies activities and issues to be assessed for each of the level 2 framework elements planning and design. The delivery approach based on a modified Public Private Partnership and Business Model structure, governance, and risk analysis and mitigation are noted. The endogenous resources which in the case of Somalia is based on the pastoral and agro-pastoral livelihoods are identified along with an initial flow diagram for subjects requiring development for both livelihoods. Information from livelihood products and associated value chains will be used to inform both training and renewable energy requirements to improve productivity for each livelihood.

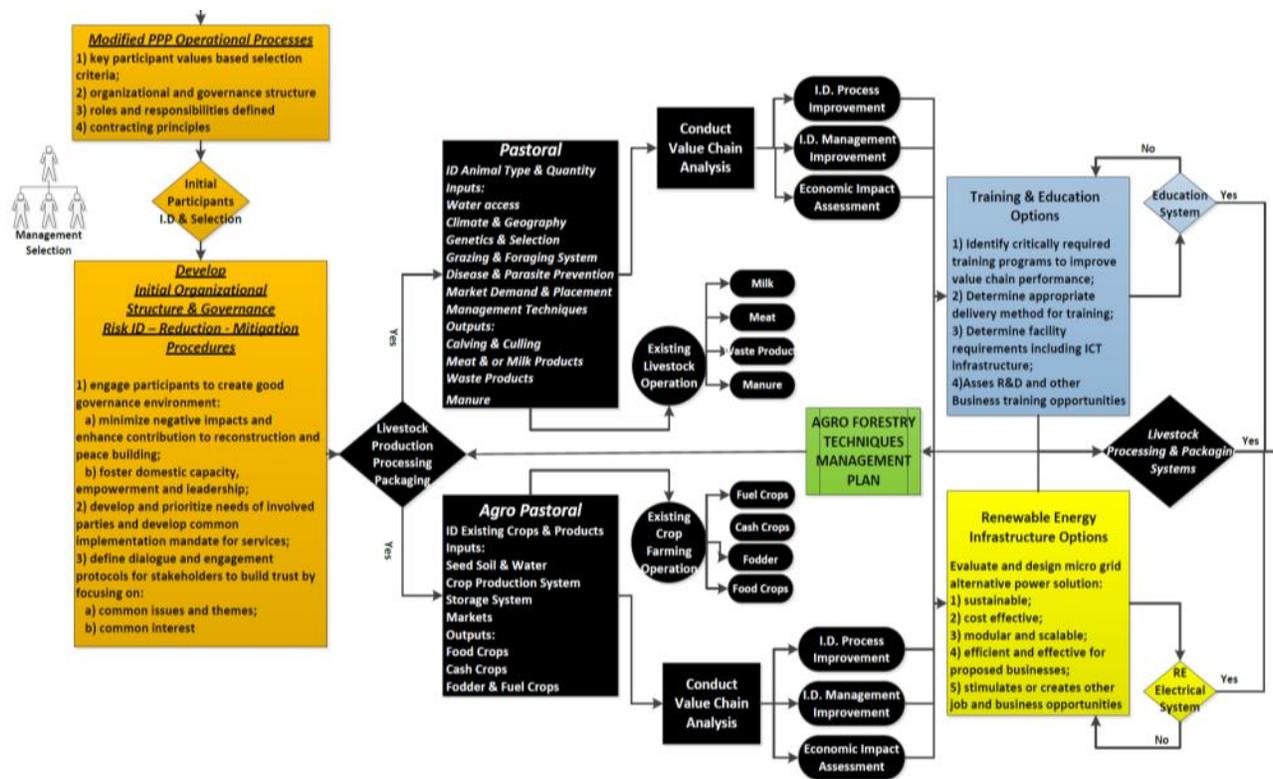


Figure 16, Chapter 6. Framework Process Flow Step 3. Source: J. Mitchell. ©2020

6.2.1.A. Level 2

6.2.1.A.1. Endogenous-Based Productive Resource

6.2.1.A.1.a. Agriculture

Post-conflict research identifies agriculture as a critical infrastructure sector to address conflict mitigation, food security, and poverty (USAID, 2009). Economy-wide simulation model studies, examining the relative contribution of agriculture to poverty reduction and growth, found:

- 1) Agriculture has strong linkages to economic growth in many countries;
- 2) Agricultural growth is more pro-poor than industrial growth;

- 3) Agriculture can generate employment and income among the poor, providing broad-based growth, shared by both poor and non-poor households; and
- 4) Growth in the staple sector has a larger impact on agricultural and economic growth because it is a larger sector, more pro-poor due to its larger base than export agriculture (Diao, Hazell, and Thurlow, 2010).

6.2.1.A.1.b. Agroforestry

Agroforestry is a tool that can affect the multiple linkages involving the production of livestock. Seeds and other parts of trees and shrubs provide necessary nutrients to improve livestock production. Trees, shrubs, and plants—when properly selected and managed—can generate multiple products. Different tree species also have shown pest-control characteristics that can be developed. Several species have multiple uses, including biomass fuel sources. Research and investigation, to establish the proper mix of trees and shrubs suitable for the selected Somali site, are essential, the basis from which IP can be generated.

Tree-fodders are considered important for livestock production because trees with their deep root systems, that can draw from deep water sources, are more resilient to variability in weather patterns, and can provide fodder for longer dry periods than shallow-rooted plants. In addition, there is a wide range of tree species that can be used for fodder, providing options for possible feed-substitution.

6.2.1.A.1.c. Livestock

Livestock are key components of African farming systems and are viewed as important pathways for rural households to escape poverty. Livestock-related activities provide a substantial market with local, national, and international economic and employment growth potential that can be pro-poor. Improving performance in this sub-sector of agriculture has multiple linkages to the socio-economic, cultural, and environmental realities. Livestock provide food (meat and milk) and non-food products (hides and skins), generating alternate income sources in both formal and informal markets. Livestock also serve as liquid financial instruments, a means to store savings by being sold for cash. Multiple products are the result of livestock production, the most important of which are meat, and, depending on animal species,

milk. Agroforestry and improved management techniques are identified in the literature as a means to increase production of both these livestock products.

Additional products include hides and fertilizer from manure and urine. A well-known linkage between livestock and soil productivity is the cycling of biomass (natural vegetation, or crop residues) through animals (camels, cattle, sheep, or goats) into excreta (manure and urine) that fertilize the soil (Pert et al., 2013). Globally, manure contributes nutrient input to agricultural soils, including: 14% of nitrogen, 25% of phosphorus, and 40% of potassium (Bouwman, Beusen, and Billen, 2009) which improves agriculture and forest product output potential.

It is important to understand the local conditions for production of livestock and related sectors. Primary milk processing includes, but is not limited to, storage, separation, homogenization, pasteurization, packaging, and marketing. Meat processing includes slaughter, dressing, boning acidification, salting, brining, smoking, thermal processing, refrigeration, storage, packaging, and marketing. Secondary and tertiary processing techniques are further applied to transform these foods into value-added products (Boye and Arcand, 2013). These systems are a result of simple infrastructure utilizing electricity in conjunction with proper human capital training.

6.2.1.A.1.d. Building Appropriate Infrastructure

Bundling infrastructure elements, to meet development requirements in Somalia, is deemed a viable approach with a potential for conflict mitigation, when associated with improving agricultural and livestock production. This framework proposes the bundling of two infrastructure elements - Renewable Energy (RE) and Education. The generation of micro-grid electrical power for rural areas using RE sources, and education programs targeted for agricultural and livestock - focused human capital development will be key to sustaining development especially in rural villages. Both elements are associated with the requirements to produce agroforestry and livestock husbandry-related products. The two infrastructure elements provision are interdependent.

6.2.1.A.1.e. Renewable Energy Provision

The implementation of village level electrical energy installations, (e.g. mechanical power for food processing and other productive activities, irrigation, and clean water and sanitation) have a significant impact on the key objectives of the framework, poverty, health, and education (Kaygusuz, 2012). Both Pasternak (2000) and Martinez and Ebenhack (2008) note that the link between per capita energy consumption and the Human Development Index is even stronger than the link with GDP at the macro level. The promotion of commercial use of energy proposed in the framework has been shown to increase rural development benefits and can improve the long-term affordability of energy services by new end-users.

Utilization of the following RE technologies can occur independently, or in combination as hybrid units. These include: photovoltaic; biomass; geothermal; micro-wind; micro-hydro; and clean alternatives (i.e. fuel cells and micro-turbines using clean fuel sources as the power source).

The initial power supply design will be in support of business applications. One of the principle deterrents to RE investment and development in rural locations is the inability of customers to pay. The framework addresses this issue by proposing utilizing power for business and job creation, using interconnected production activities of agroforestry and livestock husbandry, thereby improving the local customer's ability to pay. The framework proposes the introduction of modular RE power facilities, planned and designed to optimize the utilization of locally available fuel resources. While RE based electrical power is essential to production improvements without concurrent education improvement impact is minimal as RE requires education for sustained maintenance and operations.

6.2.1.A.1.f. Providing Appropriate Levels of Education

There is a plethora of evidence indicating that adequate investment in higher education leads to economic growth by providing skills and knowledgeable workers as well as building enhanced civic cultures (Etzkowitz, 2004; Schleicher, 2006; Saltmarsh and Zlotkowski, 2011; McMahan, 2009; McMahan and Oketch, 2013). The framework proposes education provision as one of the initial value-creation modules as it contributes to human capital formation.

The difficult conditions in war-torn and post-conflict areas, which include damaged or destroyed educational infrastructure, and a shortage of teachers and skilled instructors, demand a training approach that adapts to these conditions. Since a good, basic education enhances effective vocational training, combining literacy programs with livelihood skills training, presents the best approach to skills development in post-conflict areas. Vocational training in these areas should, therefore, be delivered concurrently with the teaching of basic skills (AU, 2007).

Collection of discarded ICT equipment (i.e., telephones and computers) is proposed as a tool to facilitate the education process. Units collected will be refurbished by businesses owned and operated by members of the diaspora where the collection of equipment would take place. The growing volumes of end-of-life (EOL) and near end-of-life ICT equipment around the globe is becoming a matter of concern, particularly as ICT equipment is characterized by high demand and a relatively short life span (Reyes et al., 2012). Recycling this equipment is an important element of industrial ecology for this product. The idea is promoted and detailed by the International Telecommunication Union (ITU) of the United Nations (Reyes et al., 2012). Using this equipment, to connect those in rural locations to accessible education and training programs, is imperative. As a job creating business module, this element also creates both societal benefits and facilitates the generation of economic benefits.

6.3. Disruptive, Innovative, Scalable Business Model

6.3.1. Framework Process

6.3.1.A. Step 4

Framework process step number 4 Figure 18 identifies several of the requirements needed to move to the next step of preparation of a PPP proposal and actual implementation. These steps focus on the Business planning and development requirements leading to finalized organizational structures to be in place for preparation of the modified PPP prior to contract execution and implementation. Steps to create a customer centric innovative, disruptive, and scalable business are noted along with identification of proposed sources of project funding. Each business operation will require a complete business plan that will include identification of

all participants roles and responsibilities leading to the final modified PPP structure. Relational contracts are to be developed and executed by all participants in each business venture leading to implementation of the business operation.

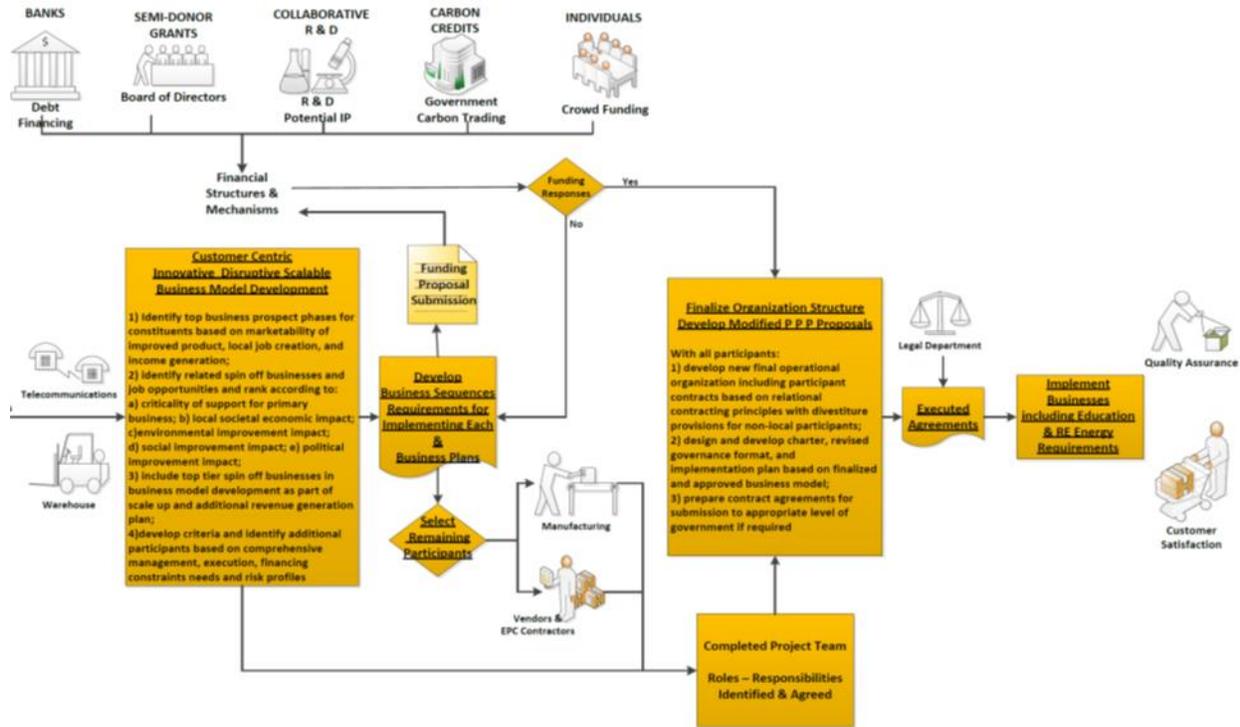


Figure 17, Chapter 6. Framework Process Flow Step 4. Source: J. Mitchell. ©2020

The framework proposes to utilize techniques, processes and tools used by Market Analysis and Development (MA&D) Business Model (BM) framework as a foundation and was modified to include Integrated Farming System (IFS) requirements. MA&D is a Community-based approach to develop tree and forest enterprise products (LeCup, Nicholson, and Fricke, 2003). This method assists local landowners to gain sustainable livelihoods by identifying potential tree and forest products and developing markets without degrading the resource base. This is an innovative process that combines existing (local) knowledge with external markets and technology information, while systematically considering social and environmental concerns, alongside the technological, commercial, and financial aspects of enterprise development. The MA&D system is focused on increasing local capacity to reach markets and business development services. This ensures market-driven strategies for local enterprises. Details implementing this approach are provided in (Lecup, 2011).

IFS, as an agriculture approach, produces synergies by utilizing complementary elements of differing agricultural sub-systems (pastoral, agro-pastoral, silvo-pastoral) and/or enterprises. They need to augment total productivity, profitability, gainful employment, efficient resource recycling, and efficient resource utilization (Rathore et al., 2019). While trees and their products provide alternative economic opportunities, they also are integral to survival of livestock production, the driver of both Somali culture and economics. Integrating trees with arable crops and grasses, reduces soil erosion, improves soil physical properties, augments nitrogen fixation, and can improve soil organic matter. This promotes efficient nutrient cycling. The combination of IFS with MA&D increases the C storage potential in the entire ecosystem increasing overall agricultural sub-sector product potential (Dasgupta et al., 2015).

6.3.1.A.1. Facility Creation and Utilization Approach

All elements necessary to reach the objective of improved sustainable socially responsible economic development require some form of facilities to be created. Original research on alternative ways to build schools, in Somaliland (Northern Somalia), is the foundation of the framework-proposed facility design and construction approach. The proposed approach fits well with the concepts underlying Industrial Ecology previously noted.

Shipping and intermodal containers are proposed as the basic facility construction element. They are readily available and have been proven effective for use as building envelopes for each of the facility requirements. They can be modified through the use and application of structural steel studs. The studs can be locally produced by stud forming machines all of which provides new business and job opportunities as well as introduces new technologies for expansion and adaptation within the society.

A base station with satellite remote stations are proposed. A hub and spoke implementation between the base station and remote stations will allow up to 200-mile radius access from a remote site for all product inputs to be collected and sustained. Both are deemed necessary as the concept seeks to disrupt the current value chain sequence of transportation and production which includes shipping live animals to foreign locations for processing. Locating these facilities is key as this will require local input combined with data that can be obtained through 3D lidar overflights.

Figure 19 shows the modular base station elements scaled to represent the dimensions of standard shipping containers. These modules are proposed as the base station elements and each contributes to the development of new businesses and jobs from which other activities can be generated. Design of all module elements is to be accomplished within a shipping container format that can be connected and readily transported.

The initial power unit proposed in the framework must supply enough electrical power for the use of ICT elements in the education facility, as well as the following: small lab; water purification unit; small-to-medium-sized (depending on available livestock quantity) slaughter facility with refrigeration; CHP unit to facilitate water purification and hot water access; small-to medium-sized milk processing facility; and Greenhouse unit. These modules are proposed as the base station elements and each contributes to the development of new businesses and jobs from which other activities can be generated.

Proposed remote stations would consist of six modules made from seven 40-ft., refitted containers and three 20-ft., refitted containers. Two modified containers at the borehole/well site provide a shaded location for watering and feeding livestock, and act as waste catchment locations for both manure and urine that can be converted to fertilizer or biogas. The borehole/well is proposed to incorporate a simple pumping mechanism, either Renewable Energy (RE) or mechanical powered for operation. One container unit is proposed to be the greenhouse element wherein agroforestry plant materials are maintained and developed. A mobile slaughter docking station, consisting of one container, is the third element.

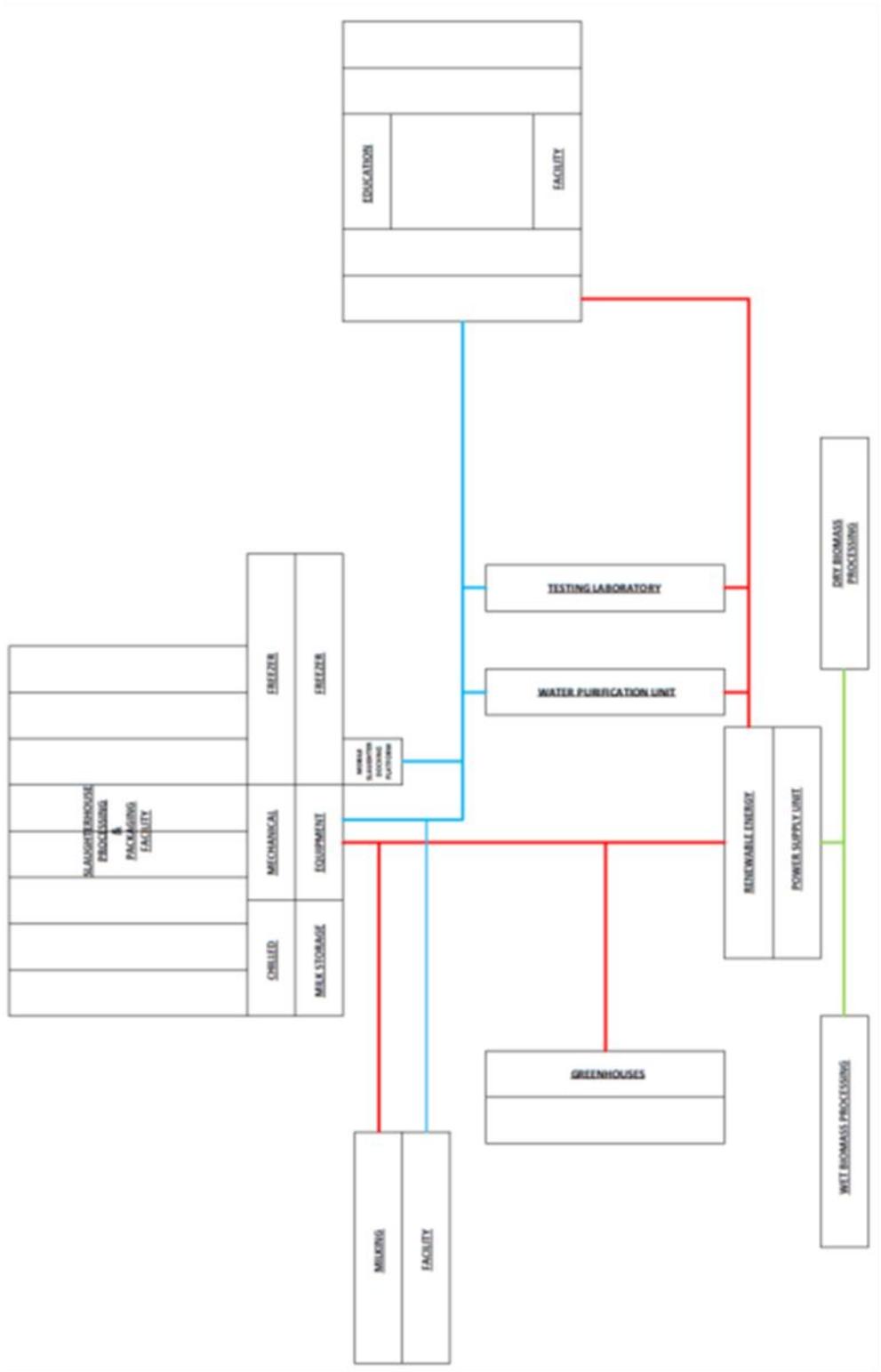


Figure 18, Chapter 6. Base Station Layout. Source: J. Mitchell. ©2020

The fourth element is a temporary raw milk collection and storage unit. This is important because milk will need to be safely stored until it can be transported to market. A 20-ft. chilling and storage unit is to be used in conjunction with a mobile raw milk chilling unit. A short-term raw milk temporary chilling storage can be created for use prior to transport in the milk chilling van with electrical power available. Another module consists of a lab/communication facility where all necessary scientific work for documenting and testing both meat and milk quality can be provided. The lab communication would allow for collection and transmission of agroforestry- and agro-meteorological related data, as well as serve as a veterinary technical station to provide health services to livestock. Provision of these services would be augmented through remote access to small, cold chain storage capacity. A residential module for the team assigned is proposed as the final module. Figure 20 shows the elements for remote site station elements.

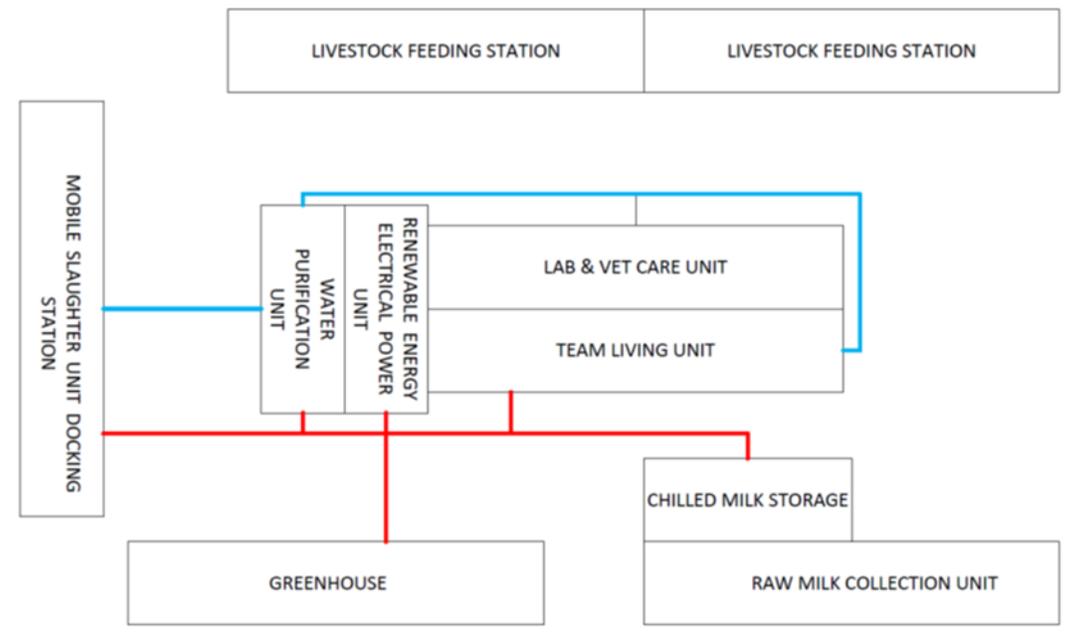


Figure 19, Chapter 6. Remote Station Layout. Source: J. Mitchell. ©2020

6.4. Framework Potential Product Opportunities

The framework proposes the simultaneous implementation of projects in four areas including agroforestry; livestock; renewable energy and education. Through integrated synergistic implementation of these elements the momentum necessary to sustain developmental process for business and job creation can take hold. They can be implemented starting with small elements to build confidence and provide societal impact.

Figure 21 depicts the level 2 framework elements in the center which are key to overcoming the existing non-conflict specific negative conditions. Elements shown in red have reduced business and job creation in both the livestock/pastoral and farming sectors of Somalia. The green area identifies some of the natural resources, equipment, techniques, and products that can be utilized to impact: 1) agroforestry and farming in the upper left; 2) livestock and livestock related production in the upper right; 3) education in the lower right; and 4) renewable energy production in the lower left.

This chapter has identified steps for implementation of the proposed framework and identified several of the initial business elements that need to be contemplated. Further research and refinement of each of the business elements is required. While this testing was beyond the scope of this research, the next chapter will lay the base for the first phase of implanting the framework. The research process, while developing and justifying a proposed framework, has also led to additional questions. The following chapter identifies some of the additional questions and summarizes lessons learned.

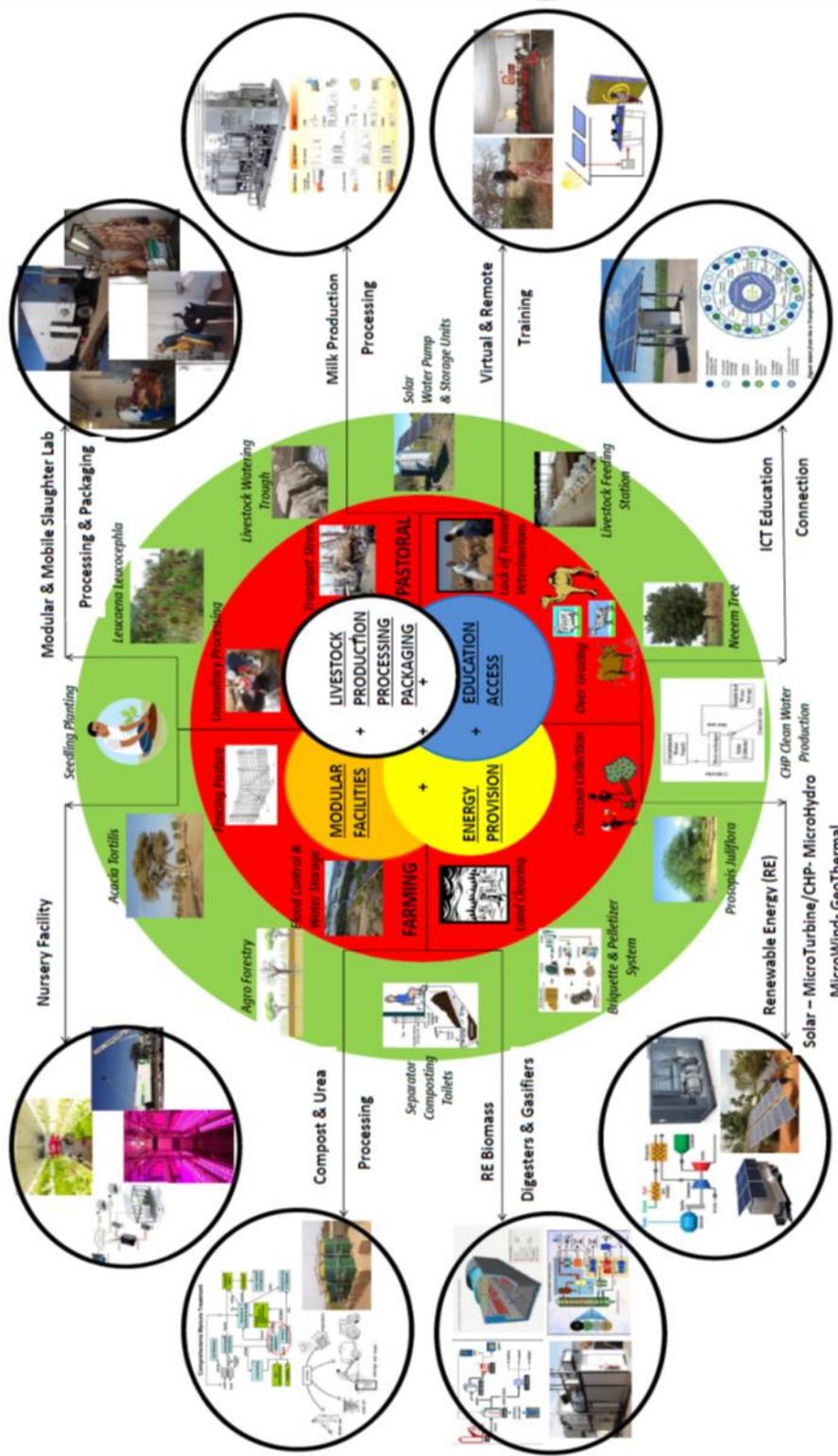


Figure 20, Chapter 6. Revised Framework with Potential Products. Source: J. Mitchell. ©2020

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7. Reflections and Conclusion

This research initially examined literature on Somalia spatially and temporally to understand key conflict factors and identify endogenous pathways with potential for mitigating the current conflict leading to improve development. Informal discussions with Somalis and case studies were then used to further examine cultural dynamics, economic, and infrastructure attributes and requirements leading to identification of economic sub-sector focus, infrastructure requirements, and stakeholders needed for the initial framework requirements. A pilot study examining the initial framework by former senior Somali government officials and development practitioners with conflict zone experience was then undertaken to evaluate the framework concepts and identify improvement opportunities. The framework including initial process steps are provided in Chapter 5 of this manuscript and Chapter 6 identifies the steps and potential implementation elements of the framework for Somalia.

The following provides reflections on the research and how it may address development success. The framework developed initially began with the researcher, as a businessman seeking participation in a private contract in Somalia with United Nations Operation in Somalia II (UNOSOM II). What evolved was involvement by the researcher with several key Somali contacts, a deep knowledge of the on-the-ground situation and a set of questions that focus on opportunities and constraints to sustainable development including:

1. Why is the Horn of Africa in general, and Somalia specifically, in this situation?
2. What are the real drivers behind these conditions?
3. Is Somalia really unique and, if so, how?
4. With hundreds of billions of dollars invested, alleged expertise in every field, and resounding technological capabilities, why have things not changed for Horn of Africa?
5. What can and needs to be done to rectify this situation?
6. What are the consequences for the status quo?

The research confirmed that these questions are critical to sustainable development, especially in Somalia. The following reflects on this research, in hopes that these reflections will be the basis for making appropriate policy and sustainable development decisions not just in Somalia, but throughout the region.

7.1. Why are the Horn of Africa and Somalia in this condition?

Research for this framework led to understanding that the Horn of Africa (HOA) including Somalia has ancient roots with several thousands of years of historic commercial and other interactions and development that are not well understood. Development appears to be based on utilization and availability of water. Water is the key resource and drives societal structures and conflict between the differing livelihood approaches of farming and pastoralism. Changes in climate that affect water availability has been a key issue in precipitating conflict historically.

Historic records of Somalia and the HOA show that interactions among these interlinked societies were important. The goods traded along East African river and lake paths indicate ancient regional relationships extending to colonial times.

In spatially constrained settlement regions such as Europe, interactions and their cultural attributes manifest quite differently than in more spatially dispersed and geographically distinct conditions in Africa. The interactions of humans with their environments created distinct societies.

Multiple and long enduring attacks at various locations around the external borders of Africa resulted in loss of control by the indigenous population. International religious conflicts between Christianity and Islam, this religious conflict combined with the slave trade by Arab countries, China, Europe, and India in East Africa ultimately resulted in a long-term decline. This research has provided insight into the East African slave trade and its potential impacts on development in HOA. Adoption of non-traditional religions sowed the seeds for mutations of African values and precipitated alliances with non-Africans leading to local participation in externally motivated conflicts such as those between Ethiopia's Christians and Somali Muslims as well as the slave trade.

European colonization in the western hemisphere and the need for labor to cultivate and harvest crops was essential to the transformation of European society to the new mercantile capitalism. What is often omitted in these conversations is the traditional agricultural knowledge and experience brought by Africans to large scale plantation cropping systems in both Americas and Somalia.

7.2. Existing Conditions and Contributing Factors

The African slave trade led to two important consequences for development. Firstly, endogenous growth theory noted that human capital is essential to production and development. If this is true, then the depopulation would stymie production and development of Africa. Secondly, if collaboration with trust is key to societal stability, then the long-term psychological effects and manifestations of mistrust created during the slave trade in Africa should not be surprising today.

Concurrent with newly independent African states becoming proxies in the Cold War destabilized Africa's ability to feed itself. Prior to the mid-1970's, Africa was a net food exporter, but since that time, the situation has been reversed. Food insecurity slows development and can lead to a reliance on foreign aid. Understanding the reasons behind the development and implementation of the foreign aid industry is critical.

Post-conflict Somalia in particular needs foreign aid as much of the farm and food support infrastructure, including wells and roads, were destroyed in on-going conflict. The destruction of wells and roads impacts not just their livelihood, but decreases the food produced for other regions. Increased scarcity of water has deteriorated farmland and pastures, devastated livestock, reduced milk production, increased food prices, and reduced availability of potable water in large areas of Somalia.

7.3. The Unique Situation in Somalia

Two factors stand out in regard to Somalia in this context. One aspect is that Somalia is a post-colonial country with four colonial masters, one being Ethiopia an historical enemy. The other unique feature of Somalia is it contains significantly homogeneous groups of people.

Foreign intervention in domestic affairs fueled conflict in Somalia and started long term foreign aid intervention. Interventions into the internal affairs of Somalia destabilized and set back Somali reconciliation efforts, fueling the rise of al Shabaab and foreign jihadist fighters into the country. Peace seems not of interest to many of the engaged parties as the African Union (AU) forces stationed in Somalia are foreign financed and hence their financial benefits to the countries that provided the forces.

Foreign aid to Somalia is focused on three areas social infrastructure, humanitarian, and unallocated/unspecified. About 30% of foreign aid is for the public sector and 65% is administrated by NGO and civil society organizations (Manuel, Faure, and Mansour-Ille, 2017). This raises questions about the level of local benefit. If the NGO representatives are local increased local benefit will result, but according to informal discussions conducted in this research this is often not the case.

If changing the reality of impoverished Somalis has indeed been the objective of foreign aid, results are and have been, at best, questionable. Welfare handouts no matter where they are applied have been consistent failures. The impact of foreign aid in Somalia can be considered complete failures from a developmental perspective, and traditional development approaches in Somalia should be reconsidered.

Theft of African wealth by corrupt leaders also impedes sustainable development. It appears that corruption, like conflict, war, and aid, are policy apparatus for maintaining colonial-like systems.

Examining Africa's economy, the continent is primarily a supplier of commodities, but has very little influence on commodity market prices. While the United States and Europe, provide subsidies to their farmers, small-scale African farmers cannot compete against large and often government-subsidized agribusiness producers. The various impacts include:

- 1) African countries rely on foreign food subsidies thereby becoming debtors;
- 2) costs for transporting food aid has both economic and environmental impacts;
- 3) local job creation is diminished, and local unemployment rises;

4) local agricultural development is weakened reducing societal resilience and response capabilities to climate change impacts; and

5) lack of agricultural surplus reduces the likelihood innovation in other areas will occur.

The range of corruption, conflict, and a heavy dependence on foreign aid have negative impacts on Somalia's development. Endogenous-based policies to avoid corruption and actions to mitigate its impacts are essential if Somalia is to achieve its full developmental potential.

7.4. Proposed Policies

The research finds that Somalia must first foster an environment that is conducive to education of its citizens. It then will be possible, through locally focused initiatives proposed in the framework, to collaboratively build integrated system approaches from which to evaluate and learn environmentally efficient, effective, and culturally acceptable solutions to the issues faced by its rural poor.

Providing access to information for societal improvement is now possible given current information communication technology (ICT). What is missing in Africa is both the filtration mechanism to discern valuable from non-valuable information and a stable electrical power source capable of driving both access to information and improving productivity capacity.

The literature shows the combination of improved education and access to alternative energy proposed in the framework has multiple impact potential. With restricted capital available, expenditures must be utilized to provide the broadest impact for local populations.

7.5. Conclusion

7.5.1. The Framework

The framework focuses on creating businesses and jobs in Somalia. Unlike other African nations, Somalia's population is relatively homogenous. It has a unique colonial history, and because of its strategic location, it possesses unique international experiences. The environmentally induced livelihood development in Somalia has specific cultural manifestations which are potentially limiting and would need adjustment if applied elsewhere.

The framework focuses on a target group of stakeholders and avoids others such as oligarchs, government, NGO's, and civil society organizations, whose influences are significant in many situations. Their lack of inclusion will undoubtedly have consequences. They are excluded, however, because, historically, the manifestations of their interests have not aligned with the pro-poor outcomes desired by the framework inclusive of eventual local ownership and utilization of the means of production and distribution.

Within the framework, education focused on agriculture, agroforestry, and livestock production are noted. While this type of focused education is deemed essential for economic growth, business, and job creation in Somalia, it must not be done in isolation. The framework does not address the need for literacy and general education delivery which are potential limitations for training and capacity building. The education proposed must be appropriate to the local context including nomadic pastoralism and others in the local population. The specific agriculture-based subsector products noted in the framework are based on the evaluation of Somalia. The application of the framework will require an evaluation and understanding of the local society to be served.

7.6. Potential Framework Implementation Impact

If implementation of all the framework elements provided were achieved, it would establish collaborative links between locals (pastoral and farming), the diaspora, local and foreign research-based universities, and local and foreign business-persons. First, the production of simple, modular infrastructure elements deployed to facilitate interaction and exchange of indigenous information and simple, modern technological capabilities for improvement of an existing product would be needed. Producing accessible cost-effective modular elements, would provide training in simple construction and system integration process. The growth and expansion of the business sector will be initially driven by the local needs and, as efficiency grows, target supply of other markets.

Improved local infrastructure elements installed along distribution routes as needed by the local population will serve well beyond the roadsides. These simplified infrastructure elements include processing and marketing facilities, access to needed inputs, and technical

assistance. Access to basic education would help in potentially changing practices that adversely impact people's health and welfare.

Most importantly, options to participate in positive developmental activities by the significant numbers of youth would be possible. The youth of Somalia seek opportunities to improve their lives. Without them, the alternative is the insurgency. Without viable productive employment options Somalia experience indicates such organizations are not sustainable.

7.7. Applications of this Research

The framework incorporates elements that are universal and elements that are most appropriate to the realities of Somalia. The combination of underlying framework philosophical premises of Endogenous Growth, Ecological Economics, and Industrial Economic theories can be applicable universally for all countries in Africa. Targeting development of human capital to foster economic development that is environmentally sustainable is key to climate change resilience, and food security.

The framework proposes a business model (BM) appropriate to the conditions of Somalia. However, it should be recognized each location will have unique factors that will modify what a pro-poor, innovative, disruptive, and scalable business model includes. It is critical that the BM identify both the product and the markets based on local situations.

The framework identifies renewable energy (RE) as a key element for success. The system requirements and design of mini-and micro-grid electrical production must be locally developed based on the available environmental condition. Consideration of RE requirements must also include assessment of the products identified in the BM and their productive requirements locally.

The framework also identifies education as an essential element of development especially training associated with improvement of the locally identified and targeted product of the BM. While general education and literacy are acknowledged as crucial, product-specific vocational education should be a focus.

The framework focuses on elements deemed essential to fostering innovative and disruptive pro-poor business and job development is seen as a means to mitigate the conflicts that have cost many lives. Results that improve livelihoods and societal equity are not available without stable and equitable systems of justice. It is believed that the elements of this framework (Chapter 4, Figure 9) when combined can facilitate a number of job opportunities supporting the collection of much-needed data to facilitate the material transformation of conditions in rural arid and semi-arid regions of Africa.

The framework as presented, while focused on Somalia, will likely have broad applicability in other countries in the HOA region as they face similar environmental conditions and have developed along similar livelihood paths. One of the considerations within this framework pertains to the pastoralist livelihood pathway that transcends artificial, manmade borders across the Horn region. It is hoped that through proper identification of local livelihood histories, characteristics, and local sustainable products the fundamental framework elements can be modified to meet the needs of development throughout Africa.

7.8. Future Research

The framework presented in this research identifies methods used for development, key elements and foundational processes for the next step of pilot implementation. It must be noted however there are several issues of impact that the framework does not address. The following items require further research to close gaps and improve outcomes.

Unlike any other continent, Africa was depopulated for its labor and several questions remain unanswered. Notably, why would other world regions seek utilization of African labor for productive purposes? What were the existing conditions of Africa prior to and during the slave trade that allowed it to supply such quantities of capable human labor to the world? Further examination of traditional African societies by African researchers is essential to begin answering these questions.

The framework proposed, does not address the need to defend or ward off external policies of influence or manipulations caused of “national” or “regional” socio-political-economic dynamics. It is believed that real education (not indoctrination) by people

independently is needed to determine what is in their best interest, and to put in place all elements to implement and sustain those interest.

The framework does not propose a means to address the concepts of land tenure and ownership which, in many respects is central to conflicts in Somalia. But it can direct attention to these and other constraints to successful development. Focus on access of grazing and water rights which cross community-acknowledged borders is important. It is believed that these types of decisions will need to be flexible and evolve based on the relations between local site-specific participants.

Additional research should examine renewable energy (RE) and education development - two essential development elements that are lacking in all of Africa. This framework proposes that RE and education must be developed concurrently to amplify impact. Development efforts typically target one identified issue at a time. Research indicates the need to re-examine such approaches. It is critical to reach a point of self-sustaining dynamism in development that stimulates significant participation to facilitate innovation, collaboration, and growth long term. Hence, the framework proposes the joint development of energy and education infrastructure to support an endogenous product production. This requires significant local collaboration and planning efforts to accomplish. If an appropriate model for concurrent implementation of RE and education is provided, access to new technology that increases productive capacity can improve Somalia's agricultural and livestock capabilities.

The initial pilot study was focused on underlying concepts and had its limitations. The number of participants in the unstructured and semi-structured interview study was limited by time and resources and, as such, receptivity to concepts included in the framework could be skewed. Upon reflection of answers to some of the semi-structured interview questions, it would appear the wording could have been better. Had time and concerns for safety allowed, a more extensive snowball sampling resulting from the interviews conducted would provide a larger sample set. Additionally, it is possible the information gleaned from the informal discussions could have been confirmed through follow up focus groups.

Unfortunately, one of the major hurdles involving conflict zone research is security. One characteristic of the insurgency in Somalia is the inability to differentiate within the population

the opposition. The threat of physical harm or possible retaliation against family members is real even when discussions occur in the diaspora. Within the environment of fear, it is difficult to follow standard sample survey protocols. While visiting Somalia, security was a very significant concern. Several of the people with whom discussions ensued were either killed or maimed by gunshot or explosion and locations visited were attacked by insurgents.

The next phase of this process is to seek adoption of the framework in an additional pilot study implemented by stakeholder organizations and individuals. The new pilot study is needed to test the implementation of the framework process. This may be difficult as new collaborations will need to be established. Initial discussions with locals in Baidoa to design and implement the proposed framework have ceased due to local government officials supportive of this aspect of development no longer being in power and the key local businessman with whom discussions had occurred was assassinated in the summer of 2019. Identifying stakeholders for such a pilot study is an on-going process in areas of Somalia and needs to be focused where insurgency activity is less intense.

APPENDIX A. A Framework for Development in Rural Arid and Semi-Arid Environments in Africa: The Somalia Case

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A.1. Scope Statement

This work proposes a conflict risk mitigation and development framework for arid and semi-arid rural conflict locations of Africa with Somalia as a focus.

A.2. Problem Statement and Objectives

This research seeks to develop a framework to mitigate causes of conflict in arid and semi-arid areas of Africa with focus on Somalia utilizing relatively small (under \$5 million) investment strategies. The framework development is general in its design intent to address post conflict scenarios, Somalia is used as a reference case location. Somalia as a pre-collapse society produced significant quantities of agricultural and animal products albeit not in enough capacity to sustain the overall development of the society. Prior to the collapse of Somali society while primarily rural (over 60%), it had one of the largest urban population percentages in Africa with 36% living in towns. Its economic base was focused on pastoral nomad herding camel, goat, sheep, and cattle (primarily for export to Arab- Gulf Cooperation Council GCC) and agriculture papaya, mango, and banana (primarily for European export).

Somalia as an example of rural arid and semi-arid conflict society in Africa showed dismal success of development projects prior to its societal collapse in 1991 ostensibly due to: poor absorptive capacity of the domestic economy, lack of explicitly stated priorities, shortage of skilled manpower in crucial occupations, fragile human resource base, domestic political squabbles and the allocation of a relatively high proportion of the recurrent budget to military build-up. These conditions coupled with shock experiences such as drought contributed to long term destabilizing political and economic conditions in Somalia (Mohamoud, A.A. 2002) and are similar throughout rural Africa.

The cycle of rural to urban migration and its consequences are an ever-increasing phenomenon across Africa. Without improving initial agricultural productive capacity to sustain the basic requirements of a population, as was the case in all developed societies, premature urban migration compounds the infrastructure and economic problems of typically weak state apparatus and accelerates the road to conflict.

A.3. The Framework

A.3.A. 10 Critical Factors Proposed for Framework

The following list of critical factors to address are identified in the initial literature review for this research.

- 1) Conflict type, current condition and experience spatially and temporally of target locations population;
- 2) Pre-existing social realities and the conflict impacts on new social dynamics;
- 3) Prior cultural norms and conflict associated changes to prior norms;
- 4) Pre and post conflict political dynamics at each level of governmental organization that can impact project/program;
- 5) Pre and post conflict economic drivers, businesses and customer bases local to international;
- 6) Pre and post conflict environmental conditions and their influence on current societal, cultural, economic and political conditions;
- 7) Hard physical infrastructure status and accessibility by sector;
- 8) Soft service infrastructure status and accessibility by sector;
- 9) Job and business innovation and creation performance and capacity locally and regionally; and
- 10) Existing local business environment and structures and regional and international business relations by infrastructure sector.

A.3.B. Proposed Framework Process

- 1) identify and utilize the combination of agro-ecological data and other environmental data sources (see table 1) to establish an efficient land management unit (lmu) to establish potential project physical boundary conditions and provide necessary information for evaluation of potential alternative power generation opportunities;
- 2) identify conflict, social, cultural, political, and economic (SCPE) data (see table 2) to create a comprehensive historic background understanding of a locale's current, social, political, and economic condition both spatially and temporally that considers the conflict implications on the social, cultural, political, and economic norms of the society;
- 3) synthesize the lmu and SCPE assessments to define the comprehensive PPP environment;
- 4) utilize the environment assessment as the basis to identify initial key participants, develop the initial organizational and governance structure and mechanisms to identify and break SCPE barriers and build trust;
- 5) identify and engage key participants to create good governance environment for the Partnership that works to (1) minimize negative impacts while enhancing positive contribution to reconstruction and peace building and (2) builds sustainability by fostering domestic capacity, empowerment, and leadership; (Abramov, I. 2009)
- 6) determine and prioritize the needs of involved parties and develop a common mandate for the implementation of services; (Abramov, I. 2009)
- 7) develop protocols based on relational contracting principles to allow dialogue and engagement of stakeholders focused on identification of common issues and themes to instill common interest and set the groundwork for trust building; (Abramov, I. 2009)
- 8) identify existing rural business/industry within the proposed land management unit construct in the society;
- 9) conduct value chain analysis to identify process and management areas for improvement and rank them based on economic impact (increase in income) to local residents (quantity of population affected);
- 10) assess both the education and energy (electrical) requirements needed to improve the value chain performance;
- 11) identify and propose design for environmentally and cost-effective alternative energy solution that is micro-grid oriented, sustainable, modular, efficient, and effective to meet

- the improvement requirements of the business and education requirements with ability to scale up energy supply over time for residential distribution;
- 12) identify critically required training programs to improve value chain performance and increase available job opportunities and proposes efficient delivery methods and implementation criteria under existing conditions and with implementation of additional energy and education infrastructure;
 - 13) develop customer centric business model based on proposed improved business structure including education and energy components;
 - 14) project and evaluate local income and job creation potential;
 - 15) identify related spin off businesses and job opportunities according to: a) critical support impact on primary business; 2) local societal economic impact (job and income creation); 3) environmental improvement impact; 4) social improvement impact; 5) political improvement impact;
 - 16) include preliminary evaluation of top tier additional spin off businesses in business model as part of scale up and revenue generation plan;
 - 17) identify additional participant criteria based on primary business comprehensive management, execution, and financing needs, constraints, and risk profiles of participant type (i.e. investor, vendor, etc.);
 - 18) solicit additional participants and investors based on comprehensive business model objectives;
 - 19) with participants, design and develop scope document, charter, revised governance format, and implementation plan based on finalized and accepted business model;
 - 20) develop new organization structure for business including participant contracts with divestiture provisions for non-local participants utilizing relational contracting principles; and
 - 21) develop and propose PPP agreement to appropriate (local) level of government for acceptance.

See Tables 1 and 2 for Potential Data Sources

A.3.C. Proposed Framework Risk Reduction Formula

- 1) identify and engage key participants to create good governance environment for the Partnership that works to (1) minimize negative impacts while enhancing positive contribution to reconstruction and peace building and (2) builds sustainability by fostering domestic capacity, empowerment, and leadership; (Abramov, I. 2009)
- 2) determine and prioritize the needs of involved parties and develop a common mandate for the implementation of services; (Abramov, I. 2009)
- 3) develop protocols to allow dialogue and engagement of stakeholders focused on identification of common issues and themes to instill common interest and set the groundwork for trust building; (Abramov, I. 2009)
- 4) target existing industry operation for improvement and transformation;
- 5) utilize incremental and scalable investment process tied to job creation and revenue generation performance;
- 6) incorporate related support businesses in plan for incremental role out and scale up as part of risk mitigation through industry diversification plan;
- 7) focus on local job creation and business development to increase disposable income and facilitate utilization of Business Model based electrical and educational provision;
- 8) submit unsolicited proposal for the provision of electricity and educational services to identified funding sources;
- 9) step up electrical provision to residential under Power Purchase Agreement based on improved job and business opportunities;
- 10) provide job and business focused education training programs in conjunction with recognized University incorporating R&D and service-learning projects within a Business Model structure

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A.5. Tables 1 and 2: Sample Data Sources

Table 1 Sample Environmental & Renewable Energy Data Bases		
Agro Ecological Data	Food and Agriculture Organization (FAO)	http://www.fao.org/nr/gaez/en/
	International Institute for Applied Systems Analysis	http://www.iiasa.ac.at/web/home/research/modelsData/GAEZ/GAEZ.en.html
Solar Data	Solar Electric Power Association (SEPA)	www.solarelectricpower.org
	International Energy Agency	http://www.iea.org/topics/solarpvandcsp/
Wind Data	International Energy Agency	http://www.ieawind.org/
	National Renewable Energy Laboratory	http://www.nrel.gov/wind/
Hydro Power	International Energy Agency	http://www.iea.org/topics/hydropower/
	Hydro 4 Africa	http://hydro4africa.net/HP_database/all_stations.php
Geothermal Energy	International Energy Agency	http://www.iea.org/topics/geothermal/
	Geothermal Risk Mitigation Facility	www.grmf-eastafrika.org/database
Biofuels	International Energy Agency	http://www.iea.org/topics/biofuels/
	International Institute for Environment & Development	http://pubs.iied.org/17059IIED.html
Biomass	International Renewable Energy Agency	http://www.irena.org/DocumentDownloads/Publications/IRENA-DBFZ_Biomass%20Potential%20in%20Africa.pdf
	Carbon Dioxide Information Analysis Center	http://cdiac.ornl.gov/epubs/ndp/ndp055/ndp055b.html

Table 2 Sample Conflict, Social, Cultural, Political & Economic Data Bases		
Conflict Data	Armed Conflict Location & Event Data Project	http://www.acleddata.com/
	Social Conflict in Africa Database (SCAD)	https://strausscenter.org/ccaps/research/about-social-conflict.html
	Peace Research Institute Oslo (PRIO)	http://www.prio.no/Data/
Social Data	World Bank	http://data.worldbank.org/data-catalog/africa-development-indicators
	United Nations Economic Commission for Africa	http://ecastats.uneca.org/statbase/
	Africa South Of The Sahara Database	http://databases.unesco.org/afr/form.shtml
Cultural Data	United Nations Educational Scientific Culture Org (UNESCO)	http://www.unesco.org/new/en/africa/
	Dept. of Peace & Conflict Research Uppsala Conflict Data Program (UCDP)	http://www.pcr.uu.se/research/ucdp/datasets/
	UNICEF	http://www.unicef.org/evaldatabase/index_13711.html
Political Data	Oxford Journal African Affairs	http://www.oxfordjournals.org/our_journals/afrafj/about.html
	United Nations Department of Political Affairs	http://www.un.org/wcm/content/site/undpa/main/activities_by_region/africa/unlo
	International Committee of the Red Cross	http://www.icrc.org/eng/resources/documents/annual-report/icrc-annual-report-2012.htm
Economic Data	International Monetary Fund	http://www.imf.org/external/pubs/ft/weo/2013/01/pdf/text.pdf
	World Bank	http://data.worldbank.org/data-catalog/africa-development-indicators
	United Nations Economic Commission for Africa	http://ecastats.uneca.org/statbase/
	African Development Bank Group	http://www.afdb.org/knowledge/statistics/