Network Frames and their Link to Commitment in Drought Early Warning Information Systems:

Evidence from the FEWS NET-KFSSG Anti-Famine Campaign

Presented to the Faculty
Regent University
School of Communications and the Arts

In Partial Fulfillment
of the Requirements for the
Doctor of Philosophy
In Communications

by
Lucy Wanjiku Gichaga

Approved by:

William Brown, Ph.D., Chair
School of Communications and the Arts

John Keeler, Ph.D., Committee member
School of Communications and the Arts

Emmanuel Ayee, Ph.D., Committee member
College of Arts and Sciences

December 2014
Network Frames in Drought Early Warning Information Systems and their link to Commitment:
Evidence from the FEWS NET-KFSSG Anti-famine campaign

ABSTRACT

This study examined the effectiveness of Kenya’s famine early warning information (FEWI) network from 2007 to 2013. The study assessed: presence of collaborative networks (NC), strength of networks (C), organizational commitment (OC), types of information commitments (IC), and perceived impact (PE) by stakeholders at FEWI’s strategy-capacity-building-network, the Famine Early Warning Systems Network (FEWS NET) and the coordination-implementer-network, the Kenya Food Security Steering Group (KFSSG), since 2007. The study’s discussions are nested in the study’s functional framework: the multi-theoretical, multi-level, multi-analytical (MTML) model for studying the emergence of communication networks (Monge & Contractor, 2003).

The study employed the concurrent embedded mixed methodology. The “networks and commitment FEWI survey” was distributed and responses from 191 respondents harvested online. Correlation analyses of the main variables were all positive as expected. Regression analysis confirmed by the Structural Equation Modeling (SEM) yielded significant results for the prediction of IC by NC, IC by OC and C, indicating a vibrant network of food security organizations, workers and researchers in Kenya who collaborate and use early warning information in their work. An initial SEM was not admissible. SEM goodness-of-fit measures became adequate after the NC path was purged and replaced by C. This pointed to the possibility that contacts and associations (NC) was an implied factor in participating in activities and discussions (C), thus the need to study contact links over time. The final SEM model
demonstrated suppressing mediatory traits by IC. IC predicted PE negatively, indicating that the more informed and involved the respondents, the more dissatisfied they were with regard to the effectiveness of the FEWI network in spearheading early action. Social network analysis (SNA) revealed centrality of the Ministry of Agriculture (MoA) in the network. The strongest collaboration links were between FAO and MoA and between MoA and WFP-VAM, and NDMA, which indicated local government leadership of the mitigation task and their capacity-building relationship with relevant UN agencies. The field narratives text analysis found that the most discussed food security issues were consumption-related, as the top three issues mentioned was livelihood, nutrition and food production. The least discussed issues were climate-change-adaptation, biotechnology and GMO, indicating less focus on policy and planning in the network collaborative discussion and activities.

The study made 10 recommendations, including grassroots participation by small-scale farmers, the education curriculum focus areas and a professional network to strengthen local connections and to drive local research and innovation for sustainable food security. This study enriched knowledge on inter-organizational dynamics in famine mitigation communities’ networks. The study placed community at the center of problem-solving, a core African philosophical incline. This integrated community view is also inclined to the entitlement perspective (Sen, 1982) which focuses on the political, economic and social factors in directing individual and organizational social commitment to food security. Future studies should focus on longitudinal procedures to test if the studied network dynamics remain constant over time.

Keywords: sustainability, networks, famine early warning, collaboration, framing, information commitment, organizations, stakeholders, development, food security, information systems, Kenya, Horn of Africa, drought mitigation, climate change communication
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LIST OF ABBREVIATIONS

AFIP – Acute Food Insecurity Phase, FEWS NET’s food security emergency gauge

AIA – Agricultural innovation in Africa

ALRMP - The Arid Lands Resource Management Program

AMIS - Agricultural market information system (at the US department of Agriculture)

ASK - Agricultural Society of Kenya

CILSS - Comité Inter-Etate pour la Lutte contre la Sécheresse au Sahel (Permanent Interstate Committee for Drought Control in the Sahel) FEWS NET’s West Africa Regional partner

COMESA – Common market for Eastern and Southern Africa

EAC – East African Community

ECOWAS – Economic community of West Africa

FAO – Food and Agriculture Organization

FEG – Food Economy Group

FEWIS – Famine Early Warning information Systems (main acronym in this study for early warning activities; including organizations and professionals studied)

FEWS NET - Famine Early Warning Systems Network (A USAID agency)

FSNAU - Food Security and Nutrition Analysis Unit – (Somalia focused)

FSNWG - Food Security and Nutrition Working Group

GIEWS - Global Information Early Warning System

ICRISAT – International Crops Research Institute for the Semi-Arid Tropics

IGAD - The Intergovernmental Authority on Development - is an eight-country regional development organization in East Africa, Horn of Africa, headquartered in Djibouti City.

It is a regional partner to FEWS NET.
IPC – Integrated Food Security Phase Classification, a standardized tool, “common currency” for classifying food security and decision making

IPCC - Intergovernmental Panel on Climate Change

ITCZ - Inter-Tropical Convergence Zone

KFSSG - Kenya Food Security Steering Group

KFSM – Kenya Food Security Meeting

MTML - Multi-Theoretical Multi-Level model of studying social networks (Monge & Contractor, 2003)

NASA – National Aeronautics and Space Administration

NDMA - National Drought Management Authority Kenya

NDVI - Normalized Difference Vegetation Index

NEPAD – New Partnership for Africa’s Development

NOAA – National Oceanic and Atmospheric Administration

OECD - Organization for Economic Co-operation and Development

REC’s – Regional Economic Communities

RFE - Rainfall Estimation

SADC – Southern African Development Community

UN FAO – United Nations Food & Agriculture Organization

USAID – United States Agency for International Development

USGS – United States Geological Survey

VOA – Voice of America

WFP – World Food Program

WRSI - Water Requirements Satisfaction Index
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ACKNOWLEDGEMENTS

I am grateful to God for the grace to complete my doctoral studies. I am grateful for the privilege of knowledge creation to enrich the existing knowledge of inter-organizational dynamics in drought early warning information (FEWI) systems communication networks and the possible contribution to a commitment to early action that prevents famine and enhances effective food security management in Sub-Saharan Africa, specifically in Kenya.

I am thankful for my professors at Regent University, Dr. Brown, Dr. Keeler and Dr. Ayee, who not only modeled meticulous scholarly life but also a compassionate teaching philosophy. I am especially grateful to the professionals at FEWS NET and USAID, KFSSG, NDMA and the staff of partner organizations, who talked to me for hours, emailed information, pointed me to information and explained concepts selflessly.

I am grateful for the unwavering support and prayers of my dear husband Daniel Gichaga, my twin sons Waruta and Wanjohi and daughter Ruguru, my parents Mr and Mrs Wanjohi, my sister and brother-in-law Drs. Gitimu, my brothers, Gachara, Mbugua and Kimani, family members, and friends in completing this huge task to the glory of God.

It is an exciting time for communications scholars. The Information Age looks to us as communication scholars to design programs that work in the real world. Therefore, doing research towards famine eradication by studying the institution that has been dedicated to that mission, the Famine Early Warning Systems Networks, (FEWS NET) in Africa and the Kenya Food Security Steering Group (KFSSG), is a great honor. I hope that my research will contribute to a further step towards an even more effective national program for effective famine-prevention, eventual eradication of recurrent famine and towards sustainable food security management in Kenya and beyond.
DEDICATION

Dedicated to the movers, daily implementers, believers and the online #MDG Momentum community

Supporting the 1st UN Millennium Development Goal (MDG) in 2000 for 2015 and beyond;

(heralding the Sustainable Development Goals #SDGs (Rio+20- June 2012) -)

Inspiring even the once forgotten, of a possible future within in this generation’s grasp,

which is completely free of extreme poverty and hunger; for all

A dream whose major ingredient will be a “mouthful” of collaboration and information

This research’s Blog/Pinterest/Storify: Musings4Progress

Blog: http://musings4progress.wordpress.com/

Pinterest: http://www.pinterest.com/progressmusings/

Storify: http://storify.com/gichaga

Twitter home: @myhumblemusings

Quote:

“People have told me that if FEWS NET did not exist, it would have to be invented.”

Roy Stacey, Program Manager, Africa FEWS NET. Quote: Silver Jubilee video, 2011
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CHAPTER 1
INTRODUCTION AND SIGNIFICANCE OF THE STUDY

Network frames in Famine Early Warning Information Systems

The yellow rays of the scorching savannah sun seemed to fall softly on the long winding lines of people outside some wholesale and distributor outlets and stores. The quiet lines which sometimes broke into rowdy disagreements when someone tried to skip the line, were now a familiar sight in each small town. This was 1984, the year of the “worst famine” (Downing et al., 1987) in a century in Kenya and the Horn of Africa region. The famine, which had begun with failure of rain in the arid regions in the northeastern part of Kenya in 1983, was now making its way to the breadbasket regions in the western, rift-valley and central regions of the country. By late 1984, pastoralists in the north had lost more than 70% of their stock; the crops had failed, bringing the production of maize to approximately 50% below normal in the rainy months of March through May. The wheat harvests were nearly 70% below normal and potato production was down by more than 70% (Cohen & Lewis, 1987).

Family networks to mitigate famine. The long lines were an attempt for parents and caregivers to get as much groceries, mostly flour or sugar, as they could find or afford for their networks of families and friends. The flour had a much higher price and sometimes a quantity limit of about two packets per family. The new higher prices were whispered across the line as the ones who had had the opportunity to buy made their way through the crowd to waiting “matatus” to take their newfound treasure to their families. These were the people who could
afford to buy foodstuff even at the much higher prices. If you belonged to their family, you were assured of food supply for as long as they could continue to afford it. The story was, however, tragically different for people who did not know anyone or who had no network of people who had access to the limited food supplies or could not pay.

To most of us who were children in 1984, the drought meant so many interesting things. For some, it meant that they ate the “yellow cake” instead of the usual white ‘ugali’ cornmeal, with such creative accompaniments as diluted milk or wild green amaranth (pig weed, mchicha or terere) vegetables or just dry corn. There was less farm-work as the crops had failed. Some people shared ideas for digging up wells for water or even setting up small marshy mini-farms near the drying rivers to grow the occasional and now rare kale-meal. It was documented that about 10% of the infants, 24% of the toddlers and 14% of the school age children lost weight between August and December 1984 (Downing et al., 1987).

**Government networks in famine mitigation.** By June 1984, then-Kenyan President Daniel Torotich arap Moi set up the National Famine Relief Fund (NFRF) through which the Kenyan government worked to mitigate escalation to a full-blown famine. In September 1984, the government imported large amounts of food (mostly the cheaper yellow maize) on a commercial basis to supplement the depleted national food reserves and asked for donor help. The local government structures and representatives such as village chiefs helped to identify vulnerable needy households and helped to distribute the subsidized food or aid fairly effectively. The efforts of the NFRF were reported by the then chairman of the board of trustees of the NERF board at the Kenya National Assembly, where he detailed relief efforts, as well as farmer support services, including seeds distribution. The board reported that about 1 million...
Kenya shillings was used to buy seeds to plant and fertilizers and were serviced by locally assigned agricultural extension officers from Kenya’s Ministry of Agriculture.

The Kenyan government’s quick reorganization and action to import food and to distribute most of the food through market mechanisms, before donors could respond (Downing et al., 1987), began the story of formalized drought management in the country. These efforts may have cushioned Kenya significantly, but not entirely, from the dire famine effects and the story of escalation from severe drought to famine that was fast unfolding in the entire Horn of Africa region in Sudan and Ethiopia. A report by Michael Buerk from the British Broadcasting Corporation on October 23rd, 1984, got the attention of the world and began an outpouring of relief activities that finally ended the famine by 1985. The lack of prior planning before the famine introduced organizational challenges to the Kenyan response (Downing, et al., 1987):

As a result there were delays at almost every step in the response to the drought. The identification of the severity of the drought, the estimations of the population-at-risk and needed food imports; discussions over food or cash for work, free versus marketed distribution, and coordination with NGOs all led to uncertainties in the response and delays in implementation. (p. 247)

More recent government of Kenya mitigation efforts are carried out through the National Drought Management Authority Kenya (NDMA), headed by Mr. James Oduor. NDMA was established under the State Corporations Act of Kenya in 2011. The Agricultural Society of Kenya (ASK) is an annual event and knowledge outlet to promote agricultural development.

**Organizational networks for famine mitigation reform since the 1984 famine.** Only profound events may help fuel complete changes in the direction of policy and services for countries, organizations, families to individuals. The 1984 Horn of Africa famine was one such
event. A source from an interview alleged that there was food available in some neighborhoods while their neighbors were hungry because of information disconnect. Fear of depletion drove store owners or families to hoard. The earliest news reports on the famine seemed to come a little too late for the people at the epicenter of the famine crisis in Ethiopia and seemed to miss the spill-over of the famine in neighboring countries. Although the famine reporting focused on Ethiopia, everyone in the neighboring countries felt the famine’s ripple effect in one way or another. Whether or not the famine effects were just annoying or catastrophic or in-between depended heavily on networks of the individual or an organization in sourcing food reserves for upkeep during the drought and famine months. Long lines of people waiting by the well-connected wholesaler business person’s shop to buy corn-meal, sugar or other food staples were commonplace. Other means of sourcing food was through schools, aid organizations and the government to the close networks.

Donor organizations came into the picture to aid the Kenya government’s efforts already in place. For instance, the United States Agency for International Development (USAID) made its first pledge of assistance in July 1984 after the Kenyan government ordered the yellow maize in June 1984. In August 1984, the United Nations Food and Agriculture Organization (FAO) confirmed the need for emergency assistance. The first concessional maize was received in December 1984, bringing much needed relief. Other notable organizations that participated significantly included the African Medical Research and Education Foundation (AMREF) and the Cooperative for Assistance and Relief Everywhere organization (CARE). This was supplemented by private and government global donations responding to the highly publicized Horn of Africa famine crisis. Finally, after two years, the harsh famine which had caused an
estimated 400,000 deaths in Ethiopia and the surrounding region ended but not without hard lessons learned.

The relief-aid communities, including the government, were overwhelmed and devastated, and they had to create a much-needed paradigm-shift. They resolved to stress prevention rather than relief in drought and famine management. The USAID’s famine early warning systems network (FEWS NET) was created in 1985 to put into place a comprehensive prevention and mitigation program through the use of information to predict drought patterns in weather systems as well as in people’s livelihoods so as to prevent any future escalation to catastrophic famines.

There are four main players in the African early warning community, including the FAO’s Global Information and Early Warning Systems (GIEWS), the World Food Program’s Vulnerability Assessment Mapping (VAM), Save the Children Fund (SCF-UK) and USAID’s Famine Early Warning Systems (FEWS). According to Moseley & Logan (in Wisner et al., 2005), two disparate monitoring models are employed by these otherwise complementary famine monitoring systems. First, the earliest approach used by FAO’s GIEWS is the food balance sheet approach explained as follows:

Food balance sheet approach is used to establish whether there is adequate food supply to meet demand by calculating national food needs (population x per capita grain needs) and comparing these needs to the sum of agricultural production, stocks and net imports.

(Wisner et al., 2005, p. 142)

FAO’s GIEWS food balance approach precedes FEWS NET indicator approach (see discussion in page 11 of this study).
Information systems within the networks for famine mitigation

One valuable means of understanding the flow of information within information societies is through the study of networks as functional structures in illuminating the flow and effects of information. *Network frames* are information systems that are influenced by specific causal, professional or contractual relationships. They help us to understand how information is generated, processed and transmitted. This study explores how networks influence attention to famine early warning information (FEWI) and implementation processes towards timely famine mitigation efforts. In this study, network frames were used to assess the efficacy of early famine warning information systems in Kenya.

A network is a formal or informal social structure that emerges from the patterns of contacts at different levels. The social network has a system of discernible patterns of contacts and affiliations. Likewise, communication networks are the patterns of contact that are created by message flow through time and space (Monge & Contractor, 2003, p. 3). Communication networks provide a context of communication that accounts for message framing in congruity with the network’s distinctive cultural traits. A *network frame* is a term I have adopted to mean the socio-cultural structure within which specific communication is initiated, transcribed, interpreted and acted upon. In this study, I take famine early warning information (FEWI) as a *network frame* where eclectic information from satellite imagery, to economic data, to policy and livelihood data) is framed into functional famine early warning information to drive timely famine mitigation action.

Network frames are established predictors of success in information systems operations (Van Dijk, 2006, p. 20). In informational societies, where information generation, processing and transmission have become the fundamental sources of productivity and power, network frames
nested in collaborative efforts are increasingly getting attention from scholars (Castells, 1996 in Van Dijk, 2006, p. 20). Some scholars study networks as part of a thriving socialization process (White, 1992, 2008). Other scholars examine networks as technical systems which form the fabric of societies, taking a largely organizational communication perspective (Van Dijk, 2006). A growing number of scholars such as Castells (1996) view networks as the mediums for human experience through which all communication occurs; therefore, network is a basic ingredient of the valid context of communication or an information system.

A network as a causative agent in communications is a growing scholarly perspective. There have been studies on networks focusing on the specific attitudes and behaviors exhibited by individual members of an organization and by organizational innovation (Monge, Cozzens & Contractor, 1992). In addition, some scholars focus on the group dynamics that take place within networks (Friedkin, 2010) and to a great extent focus on organizational commitment (Postmes, Tanis & de Wit, 2001). This recognition of the causal relationships in networks has been embraced by advocates of a structurational perspective, who argue that technologies can simultaneously shape and be shaped by the social structures into which they are introduced (DeSanctis & Poole, 1994; Orlikowski, 2000 in Monge & Contractor, 2003).

The new so-called “network society” demands reflection on the drivers of innovation and on the apparent emerging opportunities of economic, political, societal, and cultural influence as scholars grapple with the reality of the timeless, space-less, embedded, reflexive nature of connectedness driven by the spectacular advances and convergences in computer and communication technology (Monge & Contractor, 2003, p. 4). Therefore, there is growing interest in studying networks beyond exploratory displays or discoveries of loose causal diameters, to scientific studies on networks making use of multidisciplinary sources in
explaining why communication networks emerge and the effects of these communication networks (Monge & Contractor, 2003; Friedkin, 2010).

**Famine early warning information (FEWI) in Kenya: The FEWS NET – KFSSG link**

The famine early warning information (FEWI) network in Kenya forms a strategic network information system to spearhead timely famine mitigation processes through sophisticated multilevel involvements of stakeholders in sourcing and implementing FEWI information. Monge & Contractor (2003) proposed a multidisciplinary, multi-theoretical, multilevel (MTML) model of studying multidimensional communication networks such as the famine early warning network. This study uses the MTML theoretical framework to examine the effectiveness of the collaborative networks of stakeholders at the famine early warning information (FEWI) network, as the network serves to initiate an inoculation effect for famine mitigation efforts towards sustainable food security. The *FEWI network frame* in focus in this study is the dual perspective of the strategy-capacity-building-network, which is the famine early warning information systems network (FEWS NET), and the coordinating-implementer network, which is the Kenya food security steering group (KFSSG).

The proposed research examines FEWS NET–KFSSG’s self-proclaimed “network” (FEWS NET website, 2012) organization, functioning as a distinct social system or network to render an effective, multi-dimensional approach to famine early warning and to contribute to a sustainable food security program. Therefore, this research approaches FEWS NET’s framing of famine through the lens of Niklas Luhmann’s differentiated function system (Luhmann, 1989, p. 34), which owes its increased effectiveness to the differentiation of operational autonomy with structural coupling (Bechmann & Stehr, 2011, p. 144) with interior and exterior functions of the system. FEWS NET, as a distinct communications social system, like the Luhmannian social
system, depends on the specific selections of possibilities of a symbolic communication medium with three dimensions: event-related facts, relevant information and current issues (Gorke & Scholl, 2006).

Niklas Luhmann (1927-1998) was an important social theorist of the 20th century who proposed the functional differentiation view of society. By functional differentiation, he meant the process of system differentiation towards increasing the complexity of a system, to useful subsystems that can make different connections with other subsystems to yield results of variation in the environment, which in turn facilitate better responses to the environment and allows faster evolution of the social system. The sub-systems have a mixture of interdependence and independence in their contributions to the effective functioning of the entire social system.

Further, the notion of clarified information in Niklas Luhmann’s theory of social systems contrasts a system from its environment in terms of its own reduced complexity versus a chaotic but interdependent exterior (Herting & Stein, 2007, p. 3). In Luhmann’s view, a system itself consists and acts through communicative acts and thereby defines its existence. Mass media forms the cognitive systems of modern society through which society constructs its own reality and options for the future coordination of action (Luhmann, 2000), therefore yielding a differentiated view which connotes mass media as functioning to “irritate” society by creating and interpreting permanent restlessness, which is typical and normal for modern societies (Gorke & Scholl, 2006).

Likewise, Famine Early Warning Systems (FEWIS), in its interpretation of interdisciplinary knowledge (including aeronautics and satellite imagery data, atmospheric and ecosystem data and economic livelihood data), builds a distinctly Luhmannian ontological system by consisting and acting through communicative acts of pooling from otherwise
unconnected knowledge and multi-level resources and networks to construct a system (reservoir) of ecological interpretation which functions to “irritate” and drive action towards famine prevention. Moreover, the notion of “creating and interpreting permanent restlessness” connotes a cultural shift or grounding beyond just early warning towards a onetime response, while working towards a permanent will and priority for managing food security effectively and sustainably.

It is important to note that, without functional collaboration, tactical analysis and timely forecasting with strategic decision support, early warning systems are not useful (Ververs, 2011, p. 3) and may as well be dissolved in the environment as merely disparate information. FEWIS affects the subsequent processing of the notion of and action towards famine prevention and food security through society’s knowledge channels, including media coverage. In this sense, famine FEWIS information can be said to provide the initial layering of the framing of famine information through the form of pre-existing networks, and is replicated or even multiplied through communication networks to drive appropriate and timely action for famine mitigation.

**Strategy & capacity-building network: Famine Early Warning Systems Network**

The promise of information to drive community anti-famine action inspired the creation of the famine early warning systems network (FEWS NET) to improve communication in humanitarian aid response after the 1984 devastating famine in the Horn of Africa (Voice of America (VOA) broadcast, December 2009). FEWS NET is a United States Agency for International Development (USAID) funded activity. USAID was created to bring together several existing foreign assistance organizations and programs so as to synchronize and manage non-military United States’ foreign economic development programs under the U.S. Foreign Assistance Act of 1961. Among the tenets of this 1961 Legal Act is that it not only created
USAID, but also includes specific stipulations that require specific human rights standards for recipients of aid internationally. Most recently, in the 2004 amendment, there is a new requirement towards preferential service to orphans and vulnerable children (OVC’s) in needy regions globally. More than 51 years later, USAID has created relief approaches that have a unique emphasis on this comprehensive approach to relief; FEWS NET is one such example. Therefore, the notion of community, collaboration, and networking is purposely strong in the fabric of USAID’s FEWS NET. The influence and effectiveness of this networking approach to FEWIS will be examined in this study.

FEWS NET was built on the existing paradigm of famine relief by the Food and Agriculture Organization of the United Nations (FAO) with the food balance sheet approach that created the comprehensive indicator-based approach (Wisner et al., 2005, p. 142). The indicator approach takes cognizance of conditions at the household level that are inferred from data collected from broader or average conditions and general trends. These data are interpreted against a conceptual model that describes household response to both economic and physical variations in order to develop a general picture of baseline vulnerability as well as current vulnerability conditions. This study examines the role of network framing in the indicator approach method of establishing vulnerability FEWIS information so as to drive commitment and action among the stakeholders and target audience of network members.

This study examines FEWS NET’s influence within the context of a quarter century of comprehensive and interdisciplinary studies and forecasting towards famine early warning information (from 1985 to present). This span included the 2011 drought, the worst in 60 years, and a grim 2011-2021 International Food security assessment projecting that the number of food-insecure people in Sub-Saharan Africa will increase by 17 million and the distribution gap will
fall to 0.6 million (Shapouri, et al. July, 2011). This is against the backdrop of projected higher demands for production and efficient food security management and calls for deliberate political focus and action towards food security in UNFAO’s projection for 2050, as explained below:

By 2050 the world’s population will reach 9.1 billion, 34 percent higher than today. Nearly all of this population increase will occur in developing countries. Urbanization will continue at an accelerated pace, and about 70 percent of the world’s population will be urban (compared to 49 percent today). …In order to feed this larger, more urban and richer population, food production (net of food used for biofuels) must increase by 70 percent. Annual cereal production will need to rise to about 3 billion tons from 2.1 billion today and annual meat production will need to rise by over 200 million tones to reach 470 million tones. (UNFAO, 2009, p. 2)

FEWS NET is USAID’s project in Africa to help strengthen individual nations’ capabilities to manage the risk of food insecurity through the provision of rigorous, timely and analytical early warning and vulnerability information to national, international and regional partners on emerging food security issues. Although FEWS NET celebrated 25 years of service in the region in 2012, its website [www.fews.net] has only been active since 2000. This means that FEWS NET’s virtual products have been accessible through their website audiences in all levels of networks for 13 years out of the 27 years of service in total to date.

The Famine Early Warning Systems Network (FEWS NET)’s brochure captures the maxim of FEWS NET as an “objective, evidence-based analysis for a food-secure world.” FEWS NET is funded by the United States Agency for International Development (USAID) and is run by a US-contracted private firm, Chemonics International Inc. Chemonics International coordinates about 20 regional offices in sub-Saharan Africa, Central America, Haiti and
Afghanistan. The three offices in Africa are situated in Nairobi, Kenya, Ouagadougou, Burkina Faso and Pretoria, South Africa. According to USGS, beyond the three regional offices, FEWS NET supports data collection and analysis in 17 African countries, including Burkina Faso, Chad, Mali, Mauritania, Niger, Eritrea, Ethiopia, Kenya, Rwanda, Somalia, Southern Sudan, Tanzania, Malawi, Mozambique, Uganda, Zambia and Zimbabwe. According to FEW NET’s brochure, it is projected that by 2014, FEWS NET will post forecasts in 15 more countries both on site and remotely.

FEWS NET, as its name suggests, is actually a network of research organizations collecting primary data related to vulnerability information on evolving food security issues, which include climatic trend information, crop performance, and livelihood information to help create an inoculative early response by authorities based on this famine-vulnerability information so as to avoid escalation to a famine; basically, it highlights vulnerability so as to arrest the underlying causes of food insecurity. Therefore, the paradigm of FEWS NET is an ongoing use of a host of communicators and decision support products to forge a culture of investigation and preemptive action nested inside information consensus and policy-useful information on the integrated analysis of livelihoods, household vulnerability, nutrition, trade, and climate change. This information, therefore, goes beyond droughts, crop failure, and price shocks to the underlying causes of food insecurity so as to support international development organizations’ tackling economic and nutritional challenges among vulnerable nations/populations.

**FEWS NET affiliate/network Organizations and their unique contributions.** The research organizations that participate with FEWS NET are US government agencies through the United States Agency for International Development (USAID) as a funding organization. USAID was created under the US Foreign Assistance Act of 1961 so as to bring together several
existing foreign assistance organizations and programs in order to synchronize and manage non-military US foreign economic development programs. FEWS NET is one of the USAID-funded foreign missions working with four other US agencies. These agencies include The United States Geological Survey (USGS), the National Aeronautics and Space Administration (NASA), the National Oceanographic and Atmospheric Administration (NOAA), and the United States Department of Agriculture (USDA).

The USGS is a source for earth and environment data. A division of USGS’s international programs hosts the FEWS NET program headed by James Rowland, whose main goal is to identify problems in the food supply system using earth and environment data. USGS provides four distinct services, including: (a) Data and image processing support, such as remote sensing, image processing, interpretation and GIS analysis. This data is available in NDVI (derived normalized difference vegetation index) and AVHRR (Advanced Very High Resolution Radiometer) indexes; (b) Agro-meteorological product development such as rainfall estimates and crop-specific water requirement satisfaction index modeling (WRSI) and yield assessments; (c) Spatial data modeling and forecasting using a stream flow model that estimates flood risk and preparation; and (d) Data archiving and dissemination service through the Africa Data Dissemination service (ADDS) server.

NASA’s contribution to FEWS NET is that it provides direct collaboration in Geospatial Information Systems (GIS) through two partnerships, including SERVIR and LAUNCH. According to the USAID website, SERVIR is an initiative that applies earth observations and predictive models to support decision-making by stakeholders, while LAUNCH’s goal is to identify and support creative technologies and other solutions that address global sustainability problems. According to the NASA website, the SERVIR lab is equipped with an earth-observing
camera called the ISERV visualization system. The SERVIR initiative integrates satellite observations, ground-based data and forecast models to monitor and forecast environmental changes so as to improve disaster response. Among other SERVIR coordination offices for prototyping is the Regional Center for Mapping of Resources for Development (RCMRD) located in Nairobi. Below are two NASA technology images that mapped the 2009 drought:

Figure 1. Normalized Difference Vegetation Index during the drought of 2009

The National Oceanic and Atmospheric Administration (NOAA) is a US federal agency focused on the condition of the oceans and the atmosphere. NOAA’s contribution to FEWS NET comes through their Climate Prediction Center (CPC), which works to support African meteorological products for the FEWS NET project. According to the NOAA website, the CPC provides accumulated real-time precipitation estimates archived and distributed through USGS from the Earth Observation System’s (EROS) data center. Along with prediction, they have maintained climatic monitoring and compiled diagnostic products since 1988. As such, there is now useful climatology available to compare current conditions with the norm. The NOAA website documents that the CPC - FEWS NET team recently implemented GIS routines into their
operational and archiving processes, including ten-day rainfall estimates, one-day rainfall estimates, the Africa Hazards assessments, weekly weather summaries, the Africa inter-tropical convergence zone monitoring and the FEWS NET technical presentations.

Similarly, the United States Department of Agriculture (USDA) cooperates with the Climate Prediction Center (CPC) to operate the Joint Agricultural Weather Facility to provide advisory and information services on weather and climate in agriculture. The USDA website states that its mission is to provide leadership on food, agriculture, natural resources, rural development, nutrition, policy and management through its sub-agencies, one being the Foreign Agricultural Service (FAS) agency that co-ordinates USDA’s FEWS NET technical contributions. According to Peter Ewell, the regional agricultural advisor for USAID/East Africa, the Office of Food for Peace and the Office of Foreign Disaster Assistance (OFDA), both USAID agencies, are linked to the famine-prevention activities of FEWS NET.

Figure 2. Kenya’s breadbasket NDVI-MODIS anomaly

Source: FEWS NET through USDA/NASA NDVI modeling on the drought of 2009 in Kenya

The four agencies described above (USGS, NASA, NOAA, and USDA) have highly complex and specialized information and internal year-round programs, which would be hard to
harness without professional organization of the information and activities regarding the famine mitigation purposes of FEWS NET. As such, Chemonics International, Inc., a private consultancy firm, manages the information use and all the activities of FEWS NET through a legal Indefinite Quantity Contract (IQC) agreement. According to the US General Service Administration (GSA) website, the IQC contract type is often used for service contracts to provide for an indefinite quantity of services for a fixed time. The IQC is used when the GSA cannot determine a specified minimum on the precise quantities of supplies or services that the government will require during the contract period. Thus, according to a USAID quarterly administrative and financial progress report (2009) on FEWS NET, its IQC is a five-year USAID-financed activity awarded on September 29, 2005 to the Chemonics International Consortium, and consists of The Food Economy Group (FEG), Intana International, Michigan State University (MSU), and WebFirst Inc. The current IQC encompasses a five-year activity period (2012-2016), whose goal is to link up with international, regional, and national partners (such as KFSSG) so as to provide timely and rigorous early warning and analysis of potential, emerging, and evolving food security issues, and to drive the appropriate humanitarian responses. The project covers 36 countries, with plans to expand over the coming four years. The current FEWS NET website cites the partners mentioned as currently helping coordinate the activities of FEWS NET. The Chemonics International Consortium serves in many countries and offers professional services and technical support work. They offer expertise in program design and implementation, measuring and evaluation, and knowledge management and communications, for development.

Further, the Food Economy Group (FEG) is a secondary implementing partner of FEWNET in that FEWS NET uses FEG’s Household Economy Analysis (HEA) index. FEG is a
private, women-owned, limited liability international consulting group in the United States. FEG is an important source in livelihood-based food security information systems, policy analysis and complex-process facilitation services, which contributes to the efforts of a broad range of decision-makers in the humanitarian and development community. The FEG model aims to support livelihoods and reduce poverty by linking decision-makers to relevant and actionable information in the form of food security early warning system design, so as to facilitate project monitoring and evaluation and policy advising.

One of FEG’s central products is the Household Economy Analysis (HEA) index, a unique livelihood-based framework designed to provide a clear and accurate representation of the inside workings of household economies on different levels of a wealth continuum. The HEA is used for developing, planning, emergency response, early warning, monitoring and evaluation, poverty analysis and reduction, and policy analysis.

Figure 3. FEG’s HEA index formulae Chart. Source: (Carroll, ed., 2008)

The HEA has been used for over 15 years in developing countries across sub-Saharan Africa, Central America, the Balkans and Asia. The HEA’s conceptual framework for comparative
assessment of predicted needs across a region is illustrated as follows: Baseline + Hazard + Response = Outcome (Carroll, J. (ed.), 2008) (see model above).

A central strength of FEG’s unique contribution is their systems-based approach that blends well with FEWS NET’s programs, well-articulated in the guide to planners’ book as:

HEA is system-based rather than correlative to find relationships between selected indicators but rather aims to build up a holistic picture of livelihoods. This means that each piece of information gathered has to make sense in relation to the rest. (Carroll, J., 2008)

The Center for International Agriculture at Michigan State University’s (MSU) Institute of International Agriculture (IIA) was established on the campus of MSU in 1965. The IIA has been involved in development assistance programs towards food security through the coordination of agricultural research, outreach, and training in developing nations in Asia, Africa, Latin America and the Caribbean. The MSU’s IIA program has four main projects: (a) Biotechnology, (b) Food Industry Development, (c) Institution Building, and (d) Natural Resource Management and Crisis Response. The MSU Center for International Agriculture is linked to FEWS NET through the Natural Resource Management and Crisis Response project, in which the IIA also participates, a USAID-funded activity that collaborates with international, national, and regional partners to provide timely and rigorous early warning and vulnerability information on emerging or evolving food security issues.

According to the Webfirst website, WebFirst subcontracts with Chemonics on the FEWS NET Project to improve the efficiency of its workflow processes. The earlier workflow was both expensive and time-consuming as the timeline for reviewing and publishing their reports was between five and ten days. In addition, it relied on a static website and paper-based systems that
required up to eight people to review and disseminate monthly reports to thousands of subscribers worldwide, including the targeted decision-makers in Africa. The main problem was that the delay in information relaying was up to ten days, which had dire consequences for those in Africa who depended on the timely delivery of the information for action in famine mitigation.

Thankfully, WebFirst’s latest version of the FEWS NET software incorporates a brand new approach to the country program centers, including a public site which uses ESRI GIS products both in the field and on the web server. The new software uses the ArcGIS Server Advanced Enterprise w/MS SQL 2005, which uses Webfirst’s custom geospatial database (combining UN data sets with FEWS NET’s own lat/long spatial references and polygons) in order to create the maps for FEWS NET countries’ forecasts. This way, FEWS NET is now able to allow USAID mission specialists in the field to overlay weather and hazard information onto the maps and to cross-register critical information from multiple sources (weather, vegetation index, and geography). In this way, the staff and other policy-makers are able to make critical decisions about where to send famine relief, humanitarian aid, and other logistics in a timely manner.

**The FEWS NET approach.** FEWS NET activity, as described above, is a set of integrated activities that provide early warning of environmental and socio-economic hazards, as well as the monitoring and assessment of current food security conditions and a population’s current or future vulnerability to food insecurity. The goal of this activity is to help prevent food insecurity and famine. (FEWS NET Quarterly Administrative and Financial Report, 2012).

According to the FEWS NET brochure, their approach to FEWI is to provide objective, evidence-based analysis with *collaborative* efforts by a technical team in Washington, D.C., FEWS NET field staff, US government agencies, national government ministries, and international partners so as to collect data and produce objective, forward-looking analyses on
more than thirty of the world’s most food-insecure countries by using scenario developments to forecast likely food security outcomes six to twelve months in advance.

According to the World Food Summit document on FEWS NET, available on the USDA’s FAS homepage (dated June 12, 2012), FEWS NET is a specialized information network based in developing countries to combat chronic food insecurity, and which applies ten main principles in its approach: (a) Focus on investments primarily in countries where there is a political commitment to prevent famine (Kenya through KFFSG demonstrates political will for famine mitigation), (b) Invest in the professional development of local food security experts committed to objective analysis, (c) Build information networks around complementary needs, strengths, and mutually beneficial partnerships, (d) Commit to a long-term partnership, initially between USAID and the country at risk so that institutional memory is created about how best to link information to actions that prevent famine (FEWS NET – KFSSG partnership with each other and other firms), (e) Build partnerships based on trust, professionalism and open communication, (f) Facilitate joint assessments and reporting to promote consensus about emerging food security problems, (g) Identify and promote sustainable information-sharing processes that allow key information users and providers to become familiar with and effectively use the information products, (h) Promote transparency about the data and methodologies used to conduct analyses, (i) Use clear non-technical jargon that can be widely understood within the user community, and (j) Judge success based on evidence that information prompts correct and timely action.

These ten approaches highlighted above are related to collaboration and strong expert and information networks, which helps to focus FEWS NET’s activities in strengthening national and regional capacities for early warning and response planning, and increasing the usefulness of
information for decision-makers. Therefore, there is improvement in the appropriateness of responses to food security-related issues through a better understanding of, and improving the timeliness of, response to food insecurity. This includes fostering early policy action and improving local monitoring and analysis. These ten approaches are nested inside FEWS NET’s four principle objectives listed in the FEWS NET website: (a) to continue the production of high quality strategic early warning information, (b) to emphasize developing sustainable networks, (c) to emphasize policy-useful information and (d) to continue innovation in analytical tools and methods.

**FEWS NET communications and decision support products.** This research takes into consideration decision support in FEWS goals towards food security in a region supporting continuous harvests, storage, and food distribution and management modeling. FEWS NET uses five communications and decision support products to help decision-makers act to mitigate food insecurity: (a) reporting products, (b) livelihood products, (c) agro-climatic monitoring maps, (d) data, and (e) satellite imagery.

The *reporting products*, or communications products, are the information services that interpret the data into the derived framework of early famine warning information. This means that the data collected may have been for any of the above reasons and contexts, and the information services make sense of the information, thus serving a famine mitigation purpose. The reporting products further include a suite of ten traditional communication tools, including: (a) monthly food security updates with projected conditions and implications, (b) one-page alert statements, which are issued when a crisis is emerging and early action is intended, (c) a two-page food assistance outlook brief, (d) NOAA weather hazard impact assessments, (e) cross-border trade reports (specialized reports), (f) special reports (specialized reports), (g) reports and
studies (specialized reports), (h) market reviews (specialized reports), (i) WRSI reports (specialized reports), and (j) rain watches (specialized reports).

FEWS NET also utilizes social media communications, including Twitter @FEWS NET (currently with 461 followers as of November, 2013), and Facebook (currently with 78 likes as of November, 2013). Since the Facebook account was set up as recently as August 10, 2012, its “membership” is expected to grow as more people become aware of its activities and reports via social media.

Secondly, livelihood products link FEWS NET’s work to the local government work in defining livelihood indicators that may affect food security. According to FEWS NET, there are two livelihood products; the livelihood zone profile and the livelihood baseline. Third, the agro-climatic monitoring maps are mainly derived from FEWS NET’s main implementing partner, the USGS. Fourth, data are closely related to the livelihood model, and is closely related to local administrative reporting. It includes data on prices and production. In Kenya, the Kenya Food Security Steering Group provides much of the data useful to supply FEWS NET with. Finally, satellite imagery is also from one of FEW NET’s main implementing partners, the NOAA.

FEWS NET describes the severity of food insecurity using the Integrated Food Security Phase Classification version 2.0 (IPC 2.0) scale in classifying food security and decision-making in FEWS. According to their brochure and staff interviewed, FEWS NET pursues their goal of objective evidence-based analysis through collaboration and transparency by publishing all their findings and products on their website [- www.fews.net].

**Co-ordination-Implementer network: Kenya Food Security Steering Group**

The Kenya Food Security Steering group (KFSSG) is a robust organization nested inside the Ministry of Agriculture in Kenya and is dedicated to famine mitigation and sustainable food
security. The KFSSG is a sub-committee of the Kenya Food Security Meeting (KFSM) and is made up of representatives from the Kenyan Government (GoK) led by the National Drought Management Authority of Kenya (NDMA), UN agencies, NGO’s and other involved donors.

According to Gary Eilerts, FEWS NET’s Program Manager at USAID, KFSSG demonstrates the best national example of collaboration towards famine mitigation programs with government support in the Horn of Africa region. Eilerts hopes that this example of collaboration and networking will inform further examples of effective national, organizational and individual collaboration towards food security. The KFSSG provides an exhaustive country implementation program advocated by research by FEWS NET to both draw from and feed into the famine mitigation main decision-making committee that comprises KFSSG.

According to Mr. James Oduor, the CEO of NDMA, FEWS NET helps support KFSSG with vital technical knowledge in areas such as remote sensing data, GIS, mapping, relevant computer applications, along with other food security monitoring technical expertise. Although FEWS NET is a major technical partner of KFSSG, it does not support KFSSG with any direct funding. However, in the past FEWS NET has paid directly for technical capacity building activities of KFSSG. FEWS NET may finance on occasion when such capacity building is necessary.

The National Drought Management Authority of Kenya (NDMA) is the secretariat to KFSSG, hence its convener. The KFSSG chairmanship is FAO, WFP and was co-chaired by Ministry of Special Programs (MoSP) in Kenya when it existed; it is now a directorate under the Ministry of Devolution and Planning (Mr. Micheni, NDMA). NDMA has a huge role of coordinating KFSSG activities and even financial support. Mr. Micheni emphasizes that the focus is on drought management and not famine mitigation. The difference is that famine tends
to be a more extreme status of deficiency which is effectively mitigated by proper drought management.

According to Mr. James Oduor, the CEO of NDMA, membership of KFSSG is based on technical knowledge possessed by any organization joining KFSSG. KFSSG is only open to those stakeholders proven to have some technical capabilities that can help members of KFSSG. According to the KFSSG website (http://www.kenyafoodsecurity.org/), there is a strict criterion for maintaining membership in the KFSSG network of collaborating organizations, which includes a demonstrated commitment to the collaborative multi-agency approach to food security and drought management, as well as competence and capability in the area of food security and drought management in keeping with the standards of the KFSSG. KFSSG operates on a multi-agency basis with the Government of Kenya’s leadership. KFSSG’s organizational structure is shown in the organogram below illustrating current national level food security and drought management institutional linkages.

The KFSSG Website, http://www.kenyafoodsecurity.org, was developed in collaboration with KFSM (Kenya Food Security Meeting) members facilitated by FAO with funding from the Swedish Government in May 2007 (KFSSG, way-back internet archive).

The ongoing research and climatic and livelihood research by the USAID-funded FEWS NETS program since 1985 has influenced the already-existing Food Security Meeting (KFSM), the local government-based food security initiative by the Government of Kenya (GoK). Therefore, in June 1999, the Inter-Ministerial Committee on Drought and Food Security (IMCDFS) was formed to carry out research reminiscent of FEWS NET’s famine information for the early detection and warning of famine conditions. The research findings led to an evolutionary process leading to greater collaboration and joint activity that included many other
players and led to the establishment of the Kenya Food Security Information Steering Group (KFSISG). However, the KFSISG changed its name to the current Kenya Food Security Steering Group (KFSSG) because of the growing emphasis beyond information to a coordinated response towards effective famine mitigation. The organizational structures are illustrated in figure 3.

Fig. 4: The Kenya Food Security Steering group organizational set up.

Source: Kenyafoodsecurity.org

The current study seeks to discover practical nodes/agencies and co-agencies and strength and functional relations in the FEWIS community, benefitting from the collaborative nature of FEWS NET- KFSSG. KFSSG, through its strong and successful culture of voluntary and professional collaboration towards food insecurity mitigation, provides an ideal local government response to the predictive work of FEWS NET as a local mobilizer and planning for the implementation of the FEWIS information generated by FEWNET’s network of organizations (Eilerts, Jan, 2012).

**KFSSG roles and responsibilities.** The KFSSG was formed and charged with the responsibility of geographical food aid targeting decisions. The next step in the chain was a
consultancy on the same refinement of the system of food aid distribution and targeting. It was organic of their responsibilities to source technical partnerships as an essential part of their effort. The essence of collaboration and working together is to accurately present facts on the conditions with as wide a perspective as is practically possible.

The key non-governmental partners among other NGO’s positively contributing to KFSSG serving its food-targeting role effectively include the Food and Agriculture Organization of the United Nations (FAO) and the World Food Program (WFP). According to Mr. Oduor, the role of WFP is technical in areas such as vulnerability assessment mapping, food security assessments, food aid issues and some food security-related computer programming. The role of WFP is therefore to support KFSSG in these areas and also provide capacity building to KFSSG in the same areas. The role of FAO is also technical as it supports and provides capacity building to KFSSG in area such as crops statistics, food security definitions, and food insecurity severity classification using Integrated Food Security classification approach, among other contributions in its specialization.

In this way the organizational, collaborative and emergent associations form a concrete “food aid community,” which provides leadership towards driving discussion on food entitlement and which serves the crucial role of maintaining perspectives and translating them into efforts towards food security. This research looks at these associations and their commitment to the sustainable food framework at all levels, and to determine if they are conducive to famine mitigation efficiency, which is the goal of both organizational players, FEWS NET and KFSSG. Below is an example of a food security outlook map used by KFSSG and sourced from FEWS NET.
Figure 5 shows a growing severity map provided by KFSSG in September 2010. This was Kenya’s food security outlook when the Horn of Africa famine was first reported in 2010/2011. A famine was officially declared in July 2011. Source: KFSSG

The KFSSG and its network organizations. According to the KFSSG website (http://www.kenyafoodsecurity.org/), there is a strict criterion for selecting and reselecting agencies/departments to participate in the KFSSG so as to ensure maximum efficiency, technical capacity and overall effectiveness of the body. The two-fold criterion states that the organization(s) must: (a) have demonstrated a clear commitment to the collaborative multi-agency approach to food security and drought management; and (b) possess capabilities in the
area of food security and drought management, be they technical, administrative, or policy-related, in keeping with the standards of the KFSSG. (Source: KFSSG Website)

The KFSSG currently has 12 member organizations and seven sub-unit members. These members serve the Kenya Food Security Steering Group (KFSSG), and they fall under: (i) Government of Kenya (GoK), (ii) United Nations (UN), (iii) Non-Governmental Organizations (NGOs) and (iv) the District Steering Groups (DSGs). Below is the full list of the members:

Table 1. Kenya Food Security Steering Group Member List 2012. Source: KFSSG website

<table>
<thead>
<tr>
<th>Organization/Department</th>
<th>No. of Participants</th>
<th>KFSSG Sub-unit Members (technical wing)</th>
<th>Organization/Department</th>
<th>Representatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>1x Coordinator, 1x Technical Analyst - full time staff members</td>
<td>2</td>
<td>Technical Analyst (permanent staff)</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Disaster and Emergency Response Coordination Department</td>
<td>1</td>
<td>ALRMP</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>ALRMP</td>
<td>1</td>
<td>MoA (Crops Division-EWS)</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>MoA</td>
<td>1</td>
<td>USAID/FEWS</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>MoH</td>
<td>1</td>
<td>WFP-VAM</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Dept of Social Welfare/Poverty Eradication</td>
<td></td>
<td>UNICEF</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>UNICEF</td>
<td>1</td>
<td>SCF-Kenya</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>WFP/VAM</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DFID/EC</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>USAID/FEWS</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OXFAM –GB</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MSF-SPAIN</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 2. KFSSG Committee composition. Source: NDMA list, 2013.

<table>
<thead>
<tr>
<th>Organization sitting at the KFSSG Committee</th>
<th>Estimated number of Current Representatives in the KFSSG Committee per contributing organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACF – USA</td>
<td>2</td>
</tr>
<tr>
<td>ACSCU</td>
<td>1</td>
</tr>
<tr>
<td>FAO</td>
<td>4</td>
</tr>
<tr>
<td>FEWSNET</td>
<td>1</td>
</tr>
<tr>
<td>Kenya Meteorology Dept</td>
<td>3</td>
</tr>
<tr>
<td>KRDP-ASAL DM</td>
<td>2</td>
</tr>
<tr>
<td>Ministry of Agriculture</td>
<td>4</td>
</tr>
<tr>
<td>Ministry of Education</td>
<td>3</td>
</tr>
<tr>
<td>Ministry of Livestock (Markets)</td>
<td>1</td>
</tr>
<tr>
<td>Ministry of Livestock (Production)</td>
<td>1</td>
</tr>
<tr>
<td>Ministry Of Livestock (Veterinary)</td>
<td>2</td>
</tr>
<tr>
<td>Ministry of Special Programmes</td>
<td>3</td>
</tr>
<tr>
<td>Ministry of Water</td>
<td>1</td>
</tr>
<tr>
<td>MoMS</td>
<td>1</td>
</tr>
<tr>
<td>MoPHS</td>
<td>1</td>
</tr>
<tr>
<td>NDMA</td>
<td>5</td>
</tr>
<tr>
<td>UNDP</td>
<td>1</td>
</tr>
<tr>
<td>UNICEF</td>
<td>2</td>
</tr>
<tr>
<td>UNOCHA</td>
<td>1</td>
</tr>
<tr>
<td>WFP</td>
<td>4</td>
</tr>
<tr>
<td>WFP_VAM 2</td>
<td>2</td>
</tr>
<tr>
<td>World Vision</td>
<td>1</td>
</tr>
</tbody>
</table>

Note: Composition may change with need or circumstance.

**KFSSG communication products.** In keeping with its mission to marshal an effective national food security program, KFSSG has an evolving range of information products that demonstrate both its collaborative multi-agency approach to food security and drought management programs. This is aimed at tabling reliable geographical food-aid-targeting
decisions for the government and to provide effective administrative, policy and proactive food
security actions to serve the people of Kenya.

KFSSG utilizes a range of five (5) communication products, including: (a) Website -
http://www.kenyafoodsecurity.org/, (b) Assessment reports including i) The Long Rains Report
and ii) The Short Rains Report, (c) Food security analysis by livelihood cluster (five clusters)
including the cash-for-assets program carried out by the District Steering Group (DSG), (d)
Sector working group reports, and (e) Food security profiles (for all seven regions).

The KFSSG website, http://www.kenyafoodsecurity.org, was developed in collaboration
with KFSM (Kenya Food Security Meeting) members facilitated by the FAO with funding from
the Swedish Government, in May 2007 (Wayback Machine). The current modern form of the
website was initiated in 2012. The website serves as the main outlet of the KFSSG’s reports in
their various forms, although they are also made available to stakeholders directly. The
assessment reports including the Long Rains Report and the Short Rains Reports form the
backbone of KFSSG regular seasonal reports on the food security situation in the country.

The Long Rains Reports were last uploaded in 2011 and included, among other aspects,
reports from 28 individual districts. Each report includes the history of relief operations in the
district, the food security trends and the current factors affecting them, as well as both food and
non-food interventions. The reports also detail the food security trends and the current factors
affecting them, which include such considerations as; crop production, rain-fed crop
performance, irrigation-fed crop performance, grain stocks, livestock production, pasture and
browsing, milk availability and consumption, livestock diseases and mortalities, livestock
movement and migration, water, sanitation and hygiene, population, health and nutrition
conditions, birth rates, trekking distance to watering points, water and food prices, morbidity and
mortality patterns, immunization and vitamin A supplementation, education, market performance and operations, terms of trade, coping mechanisms and recommendations on monitoring required, and food and non-food interventions required.

The Short Rains Assessment Reports are current and carry information from 2010, 2011, up to February 2013. Just like the Long Rains Reports, the Short Rains Reports are presented in individual districts’ copies. The reports are issued periodically and cover a wide range of food security geographical situations, including the area satellite map with livelihood zones as provided by FEWS NET, climatic conditions, trade and livelihood information. The multi-agency input is reflected in the detailed presentation of the different areas concerned. For instance, the 2013 Short Rains Assessment Report issued in February 2013 was jointly issued as a collaborative report by the Kenya Food Security Steering Group, the office of the President, the office of the Prime Minister, ministries of state for development of northern Kenya and other arid lands, agriculture, livestock development, fisheries development, water and irrigation, public health and sanitation, medical services and education, the national drought management authority, WFP/VAM, FEWS NET, FAO, CARE-Kenya, UNICEF, OCHA, Oxfam GB, UNDP, and World-Vision. The report had financial support from the Government of Kenya, the FAO and WFP.

Similarly, the Food Security Cluster Livelihood Zone report incorporates five (5) clusters which cover the entire country, including: (a) the northwest pastoral livelihood cluster – the livelihood zone, covering 173,876 km² of land with 1.3 m people, is situated in Turkana, Marsabit, Moyale and Samburu, (b) the eastern pastoral livelihood cluster – the zone covers 190,753 km² with 1.8 million people, and is situated in Mandera, Garissa, Wajir, Tana River, Isiolo and Ijara districts; (c) the agro pastoral livelihood cluster – the zone covers 68,820 Km²
with 2,908,040 people in Kajiado, Narok, West Pokot, Baringo, Laikipia, Koibatek and Nyeri (Kieni East and West) districts; (d) the south-eastern marginal agriculture cluster - 52,000 km² with 4.1 million people situated in Kitui, Machakos, Makueni, Mbeere, Meru North, Mwingi and Tharaka districts and (e) coastal marginal agricultural livelihood cluster – the zone covers 48,000 km² with 2.3 million people and is situated in Kwale, Malindi, Kilifi Taita Taveta and Lamu districts.

Next, the sector working group reports offer an insight into the working sectors contributing to the KFSSG comprehensive report on livelihood and health and nutrition status. These sectors are: (a) agriculture and livestock, (b) health and nutrition, (c) disaster management, (d) education, and (e) water and sanitation. The mission of each of these four sectors is to guide and coordinate the activities of members in each specific sector with the aim of improving their overall food security contribution in the context of sector-specific rapid/disaster response planning and coordination for the benefit of the Kenyan people.

Next are the food security profiles for all seven traditional regions. Note that since the new 2010 Constitution was implemented in the 2013 general elections, the main regions were changed from previous reference as “provinces,” to the current term “regions.” The “regions” described by KFSSG include Central, Eastern, Rift Valley, Western, Coast, Northeastern, and Nyanza provinces. Each food security profile is generously detailed with each region’s food security statistics, climatic and livelihood socio-economic information, along with current development initiatives and their impact on food security. These profiles are an important backdrop to the seasonal rains reports and the cluster reports.

Finally, the “Cash for Assets” (CFA) program also known as the “Food for Assets” (FFA) or “Food for work” (FFW) program, is a productive safety net project carried out by the
specific District Steering Group (DSG) and is a KFSSG-associated program run by the Government of Kenya and the World Food Program (WFP). The similar but slightly different incentive for involvement (cash, food or assets) provides a productive safety net for food insecure communities which receive food or cash support as an incentive to work on household or community assets/projects that improve their resilience to common shocks/hazards such as droughts and floods, including climate change adaptation. The (FFA)/(CFA) approach has been used to help improve food security through the improvement of crop and livestock production, and livelihood and infrastructure in the Arid and Semi-Arid Lands (ASALs) of Kenya. The Government of Kenya website records that the program saw successful Food for Work Programs under the Kenya Emergency Operation Program (EMOP) in 2000-2002 and 2004-2009 at the Kenya Refugee Program Host project in Kakuma, as well as Disaster Preparedness Facility activities. As a communications program, the CFA program offers nonverbal expectancy communications theory to communicate action and relief and helps to build lasting community-based institutions to help boost sustainable food security in the regions.

**Example of use of multi-agency communication products in the 2010/11 famine.** The collaborative multi-agency approach to food security and drought management programs aimed at tabling reliable geographical food-aid-targeting decisions was witnessed at the 2010/11 Horn of Africa famine crisis from the events leading to a declaration of a famine crisis to the execution of food-aid and famine management in its entirety. The multi-agency cooperation is emulated by the KFSSG with participation of its members in decisions towards famine mitigation as well as cooperative participation.

Here FEWS NET, working with the Food Security and Nutrition Analysis Unit (FSNAU), which is Somali-focused, issued early warning products and briefings covering
Somalia in the 11 months leading up to the June 20, 2011 famine declaration. They did 25 briefings which addressed the developing crisis in the eastern Horn, and shared with donors, UN agencies, and other partners by FEWS NET and FSNAU between August 2010 and the July 20th 2011, famine declaration. (See detailed reports log in Appendix C). These communication products were in addition to regular monthly reporting by FEWS NET and FSNAU. (C. Schaeffer, personal communication, January 9, 2012).

Figure 6. Decisions towards the 2010-11 Horn of Africa famine: crisis declaration
I constructed the model above to capture the decision-support process from famine forecasting to eventual famine declaration, including the communication machinery and commitment dynamics of the stakeholders in the process.

The *Network* Nature of FEWS NET & KFSSG Organizations’ Collaborative Work

The ontological arrangement and management of FEWS NET as a *NETWORK* inspires this study. According to the FEWS NET website, the main focus of FEWS NET is to provide timely and rigorous early warning of and vulnerability information on emerging and evolving food security issues. Towards this end, FEWS NET’s functioning is mainly collaboration between networks of: (a) implementing partners’ (Intrinsic networks), (b) local/governmental food security institutions (Contextual networks), and (c) other peer-institutions in food security, early-warning and relief non-governmental bodies (adjacent networks).

(a) FEW NET’s five “Implementing partners” (intrinsic networks). FEWS NET is a part of the USAID mission in coordinating foreign assistance. As such, four of the five main intrinsic knowledge bodies whom they refer to as “Implementing partners” are US Government agencies including: The United States Geological Survey (USGS), The National Aeronautics and Space Administration (NASA), The National Oceanographic and Atmospheric Administration (NOAA), and the United States Department of Agriculture (USDA). The implementing partners’ eclectic input is coordinated by a fifth implementing partner, a contracted private research firm, Chemonics International, which runs the FEWS NET activities. We refer to the five implementing partners as “intrinsic networks” as they form the foundation of who FEWS NET is, as an informational society.

Chemonics International incorporates the resource input by the other implementing partners, including USGS, NASA, NOAA and USDA. The USGS project at FEWS NET
provides access to geo-spatial data, satellite image products, and derived data products in support of FEWS NET’s monitoring needs throughout the world as part of the early warning and environmental monitoring program at the USGS Earth Resources Observation and Science (EROS) Center. The EROS Center provides technical support services to FEWS NET in the use of remote sensing and Geographic Information System (GIS) technologies. According to the USGS website, EROS develops and provides specialized processing, modeling, and analyses to support FEWS NET activities, while providing long-term data archive and distribution services for remotely-sensed FEWS NET data.

According to James Rowland, the FEWS NET liaison at USGS, the USGS project at FEWS NET strives to present comprehensive climate analysis and prediction scenarios running 3 (three) to 6 (six) months in advance (Rowland, J. USGS, phone conference, September 14, 2011), and utilizes, among others, four main software in their data services for FEWI including: (a) the Early Warning Explorer (EWX) software, (b) the Geospatial Water Requirement Satisfaction Index (GeoWRSI), (c) the Decision Support Interface (DSI) software, and (d) the Geospatial Stream Flow Model (GeoSFM) software.

These agro-climatic monitoring services are offered through The Early Warning and Environmental Monitoring (EWEM) program that encompasses a broad spectrum of scientific endeavors operating on national, regional, and international scales. FEWS NET is one of seven EWEM projects, which include: (a) Afghanistan project, (b) Famine Early Warning Systems Network (FEWS NET) project, (c) US Evapo-transpiration Modeling (Water Balance Model - Energy Balance Model), (d) NASA Livestock Early Warning System (NASA LEWS), (e) phenology / Drought Monitoring, (f) Solar & Wind Energy Resource Assessment (SWERA) and
(g) the United Nations Environment Program (UNEP), along with the Hydrological data and maps based on Shuttle Elevation Derivatives at multiple Scales (HydroSHEDS) project.

The National Aeronautics and Space Administration (NASA) provides the Normalized Difference Vegetation Index (NDVI) image data as well as indicators of the vigor and density of vegetation on the ground through the Water Requirements Satisfaction Index (WRSI).

The National Oceanic and Atmospheric Administration (NOAA) provides the Meteosat image data used to estimate rainfall amounts in Africa, and ensures, in collaboration with USGS, that Weather Hazards Impact Assessments are made and Rain Watches reported. The African Desk was established at the Climate Prediction Center in 1994 and expanded in 2006 as part of the US contributions to the WMO Voluntary Cooperation Program (VCP). The African Desk provides access to weather and climate data and products and conducts in-house professional development training for African professionals.

According to Linda C. Habenstreit, the Public Affairs Specialist The United States Department of Agriculture (USDA) manages two food aid programs: Food for Progress and the McGovern-Dole International Food for Education and Child Nutrition Program, which support agricultural development and school feeding respectively. These programs are administered by the Foreign Agricultural Service (FAS - http://www.fas.usda.gov/food-aid.asp). The Food for Progress and McGovern-Dole Programs help prevent famine situations from occurring, but they are not used for emergency relief. The FEWS NET’s parent agency, the US Agency for International Development (USAID), administers the Food for Peace Program, which provides U.S. government emergency relief. USDA and USAID recently submitted the U.S. International Food Assistance Report 2010 to the US Congress, which contained reports on the Food Assistance Outlook Briefing, which provides warning of potential food assistance needs six
months in advance. The report also contained information about USAID's expanded use of the pre-positioning food aid commodities and provided details about USAID work with FEWS NET in famine mitigation.

In June 2011, G20 agriculture ministers met in Paris to discuss food price volatility and food security. After the meeting, US Agriculture Secretary Tom Vilsack acknowledged the need for participation in global agricultural monitoring systems and early warning systems (FEWIS) so as to improve crop production projections and weather forecasting. He also emphasized the need for collaboration with other international organizations to create links/networks among existing global, regional and national systems. This way, according to Vilsack, FEWIS systems would meet the need for market transparency with science-based rule-making systems. Thus, relations among collaborating nations and the international community will be stronger and therefore more functional. The US department of Agriculture purposefully supports establishing the groundwork for an international Agricultural Market Information System (AMIS) to mitigate food insecurity indicators by promoting a greater shared understanding of food production and price information.

USDA’s Agricultural Market Information System (AMIS) produces three reports, including: (a) a monthly publication of the World Agriculture Supply and Demand Estimates (WASDE) bulletin. (Online http://www.usda.gov/oce/commodity/wasde/), (b) a monthly commodity trade and crop production estimates stored in the USDA’s Production, Supply and Distribution (PSD) - Online on http://www.fas.usda.gov/psdonline/, and (c) a global weather and vegetation (i.e., crop production) report monitored via satellites with USDA/FAS Crop Explorer (Online http://www.pecad.fas.usda.gov/cropexplorer/).
(b) Local/governmental food security institutions (contextual networks) – KFSSG.

The local authorities/Kenyan government (GoK), KFSSG, and other non-governmental organizations such as the World Food Program (WFP) are directly responsible for food relief activities and some livelihood monitoring, while FEWS NET's roles include food security monitoring and analysis, vulnerability analysis and early warning. The GoK, WFP and FEWS NET and other collaborating organizations on famine mitigation maintain a symbiotic relationship where the food distribution heavily relies on FEW NET and KFSSG’s cumulative reporting on potential food insecurity conditions.

Figure 7. FEWNET/ KFSSG Network levels

(c) Peer-institutions in food security, early-warning and relief (adjacent networks). FEWS NET operates and is clearly influenced by its alliance with peer organizations both formally and informally. FEWS NET professionals, information and resources have been sourced from other
peer organizations. In a report comparing the regional early warning information systems during the just-ended 2010-2011 Horn of Africa famine crisis, FEWS NET was ranked top in providing highly accurate and timely FEWI information as compared to other FEWIS agencies in the Horn of Africa region, including: FSNWG, IPC, FAO’s GIEWS and WFP’s HEWS (Ververs, 2011). The KFSSG Sub-Unit Members (technical wing) constitute these adjacent networks.

Social Networks and Social Trends

The local response in Africa to challenges, including food security, is by the activation of existing organizations and the formation of new groups, social networks, to deal with the many facets of economic, cultural and political reality (Chazan et al., 1999). According to Chazan et al (1999), each group or association occupies a particular social space [original emphasis] yet at the same time interacts with other groups on both a hierarchical and lateral basis. Cultural legacies and differing manners of social and economic organization have yielded distinct patterns. This study, the focus of which is a collaborative network in Kenya, Africa to solve the problem of persistent famines, will hopefully shed further light on how social networks have influenced social trends to enhance food security.

The span of social networks is far broader than the reach of formal institutions (Chazan, 1999, p. 101). Organizations function within the cultural context of a society and are three times more likely to have long-term effectiveness when they are strongly supported by local social networks. Groups have molded a variety of means to mobilize their resources and to fulfill their aspirations culturally, so there is a need to study the possible influence and nature of these networks on the success of the diffusion processes that organizations such as FEWS NET-KFSSG embark on.
Famine Early Warning Information (FEWI) as framing

Issue frames in mass media research implies that information has been purposively organized, and that the interpretation of an issue by a particular entity, such as a social movement organization, that wishes to mobilize support conveys this interpretation to other entities, thereby hoping to guide subsequent beliefs and actions (Dardis, 2007, p. 249). The FEWS NET- KFSSG partnership can be taken as a social movement organization towards sustainable food security, thereby offering interpretations of climatic data, satellite imagery data, and livelihood data. These resources guide a myriad of influential networks, including USAID, governments, regional and other donor entities in their beliefs about the state of the drought conditions and relevant action to be taken based on the interpretations or frames provided by FEWS NET.

Just as FEWS NET serves various purposes in its interior and exterior functions, framing is a macro level and a micro level construct (Scheufele, 1999) encompassing both modes of presentation, and how people use the presentation features as they form impressions (beliefs and attitudes) and subsequent actions. How information is presented so as to reduce complexity in a way that serves existing schemas among their audiences serves macro construct framing, while micro construct framing describes audience use of these presentation features to form impressions (Scheufele & Tewksbury, 2007).

Moreover, the macro construct reduction of complexities serves as a trigger effect towards framing. According to research by the Project for Excellence in Journalism (PEJ), nearly 4 in 10 times, journalists frame a story around an explanation, a released research report, or an ongoing frame (PEJ, 1998). FEWS NET addresses both an ongoing frame of food security in previously famine-stricken regions in the Horn of Africa, as well as offering explanations from its implementing partner data-sourcing organizations, including NASA, NOAA, USGS, FAS and
Chemonics International. In addition, the representation of information from the partnering organizations is also seen as a form of website framing that can be said to create a derivative work (Lisby, 2001), as it repackages the data from the implementing partners to serve the FEWI frame.

**FEWIS decision support process in framing famine.** An important and distinctly unique process in the framing of famine is the decision support mandate of FEWI. At FEWS NET and KFSSG, decision support is both embedded in the reporting matrix of FEWS NET, as well as being spearheaded by the contextual networks, the Kenya Food Security Steering Group and partnering network organizations. This is indeed an ideal situation. FEWS NET's role in decision support is to provide timely, comprehensive and accurate food security analysis, often conducted after bi-annual national food security assessments. The information is used as input to decision-making with respect to several sectors, including Food, Health and Nutrition, Health and Sanitation, Education and Agricultural and Livestock.

FEW NET uses five communications and decision support products to help decision-makers act to mitigate food insecurity including: (a) reporting products, (b) livelihood products, (c) agro-climatic monitoring maps, (d) data, and (e) satellite imagery. The Reporting products, or Communication products, are the information services that interpret the data into the derived frame of the Early Famine Warning Information. This means that the data collected may have been for any of the reasons and contexts for collection, and these information services make sense of the information as serving a famine mitigation purpose.

Further, FEWS NET utilizes 10 reporting products including: (a) alerts, (b) food security updates, (c) food assistance outlook brief, (d) NOAA weather hazard impact assessments, (e) cross-border trade reports, (f) special reports, (g) reports and studies, (h) market reviews, (i)
WRSI reports, and (j) rain watches. FEWS NET describes the severity of food insecurity using the Integrated Food Security Phase Classification version 2.0 (IPC 2.0) scales, a standardized tool or a “common currency” for classifying food security and decision-making in FEWI.

**Purpose statement**

The purpose of this study is to examine the effectiveness of Kenya’s famine early warning information (FEWI) network from 2007 to 2013. The study assesses: (a) the strength of collaborative networks, (b) the number/types of information commitments, and (c) patterns of organizational commitment and perceived impact by stakeholders at the FEWI strategy-capacity-building-network, FEWS NET, and coordination-implementer-network, KFSSG, since 2007.

In this concurrent embedded strategy study, the FEWI social networks will be mapped using the FEWI networks and commitment survey, followed by strategic in-depth interviews which will be used to probe significant findings on the types of information commitments, networks, progress and impact of FEWI in the six-year period. The reason for using a triangulation research approach is to better achieve the research goals by converging both quantitative (broad numeric trends) and qualitative (detailed views) data (Creswell, 2009:122). The Organizational Collaboration Survey is employed to help map/visualize the various “communication and collaboration” constituted in the network against the backdrop of the detailed interviews on the impact of FEWI in the given period. The qualitative data will hopefully shed light on the emergent information commitment trends by both agencies and co-agencies stated above.
Significance of the Study

This study evaluates the role of human capital and organizational networks. These networks are nested in the technology-supported commitment to famine early warning information (FEWI) by both agency and co-agency groups in realizing the food security forward-planning vision of FEWI. As such, three unique historical socio-cultural constructs set the backdrop for this study and make up its essence: information age problem-solution ideals, the role of networks in communication and collaboration whereby the FEWS NET foundations have an effect on decision-support, and FEW Net’s 25th anniversary.

First, the need to focus attention on the food insecurity pointers in a pre-emptive way is seen as an information problem. As such, the launch of a comprehensive information-driven network is a problem-solution function that directly linked the problems of persistent famines in Africa to solutions to be found in persistent information monitoring, interpretation and recommended solutions. This is one among the three ways of assessing the functions of the current “information age,” including the problem-solution perspective, making sense, and information foraging (Spink & Cole, 2006). The main movers of FEWS NET are USAID, along with the decision-makers in the regions, including governments, relief organizations and non-governmental organizations. FEWSNET provides a comprehensive information resource that supports decisions for resource mobilization and famine mitigation. The main audience’s emergent attitudes and beliefs about strategies for action are based on strategic, specific food security update and media coverage which serve to assess the extrinsic functions of FEWS NET-Kenya. Gorke & School (2006) state that the constitution of a social system, in our case FEWS NET, can be understood as the reduction of external complexity, with a corresponding internal complexity, so as to solve particular social and societal problems which have led to the
constitution of the system. The question is whether the FEWI information managed by FEWS NET has served to solve the famine mitigation problem at least on some levels in guiding decision-makers’ actions (see research questions).

Secondly, within the intrinsic make-up of FEWS NET, the Famine Early Warning Systems Network, as well the main national food security body, the Kenya Food Security Steering Group (KFSSG), is the notion of networks, collaboration and co-ordination among stakeholders in information-sharing, harmonized action-plans towards the mitigation of famine effects in Kenya, and action towards sustainable food security in the country. This research seeks to map out the socio-metric underpinnings in FEWS NET that will essentially reveal the internal structural functioning of FEWS NET as a Luhmannian system (Gorke & School, 2006, p. 646). The socio-networks and linkages, which form the FEWI system both serve to obtain and process information within the system for framing anti-famine rhetoric, therefore forming the FEWS NET foundations, which affect decision-support towards famine mitigation.

Finally, FEWS NET’s 25th anniversary was in 2011, and it coincided with the 2011 droughts in the Horn of Africa, the worst in 60 years. This necessitates a study of FEWS NET’s role in defining both the ecological situations and actions leading to the current status of food security outlooks in Kenya and the Horn of Africa region and why these information efforts did not prevent the 2011 drought. An initial assessment based on the opinion of FEWS NET staff member Gary Eilerts, the Horn of Africa drought would have been worse in the absence of the FEWS NET efforts. He feels that the local support to FEWS NET by the KFSSG and the Kenyan government helped to stop the Horn of Africa drought from being a famine experienced within the borders of Kenya; that the triggers of information and action mobilization in the country served as useful cushions against famine in Kenya in 2011. An anniversary study on how true the
proposition of FEWS NET –KFSSG’s role in preventing the 2011 famine is important to undertake. The importance of this research is to specifically provide an appraisal of the famine prevention programs within the FEWS NET foundations, and formidable food security collaborations such as the Kenya Food Security Steering Group (KFSSG), which according to FEWS NET staff, demonstrates the best national example of collaboration towards famine mitigation programs (Eilerts, Jan, 2012). This example of collaboration and networking will hopefully inform future national, organizational and individual collaboration towards food security.

*Contributions to knowledge and practice*

This research adds to the existing knowledge of inter-organizational dynamics in famine early warning information (FEWI) systems networks. This research explores whether or not the participants in each network are committed to FEWI information and organizations, and whether they believe that the networks are effective to influence policy and action towards preventive and sustainable food security.

Previously, studies on frames towards food security have presented frame-analytic approaches to defining food insecurity and distribution (Mooney 2009; Sen, 1976; Waal 1990; Byrd, 2007), but stopped short of extending the frames to informing a culture-shifting distinct famine early warning system community serving both exterior and interior functions. Although a major underlying assumption in early famine warning information is to spur a preventive suite of behaviors, there is modest or no research directly depicting Early Famine Warning Systems (FEWI) as a communicative cultural product operating as a self-sustaining system with a specifically defined network framing design as I propose in this study. This FEWI system takes upon itself the baggage of cultural beliefs that frame information on the causes of and remedies
for famine, the role of technological reach, and social networking towards subsequent community anti-famine action.

The Network Analysis Approach

The network analysis approach has distinctive and unique guiding principles in the analysis of the variables being examined. According to Scott & Carrington (2011, p. 14), network analysis has an especially strong emphasis on relations and context, and differs from conventional paradigms in data investigation and analysis in three major ways: (a) network analysis focuses on relations, not attributes, in describing causation, (b) second, the network analytic approach studies networks, not groups, or uniform group membership versus the network strength of a relations approach, and (c) finally, SNA analysts study patterns of relations in a relational context.

The network analysis approach, as this research proposes, offers useful ways to look at what the relations, and the quality of those relations, of the actors at play in framing are, and how these actors have similar positions in the network with an emphasis on seeing how they are located or “embedded” in the overall network, as well as the directions of these linkages (whether strong or weak, with causal indications), where conventional data focuses on actors and attributes, network data focus on actors and relations (Hanneman & Riddle; 2005).

Research focus/questions

The study assesses the collaborative networks of stakeholders at the FEWI strategy-capacity-building network FEWS NET, and coordination-implementer network, KFSSG, as well as their FEWI stakeholders’ information and organizational commitment since 2007. The study analysis is shaped by seven research questions with both qualitative and quantitative methodology questions of this concurrent embedded mixed methods study. These are served by
four hypotheses that guide the quantitative section of the study and the secondary questions help to cover all the areas of inquiry into the effectiveness of the FEWS NET-KFSSG networks in driving famine based on their connectedness (there are seven indicators of connectedness), organizational and information commitments of their members.

**Definition of Terms Essential to this Study**

The current study compels us to a clear understanding of the key concepts around the notions of networks, information systems, commitment and famine.

*Networks.* A Network is a collection of points/components joined together by lines. A Network is a simplified representation that reduces a system to an abstract structure capturing only the basics of connection patterns (Newman, 2010, p. 2). Network representations utilize elements (individuals, groups, organizations, activities) and their relations (reflexive, dyadic and polyadic) (Freeman, White & Romney, 1989, p. 2). The study of Networks investigates the nature of individual components, while others study the nature of the connections or interactions or the behavior of the system of the pattern of connections between components (Newman, 2010).

*Social Network.* A social network is a set of socially relevant nodes connected by one or more relations/nodes or network members (Marin & Wellman, 2011). Social networks are networks whose vertices are people or groups of people, and the edges represent some form of social interaction between them (Newman, 2010, p. 36). A social network is a set of socially relevant nodes connected by one or more relations (Scott & Carrington, 2011).

*Information Systems* are the systems that comprise information in specific means and encompass the entire network of all communication channels used within a given organization or program. The UN FAO GIEWS defines Information Systems as a focal point within
governments or specialized entities for collecting, processing and communicating information on all the key variables that influence action (in this case, information on food security).

"Framing" is the presentation of knowledge and information in a certain fashion that enables attention to, and attitude about specific information.

*Framing.* Drought is a climatic change that is characterized by a severe lack of rain and other natural factors to food production. UNISDR defines drought as an extended period - a season, a year, or several years - of deficient rainfall relative to the statistical multi-year average for a region. Drought is discerned in three main ways: meteorological, hydrological, and agricultural or soil moisture level descriptions. Since drought is a prolonged period of shortage of precipitation, which in turn affects crop production, livestock food resources, and in general the myriad uses of water as a basic sustainer of life; in the absence of other supportive infrastructure, the presence of drought affects the ecological set-up of the food pyramid, resulting in a famine. This means that a drought does not have to lead to a famine.

*Famine.* Famine is an extreme shortage of food and resources for sustainable livelihood. Georg Borgstrom in Sandberg (1966) suggests that famine is a result of population explosion against a lower rate of corresponding food production, suggesting the possibility of famine without necessarily the presence of drought in the first place. Amartya Sen (1981) in his essay, *Poverty and Famines,* retorts that famines are an economic, man-made phenomenon resulting from bad governance. Both Sen’s (1981) and Borgstrom’s (1966) outlook depart from the legendary Malthusian population balance argument for famine by acknowledging the potential of increasing agricultural productivity for the developed world, which he claims would reverse apparent famine indicators. As such, he suggests that food shortages would be measured in terms of an “adequate diet” (Sandberg, 1966, p. 97), which would include the definition of
vulnerability related to poverty and sustainable livelihood. Therefore, famine is a complex concept in human society and its solution characterized by a host of information and mitigation variables which are preventive rather than curative.

*Famine Early Warning Information systems (FEWIS).* FEWIS is an information system model that incorporates the interpretation of interdisciplinary knowledge, including aeronautical and satellite imagery data, atmospheric and ecosystem data, and economic livelihood data, as well as other ecological functions to “irritate” and drive action towards famine prevention. It is important to note that, without analysis or timely forecasting, early warning systems are not useful (Ververs, 2011, p. 3). In this sense, Famine Early Warning Information can be said to provide the initial stages of the framing of famine information, and is replicated or even multiplied through media coverage of famine. The concept of FEWIS messages or information in its broad sense includes data, information, knowledge, images, symbols and any other symbolic forms towards famine early warning.

*Relief Agencies.* These agencies are local and international non-governmental organizations whose mission is to provide relief services for various kinds of disaster. They marshal resources and knowledge so as to be prepared to respond promptly to a disaster which is both predictable and unpredictable. FEWS NET is a branch of USAID, a major global network of relief agencies working to send effective relief aid from the United States.

*Embeddedness.* To be embedded is to be located within the context of a larger organic entity. This concept has been applied to explaining the context of the effects of social networks where economic relations between individuals or organizations/firms are embedded in actual social networks rather than in an abstract idealized market. Mark Granovetter (1985) connected and popularized the concept of embeddedness in social network studies.
**Nodes/Actors.** Nodes are the end units of a network which represent actors, human or non-human, who are related in some way to others in the network either mutually or unilaterally.

**Linkage.** Linkage in networks represents directional bridges that indicate relationships between nodes or actors in a network.

**Egocentric networks.** An ego is a type of node in a network that either receives or gives.

**Degree centrality.** There are two types of degree centrality, in-degree and out-degree centrality. Degree centrality is related to the number of links connected to or occurring in a specific node. The out-degree consists of the nodes acting outwards towards another actor in a relationship and the in-degree is the node receiving a connection from other nodes.

**Closeness.** Network closeness is a measure of centrality. The more central a node, the lower the total distance to all other nodes.

**Betweenness.** Betweenness is a measure of centrality in a network that defines the distance between nodes, whether short or not.

**Network frames.** These are information systems that are influenced by specific professional or contractual relationships. This study explores how networks (associations) influence scripting FEWIS, the attention to FEWIS information, and the implementation processes towards famine mitigation efforts.

**Mass media** consists of information and messages to a mass audience. Mass media comprise of interacting agencies who originate messaging and whose message is affected by the environment and the input of the recipient agencies through feedback. Internet technologies have redefined mass media to be personalized while also having a wide reach of audiences. FEWIS comprises mass media aimed at stakeholders in food security functions within a nation but has a mass audience through its website (www.fews.net).
Commitment is the tendency to attend to information and enter into deliberate implementation processes. Commitment is largely characterized and defined by attitude change, action and verbal acclaim.

Decision support. This is a method used within FEWIS to support stakeholders in their famine mitigation efforts within their own jurisdiction. Supports implementation strategies (sometimes through funding) of decisions arrived at towards early mitigation action.

Culture and technology refers to the cultural establishments in the specific context that relates to famine early warning information (FEWIS). They may include poverty, increasing famine possibilities in the case of drought, or conflict situations of any kind. Technology indicates both agricultural and other technological advances that decrease food insecurity. There has been a lot of discussion on Kenya’s and Africa’s phenomenal growth in the mobile technology sector (Murithi et al., 2009) that has broken through the confines of poverty. Information technology has provided the backbone for growth in the agricultural sector and in rural development in Africa. This is one of the central considerations in this study.

Communication networks. According to Monge & Contractor (2003), communication networks are the patterns of contact created by the flow of messages among communicators through time and space.

Limitations, Delimitations and Assumptions

The limitations emerging from the scope and nature of FEWS NET-KFSSG direct the delimitations that I have specified for the participants of the study. For instance, the first limitation of the study is that FEWS NET’s target audiences are not the grassroots people being affected by food insecurity issues, but rather but decision-makers. As such, this dictates a major
delimitation of the study since I can only evaluate the effectiveness of FEWI among stakeholders.

Secondly, the FEWI message-originators within have been largely outsiders (professionally, culturally and experientially), although there has been a deliberate push to reverse that. This is because the stakeholders may be experientially removed from the experience of famine because of socio-economic status. The more ideal study would be to examine the effectiveness of FEWI among the grassroots populations, which is not possible for this study. In addition, FEWI information has been sourced from agencies that deal with completely different areas of study in data collection. FEWS NET was developed in 1985 to improve communication in a humanitarian aid response after the devastating 1984 famine in the Horn of Africa (Voice of America). According to the FEWS NET website, FEWS NET is funded by the United States Agency for International Development (USAID). It collaborates with international, regional and national partners to provide emerging comprehensive, accurate and timely information (at least six months ahead (Ververs, 2011) and food security and vulnerability information to strategic people and organizations. FEWS NET, therefore, is a NETWORK of individual professional, national and regional food security monitoring systems which are non-governmental organizations and humanitarian aid agencies working together towards predicting and preventing famine in developing countries. The data is sourced from US federal agencies, who pursue other specific goals in their context. The information is gathered and packaged to reach FEWIS stakeholders at a national level in order to spur early action towards famine mitigation.

Thirdly, in contrast to the common belief that FEWS NET plays a major role in informing local authorities of the various FEWI food insecurity indicators, in actuality FEWS NET’s primary audiences are Food for Peace sector in the USAID, the food aid community,
multidisciplinary networks and strategic decision-makers in national and regional establishments. FEWS NET is located in Africa, Central America, Haiti, Afghanistan and the United States. Once the food security and vulnerability predictions are calculated from the data, FEWS NET uses a suite of communications and decision support products to help decision-makers act to lessen food insecurity. These products include: (a) monthly food security updates for 25 countries, (b) regular food security alerts which they refer to as outlook reports, (c) briefings on appropriate contingency and response planning efforts, (d) localized livelihoods and market data, and (e) information and analysis to support relevant program and policy development. This means that FEWS NET data may be more international and relief-oriented in outlook than local application and relevant, a void which local professional teams may fill.

Fourth, FEWS NET-KFSSG faces a paradox of excellent working information against the backdrop of grim famine statistics in the region. This limitation may be solved by more research so as to prove the effectiveness of the measures in place. FEWS NET’s focus on accurate data made it necessary to work towards transitioning from expatriate staffing to local professionals by 2003, as local professionals are familiar with the climatic and socio-cultural conditions of the regions and therefore can both predict and advise on food security (G. Eilerts, phone conference, January 12, 2012). According to Gary Eilerts, the FEWS NET program manager at USAID, the model process of a national program that FEWS NET views as having a successful culture of voluntary and professional collaboration towards food insecurity mitigation is the Kenya Food Security Steering Group (KFSSG). The present emphasis is to strengthen local networks so as to wean FEWS NET from USAID and create self-sustaining national FEWI efforts based on experience and past success/ performance.
Nonetheless, a quarter century of FEWS NET comprehensive and innovative studies and forecasting saw famine occur in certain areas in the Horn of Africa caused by the worst drought in 60 years. The 2011-2021 International Food security assessment projected that the number of food-insecure people in Sub-Saharan Africa will increase by 17 million and the distribution gap will fall to 0.6 million tons regardless of the projected 140 million global decline in food-insecure populations. The onset of famine signals deeper infrastructural problems that eventually affect vulnerabilities to food insecurity. Waal (2003) listed food insecurity as mainly caused by poverty, rising food prices, unrest, drought, and, as in Sen’s (1983) view, famine is a distribution and economic inequality problem.

Fifth, it is crucial to look at the challenge of Famine Relief Early Warning information in Africa today as it presents a complex paradox of planning versus the reality of achieving desired food security goals on the ground. According to Deng & Minear (1992), current news coverage capabilities have pushed the relief agenda forward as humanitarian emergencies dominate the daily news. The authors discuss four main famine relief challenges that confront relief organizations, including the external nature of humanitarian interventions, the relationship between relief activities and endemic problems, the co-ordination of relief initiatives, and the ambivalent results of relief operations (Deng & Minear, 1992, p. 32). The author recommends that a more vigorous humanitarian agenda that exceeds moral grounds is crucial so as to institutionalize improved arrangements for global responses, which include holding political authorities accountable to complement relief organizations’ commitment by implementing more effective and creative assistance and protection strategies.

Sixth, the reality of a competitive global marketplace may increasingly pressurize African governments for the need for positive press so as to attract investors. This genuine national
patriotic agenda often clashes with Famine Early Warning and relief organizations’ push to warn of an impending crisis. The two only meet at Deng & Minear’s moral counter of what FEWS NET’s USAID Contact Officer's Technical Representative, Gary Eilerts, calls “business of truth-telling” (G. Eilerts, phone conference, January 12, 2012). The practical problem here is that FEWIS is low on newsworthiness, and therefore termed as non-news, especially to local news and information coverage.

Assumptions. Along with methodology assumptions, this study’s assumptions are nested in the five assumptions included in the USAID-FEWS indicator approach because of their relevance to this study.

USAID’s FEWS developed an indicator-based approach to Famine Early Warning. This indicator approach relies on the vegetation index derived from satellite imagery to make production estimates, and juxtaposes these with other forms of data, including health conditions, food supply, food access, labor prices and local terms of trade, food prices, mobility, mortality and malnutrition figures. As such, the USAID-FEWS indicator approach has five basic assumptions that we have adopted for this study: (a) that famine is the culmination of a process rather than a catastrophic event, (b) that famine has observable indicators, (c) that there is a progression of indicators that reflects the degree of vulnerability to famine, (d) that indicators will vary between places and through time, (e) that the same indicators appear early enough to permit mitigating action to be taken. (Source: FEWS, 1997a, p. 12 in Moseley & Logan (in Wisner et al. 2005, p. 142).

Further assumptions of the study are that the network connections of the stakeholders are around FEWI and focus towards early action and famine mitigation. Methodology related
assumptions include that for every participant, their identified affiliation represents that organization’s participation in the study.

**Chapter 1 Summary**

This chapter outlines the role of network frames in defining the unfolding food entitlement and planning programs in Sub-Saharan Africa and their link to commitment to early famine warning information. This study’s primary objective is to acquire insight into the manner in which FEWS NET- KFSSG organizations and collaborating organizations and food security professionals strategically use frames in their public communication about famine early warning information. This study maps the organizational networks of the Famine Early Warning Information Systems (FEWS NET) and the Kenya Food Security Steering Group (KFSSG), the former a famine warning information pioneer, and the latter a famine mitigation response implementer, so as to examine and explain the emergent social and semantic networks in Famine Early Warning Information Systems (FEWS) and their link to commitment to famine mitigation early action. This chapter establishes a rationale for this study through examining FEWS NET-KFSSG’s self-proclaimed “network” organization, functioning as a distinct social system or network to tender an effective, multi-dimensional approach to famine early warning and to contribute to a sustainable food security “communication network” program. Chapter 2 examines the historical and contemporary context of food entitlement in Africa that drives current programs in food security management, famine mitigation and future planning.
Quote: “What we do at FEWS NET is **plain truth-telling** about the conditions that may impact food security in the near future.” *Gary Eilerts, FEWS NET’s Program Manager at USAID (Jan 12, 2012)*

CHAPTER 2

LITERATURE REVIEW

**Truth-telling in Famine Early Warning Information: Framing, Theory and Research**

**Overview of Literature Review**

The previous chapter established the need for this study and outlined the purposes of this research, which are to map network frames within the Famine Early Warning Systems Network (FEWS NET) and the Kenya Food Security Steering Group (FEWS NET - KFSSG), and their link to organizational commitment and commitment to famine early warning information (FEWI) and action towards Food Security by stakeholders (members of the network).

The following literature review reveals six gaps in literature: (a) Insufficient research on disparity in the amount of famine early warning information generated and extent of corresponding information (organizational and government policy, media coverage) and early action for famine mitigation (Bailey, 2013; Tadesse, et al, 2008; Juma 2011; Kim & Guha-Sapir, 2012); (b) Lack of precise literature linking food entitlement perspectives, agricultural and economic development and priority issues to the practice of collaborative/participatory food security management (Sen, 1980 & 1997; Tilley, 1983; De Waal, 1990; Devereux, 2001; Huesca in Valdivia, 2005; Juma, 2011; Van Gorp & Van der Goot, 2012); (c) little published research on emergence of communication and organizational networks motivated by network theories (Monge & Contractor, 2003:xi); (d) eclectic and superficial framing studies in communication meaning in networks and public discourse (Gamson & Modigliani in Scheufele, 1999); (e) gap in
research on information commitment as a context in information systems (Hirashima et al., 2011; Van Dijk, 2006, p. 20); and (f) gaps in African and historical philosophic contributions to social change and issues including the food conversation (Asante, 1980 & 2012; Naugle, 2002; Garnsey, 1989; Juma 2011).

The following literature review builds on networks in the FEWIS community as a basis for framing, and finds inspiration in four theories of social and communication study including; social network theory, general systems theory, social exchange theory and organizational knowledge creation theory. These theoretical perspectives form a multi-theoretical, multi-level, multi-analytical model (MTML) (Monge & Contractor, 2003) for studying why communication networks emerge and help to assess the effects of those communication networks; in our case, the effects of the mapped network of FEWS NET-KFSSG on the commitment to famine mitigation action by targeted stakeholders.

This chapter integrates the multifaceted nature of related concepts to the study and the following topics are integrated (See Literature review map - Appendix B), including framing studies and framing famine studies, sustainable food frames, communication networks studies, network framing, communication campaigns and how it affects commitment to information, as well as food entitlement perspectives history and how these inform FEWI information systems networks. These studies lay the groundwork for investigating network frames in FEWI and their link to commitment towards famine mitigation by FEWS NET-KFSSG.

**Frames and Framing**

A *frame* can be defined as the basic element used to organize experience which allows a user to locate, perceive, identify and label concrete occurrences (Dexter, Perry & Berube, 2006). The framing question has been a subject of interdisciplinary examination and quite relevant in
communications studies because of its potential to influence message construction, message perception and feedback. Gregory Bateson introduced the term “frame” in 1955 as a word to represent the bracketing of information stored by the brain for retrieval in the future (Dexter et al. 2006). Bateson highlighted the frame as a special set of boundary markers or brackets, like the wooden frame (from the Visual Arts perspective) of a picture or windowpane.

A network is a social structure, both formal and informal, to which a member belongs and whose cultural activities are defined within the network. Just like a mechanical network or a wiring network, a social network has a system of observable/discernible patterns of contacts and affiliations. Likewise, communication networks are the patterns of contact that are created by message flow through time and space (Monge & Contractor, 2003, p. 3). The construction of communication networks allows for the conceptualization of the network in a visualized mapping, which in turn imposes a visual-arts conceptualization of frames as “boundary-lines” marking a specific communication context. Communication networks therefore provide a context of communication that certainly accounts for message framing in congruity with the network’s distinctive “cultural traits.”

A network frame is a term I have adopted to indicate the structure within which specific communication is initiated, transcribed, interpreted and acted upon. In this study, I use famine early warning information (FEWI) as a network frame where eclectic information (from satellite imagery, to economic data, to policy and livelihood data) is framed into functional famine early warning information to drive timely famine mitigation. Network frames have been established as a predictor of success in information systems operations and by extension, in informational societies (Van Dijk, 2006, p. 20). Networks are part of a thriving socialization process (White, 2008) and are also seen as technical systems with distinct form which constitute the fabric of
ordered societies such as organizations (Van Dijk, 2006). Essentially, networks may be seen as the mediums for human experience through which all communication occurs, and therefore they are a basic ingredient of the valid context of communication or an information system (Castells, 1996).

Therefore, network frames function as structures in illuminating the flow and impact of information. Network frames are information systems that are influenced by specific causal professional or contractual relationships. This study explores how networks or associations influence attention to famine early warning information (FEWI) and implementation processes towards timely famine mitigation efforts. In this study, network frames are used to assess the efficacy of early famine warning information systems in Kenya. There is therefore a need to discuss the concept of frames and framing and how the harvesting of eclectic information by FEWS NET is useful in the food management and famine mitigation work of the KFSSG committees constitutes framing of information or Bateson’s “contexts of interaction” for/about food security.

Hale (2011) observes that Gregory Bateson (1955) saw the term “frame” as describing the various contexts of interaction. Hale writes:

Within a frame, meta-messages are sent between interactants which define the boundaries of communication and indicate whether the interaction is serious, playful, ironical or in some other interactional, social capacity. While observing monkeys at play, Bateson noted that they would often bite each other, an act one would normally associate with aggression. However in that context, the biting was a manifest sign (a meta-message) that they were in fact playing…. The idea that interactants send messages to signal how interaction is to be interpreted or framed [emphasis original].

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While Bateson’s (1955) research provoked thriving communications research on framing, it dealt mainly with non-verbal encounters, thus the need for Erving Goffman’s (1974; 1981) expansions of the concept of frames in communication. Our synthesis in this study takes the context, borderlines, keys, and cultural concepts of frames to present communications networks as “labyrinths” of frames at various levels which define communications patterns and even outcomes.

Erving Goffman (1974) contributed heavily to social theory in his studies on Symbolic Interactionism. Goffman’s critical potential is strongest when he examines institutional talk and interaction (Ytreberg, 2002). According to Goffman, frame [own emphasis] is the word that refers to such elements that are able to be identified. Therefore, frame analysis is the examination of these terms of the organization of experience (Goffman, 1974). He argues that frames have the capacity to use concrete, actual activity that is meaningful in its own right as a model upon which to work transformations for, among others, demonstration, analysis and charity. Here, he asserts, what is important is relationship (not just of substance) and how it is seen by participants to contain differently framed episodes (Goffman, 1974, p. 561). The concept of participant (or player or individual) allows the opportunity to address assumptions about ordinary activity that would otherwise remain implicit (Goffman, 1974, p. 566). Finally, Goffman argues that nature of a frame is that it establishes the lines for its own reframing (Goffman, 1974, p. 575).

According to Goffman, frames are constituting keys [own emphasis], which are the sets of conventions by which a given activity against an already meaningful primary framework is transformed into something patterned on this activity but seen by participants (Goffman, 1974, p. 8). The process of keying uses five conventions: (a) The systematic transformation that is involved across materials already meaningful in accordance with schema of interpretation which
without the keying would be meaningless; (b) participants in the activity are meant to know and to openly acknowledge that a systematic alteration is involved; one that will radically reconstitute what it is for them that is going on; (c) cues will be available for establishing when the transformation is to begin and when it is to end; (d) keying is not restricted to events perceived within any particular class of perspectives. Although events perceived within a social schema seem more susceptible to keying; and (e) for participants, systematic transformation that a particular key introduces may alter only slightly the activity thus transformed, but it utterly changes what it is a participant would say was going on. Therefore, keying performs a crucial role in determining what it is we think/perceive is really going on.

Whereas frames provide context messaging precision, they may also introduce four ambiguities, such as Goffman identifies as primary network errors, key errors, identification errors and information management errors. First is the error with regard to primary frameworks being schematically wrong, such as a person leaving a shop and offering an apology for tripping over the clerk’s foot only to look down and find that he actually tripped on the carpet (p. 309). Mis-framing, notes Goffman, can also occur when differing bases for reducing responsibility can be applied. Secondly, there is also an error in terms of keys (Goffman 1974, p. 311), which may be evident on those occasions when something ominous occurs and participants insist on playfulness, or using over-general terms so that it downplays the situation or is an outright fabrication. An example would be when a writer uses quotation marks to indicate when he does not mean what he writes. Third, there are framing errors with respect to the biographical identification of materials in a scene. This study is a framing issue because in many activities unmistakable identification is systematically presupposed in the building up of the interaction that follows (p. 317-318). Finally, the fourth framing error occurs when a strip of activity could be
organized into tracks. The mis-framing error can occur in the management of each of the several tracks with the possibility of co-sharing attributes being overlooked. (p. 319).

**Framing etymology and visual art framing connate.** The Encyclopedia of Educational Leadership and Administration, defines a frame as the basic element used to organize experience and which allows a user to locate, perceive, identify and label concrete occurrences. Thus, a frame is an organizational tool used by the brain to organize information. According to the encyclopedia, the essence of frame theory occurs when one encounters a new experience that one selects from a memory structure called a frame, which is a remembered framework to be adopted to fit reality by changing details as necessary. As such, the frame provides the rules and principles that govern events, and guides a person to understand the meaning of events. Erving Goffman’s frame analysis sought to understand and communicate how the brain decides what is real and what is not, based on everyday events.

Therefore, for this study, the perspectives on framing famine are informed by the prevailing societal views as they construct meaning based on the type or mode of communication. For instance, studies have found that the design of positive or negative “message frames” have an influence on decision-making, and that psychological experiments have demonstrated that there is an increase in recall and comprehension when a picture is presented as a meaningful aid to understanding an otherwise disconnected set of sentences (Bransford & Johnson, 1972). Pictures and art therefore may be used to visualize and therefore wrap our understanding around the role of frames in message construction, movement, reception and impact.

The study of frames from their original connotation can yield profound insights that can illuminate our discussion on framing famine. To begin with, digital media have given visual arts
as a communications theoretical exemplar more meaning. Like visual arts, the worth of a piece of communications in digital media is tied more to the history and value placed on it by its audience. For instance, a Tweet is important based on how many times it has been favorite or retweeted; or in Facebook, a cause’s importance is based on how many people “liked” the cause’s Facebook page. Similarly, a visual arts item costs more based on historicity, or the state of being historically rich and authentic. On the subject of social media, the inescapable question of globalization comes into play. The powerful historicity of a work of art and its implication in both productive and receptive bodies in history and on informing ontological claims has been shattered by transformations in science and technology that configure subjectivity into various cultural entities (Duro, 1996). Duro maintains that the narrativity of frames provides narrative development with thematic effects.

Contemporary art, in the context of the current globalization phenomenon, takes the conversation further as a convergence of peoples and ideas (Harris, 2011). Globalization is an analytic construct concerning the progressive ordering of the world and its hitherto separate societies into an integrated system. Contemporary art concepts consist of the artistic systemization of artists, practices, pedagogy, styles, and institutions of art, collections, exhibitions, and sales on a global scale. Scholars have argued that this has produced radical homogenization in life that flattens and reduces human experiences and values to five identifiable networks: global production, electronic transfer, transportation, virtual instantaneous nature, and appeal (Harris, 2011).

The art of photographs, paintings and sculptures, among other forms, has a common core of emotive expression and the clarifying of what begins as a vague feeling (Warburton, 2003). Warburton espouses what he calls the Institutional Theory of Art, which stresses that the context
of art is what matters and not the look. The context includes how the work of art has been treated by whoever created it, and by those who exhibit and appreciate it. It is a theory that explains what works of art have in common by drawing our attention to their non-exhibited, relational qualities. The essence of this theory is the history of how an object has been treated rather than anything visibly detectable. This is a procedural theory of art, a terminology popularized by Stephen Davis, versus the functional definitions, which concentrate on the purposes that the works of art serve.

The study of frames in the visual arts has been revived in the last thirty years (Newbery, 2002) through stylistic analysis and comparisons of the molding profiles that reveal a network of cross-references. Akin to the visual arts, a frame is a surrounding structure that surrounds a specific space. The style of the frame may depend on the subject matter of the picture, whether religious, mythological, historical, portraiture, genre, landscape, still life, or abstract (Mitchell and Roberts, 1996). The independent picture frame first appeared in Italy during the early years of the Renaissance largely as a result of the privatization and secularization of painting (Brettell & Starling, 1986). According to Brettell (1986), during this time frames expressed the values of their owners, or sometimes the artists of the pictures or the people who made the frames. He maintains that, all pre-Renaissance frames were part of the material nature of the painting. By the Middle Ages, both sculptures and paintings were placed in large pieces of ecclesiastical furniture called altarpieces which celebrated their holiness rather than to protect them.

Frames throughout history are relegated to two categories, architectural and ornamental. Modern artists made the frame part and parcel of the picture, so that the painting also included framing as part of the process. Since then, it has been perceived that the frame is often the first tangible link between the picture created by the artist on an easel in the isolation of his studio,
and its acceptance by the patron who conditions its subsequent reception by framing it in a manner appropriate to its intended setting, whether a medieval church, the Renaissance or a modern picture gallery. Frames epitomize the complex structure of cultural cross-references and the origins of the art form in the widest possible historical context, and are distinguished in three ways: the picture’s purpose, setting and owner (Mitchell & Roberts, 1996). A well-chosen frame should not only ease a picture into a wider public context and amplify its dramatic effect, but also quietly punctuates the painter’s own artistic language and encloses his form of visual communication within its own internalized space (Brigstocke’s Preface in Mitchell & Roberts, 1996). The idea of second-hand frames spread from artists and dealers; museums’ old frames and paintings had entirely anachronistic furniture with careful conservation, such as the “Sansovino” frame in Venice (Penny, 1997).

The final and most important term to comprehend for this study is the notion of framing in communication. The concept of framing is defined as presenting information, especially in media, in a predictable and patterned way and is therefore a process by which individuals construct meaning in public discourse (Gamson & Modigliani in Scheufele, 1999). Frames in visual art represent a surrounding structure that surrounds a specific space. Visual artists perceive frames as serving both intrinsic and extrinsic functions innate in the style of the frame which may depend on the subject matter of the picture, whether it is religious, mythological, and historical, portraiture, genre, landscape, still life or abstract (Mitchell & Roberts, 1996).

Just as the concept of frames has been interwoven with the existing cultural context, frames in communication have grown with the concomitant growth of an idea in a given communication. Just as artistic frames have both architectural and ornamental purposes in history, framing in communications may be both part of the formal arrangement and the
ornamental purposes in the formal and informal networks within which the communication occurs. Similarly, just as visual art frames epitomize the complex structure of cultural cross-references in the picture’s purpose, setting and owner, frames in specific communications networks exemplify the contextual networks’ purposes, setting and membership, with both intrinsic and extrinsic functions for placing emphasis on the art to both define and emphasize it.

**Framing and Ecological Communication.** Ecological communication is a concept used to define how human culture uses messages about the environment to guide their interaction with the natural environment. Niklas Luhmann, a leading scholar in ecological communication, does not restrict the argument for ecological communication to the natural environment and climatic conversation but rather takes on a culture-encompassing, system-theoretical approach. Luhmann maintains that the interpretation of ecological problems from a general-systems perspective in terms of the relationship of a system with society can be exploited not only to reveal the conditions for these problems but also ways in which their resolution becomes a possibility (Bedbartz in Luhmann, 1989).

Just like trigger effects in media framing, Luhmann uses the term “resonance” to designate this system/environment interplay. The significance of the meaning of ecological communication, therefore, is the essential recursiveness of a system’s components, implying that communication can occur only when what is meaningful is passed on. This is because communication is not only a transfer of information, but is the common actualization of meaning. Therefore, in ecological communication, the communicative reactions or disturbances that a society’s environment produces within it are called “resonance.” When this communication occurs, the dangers in the environment can be addressed only in the ways that society itself has established for communication, which we may refer to as the ongoing frames.
and information interpretation frames that FEWS NET uses to address the ongoing food security frame in their communication, as well as findings from data on the direction of food security conservation in the regions.

Framing Food Security

“Food security” as “Food entitlement” perspectives

FEWS NET and KFSSG exist to help manage food security and mitigate possible famine. Since food security’s goal is to make available food to all people, food entitlement or simply the right to food is a plausible sociological context perspective to drive food security management policy and action. Historical epochs have inadvertently dragged up the notion of food entitlement, which often follows economic realities of the time. In order to understand the historical context of FEWIS, it is important to trace the mutation of the contemporary, post-modernistic view of food entitlement represented by the economist Sen Amartra’s arguments on food entitlement and analysis. The study’s further unique context of FEWIS is the focus on Sub-Saharan Africa, a region whose recurrent famines and current data indicate declining food security indicators despite growing formal efforts for famine mitigation. The lessons learned in this study, however, spur optimism of sustainable famine prevention programs nested in the FEWS NET foundations, food security collaborations like the KFSSG, and recent Afro-centric studies by the likes of Calestous Juma, who argues that Africa can feed itself and effectively transition from a hungry importer to self-sufficiency in a single generation through the opportunities presented by advances in science and technology, and the creation of regional markets and strategic local leadership.

Amartya Sen’s food entitlement perspective. Amartya Sen systemized the concept of food entitlement as an approach to famine analysis. He is credited with defining the
contemporary notion of food entitlement. He argued that famine is a social process whose prevention and solutions need social measures for entitlement. According to Sen, everyone has an “entitlement” to all possible combinations of goods and services necessary for survival, so that the basic unit of analysis is the individual person. In the occasion of a drought, famine need not necessarily follow if the means of distribution are even. Sen’s landmark essay, “Poverty and Famine” (1982), led to a major reorientation in the study of famines by challenging the assumption that a massive lack or total food-availability decline (FAD) is the central cause of famines. Instead, Sen argued, the “entitlement failure,” which can occur even when there is no general or acute decline in aggregate food, was responsible for famine and famine mortality. He wrote:

“Entitlement to food” of a person means the amount of food over which the person has the right of use, what he or she can actually consume. In most societies this means the amount of food over which the person has ownership. … of production possibilities and the possibility of their use...depends on the exchange conditions: the ability to sell and buy goods and the determination of relative prices of different products… also influenced by the presence or absence of political guarantees.” (Professor Amartya Sen’s talk, “Entitlement Perspectives Of Hunger” at the WFP Forum, 1997)

The Entitlement Approach’s main contribution is its shift in focus from the Malthusian logic of “too many people for too little food” to the capability of individuals and their families to acquire food. Inability to access food is due to poverty/inability, irrespective of food availability. He also asserts that famine can be caused by “exchange entitlement decline,” so that falling food wages or falling livestock prices and rising food prices are not negotiated against the incidence of drought.
This view implies that how one deals with his fellow man in community through technology, political perspective, capability and knowledge impacts on perspectives of food entitlement, from the individual’s entitlements to political and societal guarantees. Therefore, the different historical ages (eras) of man have contributed their stake to the food entitlement perspective, as men negotiated their sustenance in each context. This implies that a careful examination of food entitlement through prevailing paradigms in the pre-modern, modern and post-modern societies’ views and through their leaders or key thinkers may help explain current perspectives on and practices in food entitlement, and the prevailing disparity and may also help the envisioning of a future global-village perspective on food entitlement. I have included these discussions later in the literature review.

Amartya Sen’s entitlement approach has a bearing on the business of famine early warning, through it emphasizes livelihood as part of a complex array of indicators that can be attended to, to avert famine even in the face of FAD due to climatic conditions, security, etc. Sen’s entitlement approach analysis is built upon three basic conceptual categories: (a) the endowment set, (b) the entitlement-mapping (or e-mapping), and (c) the entitlement set.

The *endowment set* is the blend of all resources legally owned by an individual person. It comprises the set of all possible combinations of goods and services that a person can legally obtain by using the resources of his endowment set. By *entitlement mapping* or *e-mapping*, Sen refers to the rate at which the resources (endowment set) can be converted into goods and services (food security, shelter, good life capability) included in the *entitlement set*. *E-mapping*, therefore, is the relationship between the *endowment set* on the one hand and the *entitlement set* on the other. The *entitlement set* also advances the concept of the *endowment set* to also include contextual justice issues, such as freedom of obtaining and using the resources. A famine occurs
when a large number of people within a community suffer from what Sen calls *entitlement failures* at the same time, which arise when the three aspects of entitlement are lopsided and unbalanced. Sen’s entitlement approach is closely related to his *capability approach economic model* on development. The *entitlement approach* has been hailed as an innovative and holistic approach to famine analysis (Devereux, 2001).

**Critique.** Sen’s *entitlement approach* has been critiqued across the sociological sciences when scholars have found problems when applying the ideas to various models and when examining the approach’s conceptual framework as an analytical tool (Osmani, 1995; De Waal, 1990; Nolan, 1993), although Sen says that this model is descriptive rather than analytic. Amartya Sen himself acknowledges four main limitations of the *entitlement approach*, which include assumptions that the following possible factors are in the *endowment set* or the *entitlement set*: (a) starvation by choice, (b) disease-driven mortality, (c) ambiguities in entitlement specification and (d) extra-legal entitlement transfers.

Stephen Devereux asserts that the *entitlement approach* is silent on violations of the fundamental right to life that can disrupt exchange of endowment to entitlements. Besides, Devereux notes, Sen’s focus on the individual household as a unit of analysis fails to engage with social relations and power inequalities between intra-household units. De Waal claims that the *entitlement approach* was challenged by the incidence of famine mortality in Southern Sudan not having a positive correlation to poverty. Instead, the *entitlement collapse* which Sen advances as an economic process does not necessarily hold. Instead, exposure to further contextual factors made famine more a social process than an economic one. Instead, De Waal suggested the “*health crisis model*” which adds the element of disease to the economic crisis model.
The significant line of critique or limitation that various views have taken against Amartya Sen’s model seems to be ambiguous, or what De Waal calls “fuzzy entitlements.” Therefore, each study that does make use of Sen’s self-declared-descriptive entitlement approach ideas should endeavor to define the notion of entitlements to further contribute to the notion of entitlement. This study identifies the six sustainable food frames (Van Gorp & Van der Goot, 2012) to further our understanding of the notion of entitlement sets at various levels from the micro to the macro level. Besides, our use of the multi-theoretical, multi-level, multi-analytical model in our theory and analysis enriches our adoption of the fundamental ideas from Sen’s basic view of food entitlement that informs the business of famine early warning information and early warning community.

**Sen as a sponsor of post-modernistic perspectives in Development Communication**

Amartya Sen’s entitlement approach has effectively offered us a practical application of food entitlement perspective logic on the capability of individuals and their families to acquire food through legal means. Although nested in the individual livelihood index, it is also a general approach applicable as an organizational framework for analyzing famines’ multiple causes and the corresponding comprehensive famine mitigation efforts towards production possibilities, trade opportunities, entitlements vis-à-vis the state, and food aid among many other means of access to food.

A rather subtle, albeit paradigm-shifting, contribution of Sen’s entitlement approach and later, capability approach, is the focus on the individual participation of grassroots citizenry in determining their joint entitlement stakes. This puts Sen in the rank of recent scholarship in development communications, with post-modernistic perspectives shifting to the participatory paradigm in development communications (Huesca in Valdivia, 2005). The dominant paradigm
in development communications has adopted the binary schema that mainly compares traditional or rural societies with modern or urban, developed societies as the roots of global inequality; the main drive being to substitute the rural “peasantry” with their modern counterparts. Thus, there is talk about diffusion of innovation (Lerner, 1958; Rogers, 1969).

However, developing nations’ scholars deconstructed the dominant paradigm and called for more humane, egalitarian and responsive communication theories and practices (Huesca in Valdivia, 2005). The alternative approach introduced participatory communication which served to reform development communications to be expansive, flexible and humane. It examined levels of participation, media applications and research methods. Huesca argues that the rhetorical veneer accompanying the participatory model has given rise to an expanding civil society in the form of new social movements that are organized around issues and identities concerned with development problems. These are characterized by decentralized structures and intense local involvement at various levels. At the center of the activity is the individual’s capabilities and network’s enabling of the individuals to take charge at both the micro and macro levels of participation.

Network studies have shed light on the central role of the individual’s livelihood and capabilities to affect the overall food security status of a given community. FEWIS communities of individuals and organizations are brought together by their concern with famine mitigation on various fronts, representing a participatory model that is eclectic and uplifts the individual’s contribution and his/her role in the larger political economic structures.

**Calestous Juma’s Africa self-sufficiency and innovation perspective.** Juma (2011) breaks the grim myth of persistent food insecurity as an aspect of the African food security perspectives. He joins the post-modernistic scholars in espousing food policy with a humane,
egalitarian and active agenda towards lasting food security in the region. Juma detailed a sustainable food insecurity mitigation plan within a generation in Africa. His book, *The New Harvest*, may be seen as the essential missing link between the intentions of FEWIS and mitigation implementation success, most felt in African countries within the backdrop of sporadic climate change effects.

Juma (2011) explores critical links between agricultural and economic development through entrepreneurial leadership, helping to foster co-evolution between technology and institutions. He argues that Africa’s agricultural development is intricately linked to overall economic development in African countries. He makes a case for Africa’s food security through three major opportunities, including: (i) advances in science and technology, (ii) the creation of regional markets, and (iii) the emergence of entrepreneurial leaders dedicated to economic improvement (p. 14). He maintains that agriculture as a force for economic growth is the backbone of food security. For instance, in sub-Saharan Africa, agriculture contributes to 34% of GDP and 64% of employment, and agricultural products compose about 20% of Africa’s export (Juma, 2011). However, rising food prices, the threat of climate change, and soil infertility through degradation and governance have been the main threats to food security on the continent. Over the last 25 years, growth in agricultural GDP has averaged 3% and nearly 75% of the farmland is affected by excessive extraction of soil nutrients (p. 8). The paradox is that about half of Africa’s arable land, about 73 million acres (p. 14), is inaccessible for increased production due to the policies in place. Juma maintains that since 1960, there have been low levels of investment in this sector, with food production being 10% lower and the number of hungry people increasing since 1990 (p. 11), so that now land productivity in Africa is at 42% and 50%. Juma sees that mere expansion would be blind to environmental degradation and
instead advocates integrating agriculture with other sectors, including manufacturing, to achieve broad-based growth on the continent.

Juma maintains that modernizing the continent’s economy through the application of science and technology in agriculture, effective networking, and an enabling policy environment will move towards the goal of sustainable food security in the region. He observes that Africa is among the most rapidly-growing economic regions in the world, and added that agricultural growth would be a huge potential for companies across the value-chain and is key to increasing the agricultural output from US$280 billion to a projected US$880 billion by 2030 (p. 15). Innovative technological platforms such as in nanotechnology, biotechnology, information and communications technology (ICT), and Geospatial Information Systems (GIS) (p. 24) have the potential to transform African agriculture through solving enduring and novel problems towards “sustainable development” (p. 25). He cites the examples of the Safaricom’s M-PESA service, which revolutionized the service sector through branchless banking in Kenya, and the Bhoomi GIS project, which helped map and transform and enhance land tenure policies and their use in India. Biotechnology, on the other hand, has improved food security by enabling the genetic alteration of crops, improving soil productivity, and enhancing weed and pest control, thus increasing productivity (p. 33, 37).

The author stresses that infrastructure investment (transportation, energy, water and telecommunications) is a critical aspect of stimulating innovation in agriculture. Its benefits double up through regional co-ordination in mutually beneficial programs, an example of which would be linking education or the military to certain production sectors in the economy. This interlinking also addresses the issue of human capacity (p. 114), where the author argues that governments should treat agricultural education as a skill to be learned, valued and improved
upon throughout adult careers, which would also impact the problem of rural-urban migration. He observes that UNESCO estimates that only 45% of women in Africa are literate compared to 70% of men, and yet 80% of agricultural producers in Africa are women. Community-based agricultural education such as in Uganda and Ghana is essential to bringing academic work and experiential learning in innovative agricultural knowledge to support community development.

A network collaboration approach that dominates the book’s arguments is that there is a lot of overlap and duplication of efforts. They cite the example in 2008, when the heads of state and governments of COMESA, EAC and SADC agreed to form a more stringent network to face the food security issue by forming a triplicate free trade area covering 26 countries which would merge the three trading blocs into a single REC (Regional Economic Community) focused on creating a fast-track creation of an African Economic Community. This community would be focused on innovation and with strong structures in place to help disseminate critical best practice and technological breakthroughs through interaction, collective action and broader public-private partnership programs to strengthen innovation capacity. The author observes that regional innovation is a key component in enabling agricultural innovation as it dismantles three barriers to development: weak national economies, dependence on importing high-value finished goods, and reliance on small-range, low-value primary exports which are mainly agricultural and natural resources (p. 167). Therefore, integration creates the opportunity for RECs to collaborate on mutually beneficial projects, and they provide the crucial mechanism for standardizing transport procedures and trade among other partnerships that boost growth and food security.

Besides, the existing agricultural challenges and natural resources are confronted by impending climate change, where the World Bank estimates that 2°C of global warming may result in a 4-5% permanent reduction in annual income per capita in Africa (p. 204). Therefore,
technological innovation is essential to enabling appropriate adaptation to the changing climate. Juma cites the collaborative solution example of the Intergovernmental Panel on Climate Change (IPCC), which views “requisite adaptive capacity” as the ability to moderate damage and to take advantage of opportunities or cope with the consequences of climate change to infrastructure, among other areas. There is a need to develop analytical and operational frameworks that will make it easier to incorporate adaptation to climate change in innovation strategies used to expand prosperity. He argues that the anticipated disruptive nature of climate change will demand increased access to diverse natural assets, such as genetic resources for use in agriculture, forestry, aquaculture and other productive activities (p. 207). He maintains that adapting to climate change will require a significant upgrading of the knowledge base of society so as to identify trends and design appropriate responses at all levels of society.

**Famine and Culture: Perspectives of food entitlement in history**

Food entitlement as a concept has been fluid throughout the ages. Since famine is the severe absence of food for sustainable life, it is prudent to lay the foundation of our current discussion on framing famine within the cultural roots of understanding “food rights” for individuals in society, or what may be technically referred to as “food entitlement.” Food entitlement may be defined as an individual’s minimal or sufficient portion of food, and may be quantifiable in calories. For instance, according to the Food and Agriculture Organization (FAO) of the United Nations, food entitlement is determined by the Individual Food Adequacy (IFA) index. An estimate per an individual person’s food entitlement is determined by the national livelihood index.

Food history illustrates that food entitlement has been a subject of intense debate, and the perspectives have changed significantly during periods of transitioning entitlements such as
Conflict, drought, and social struggle (Tilly, 1983), and has followed other trends in the information age. The initial modern framing of food security as a concern of hunger and malnutrition derives from Malthusian assumptions (Mooney & Hunt, 2009), but is disputed by optimists who argue that creative technology can continue to provide enough food for ever-larger populations.

It is not uncommon for major events to herald profound changes in the way people perceive their environment and subsequent thinking of collective solutions. The 1984 famine in the Horn of Africa marked the beginning of a ripple-effect of post-modernistic perceptions in what Siri et al. (2005) referred to as the “dynamism of coping and vulnerability” that broke the myths surrounding small-scale cash-crop farming in the country at the time. Furthermore, around this time, the International Monetary Fund’s (IMF) structural adjustment programs (SAPs), which were meant to spur macroeconomic growth through reduced government support, rejected the role of the government as the predominant agent for affecting social change and development (Ellis, 2000).

This change of perspective further drove mainstream thinking on food entitlement away from the larger narrative of relief through large donor agencies and government in a time of famine to a “self-reliance and involvement” model by mainly small-scale farmers to cope with a looming drought. These thoughts are echoed by Kenyan clergyman Rev. Dr. Njoya, who wrote that “Agriculture is the core of our economy because even if we do not have enough products for foreign markets we can trade internally with our own food. …” (Njoya, 1994, June)

Further, Njoya’s (2002) vision of food subsistence also includes the religious community as a central player, as he does not see a divide between the contemporary “world” and the church. He argues that the dichotomy was created to exonerate Christ from the havoc of Western
imperialism that created inequalities and shortages, which are manifest in shifting entitlements to food. However, he refutes the euphoric dream of provision for all, calling this notion and expectation on political leaders as “creating a bubble messiah” (Njoya, 2007). Such bubbles eventually become too big, blow up and explode into ethnic conflict over land and other resources. He sets the vision of both religious and political amends through the personal responsibility of the citizenry to ensure their own entitlements in enabling state support, thus offering us a plausible argument for taking on the religious community as a perspective-bearer of food entitlement through history.

**Paradigm thinking in evaluating food entitlement in history.** Food entitlement, which is the means for food production and consumption patterns, has inevitably mutated along with the other philosophical, economic, political and technological activities of man. Paradigm thinking is a fairly authentic means of representing history and is discernible when based on geographical location, culture and philosophical presuppositions in a given era. As Kwiredu (2004) acknowledged, philosophy is at best unavoidably comparative in nature across eras and regions. This is because philosophy is an attempt to examine life and the world as a whole (Hunnex, 1986), as well through the individuals’ lenses, providing a knowledge of themselves, their surroundings, and beyond (Naugle, 2002). Similarly, Thomas Kuhn, in describing scientific paradigm revolutions, maintains that the presuppositions must be contextualized in the narrative-historical tradition. Naugle writes:

> When a person discovers his set of absolute presuppositions or the narrative - historical worldview tradition he inhabits, several consequences follow. He grows not only in self-knowledge, but also in understanding of the traditions and contexts that animate others around him. (Naugle, 2002)
This study’s examination of food entitlement through the perspective of selected scholars in the pre-modern, modern and post-modern eras takes on the history of the notion of food entitlement primarily in the context of the existing social institutions in each era, which we may use to decipher food entitlement perspectives in the light of the existing economic situations at the time. I draw parallels from the eclipsed historical timeline (Webber 1999) and the philosophical musings of key thinkers through the ages, including Aristotle, Aquinas, Locke, Descartes, Derrida, Foucault, and Wiredu. I seek the philosophers’ views and teachings on the problems of the world and the problems of values as they relates to man and state to inform the areas covered by Sen’s food entitlement model. Finally, I amalgamate the philosophical views of the respective scholars from each era with the Church’s traditional era and with the communication timeline (Fang, 1997) of the corresponding era so as to contemplate, through these three factors, the perspectives of food entitlement in that historical epoch.

*Pre-modern food entitlement perspectives.* It is important to note here that food acquisition and entitlements marked more significantly the identity of the people around the pre-modern time, than, say, our time. Many pre-modern perspectives on food were marked by conflict when there were shortages. Recorded in particular were the years of famine in Western Europe due to a deadly blight that destroyed entire harvests and in extreme desperation drove societies to cannibalism in Bohemia, Silesia and Poland until the Middle Ages (Tannahill, 1973). But new developments in agriculture, heralding the Industrial Revolution, changed perspectives on food entitlement for good. This pre-modern period constitutes the Classical, Medieval and Reformation periods. The classical period had three distinctive features that Webber (1999) observes, including mystery, community and symbols, which manifest themselves as the unity of the church, and apostolic leadership, who make decisions on food distribution.
The concept of fairness and distribution in this ancient period could have been informed by Aristotle’s (384-322 BC) view on food in his ethical treatise *The Nicomachean Ethics*. Aristotle listed food as one of the attentions, necessities and needs to accord a healthy body. Aristotle also believed that a state agreement existed to serve a balance of the needs of its constituents by recognizing natural inequalities and conferring equal rights accordingly (Frost, 1989). Akin to his golden mean moral view, Aristotle observes that food, like happiness, can cause grief if indulged in too much or too little. This Hellenistic view was accorded community dissemination (Peters, 1999) with the rise of Roman Christianity that instituted Christ’s culture-altering view on food distribution and happiness (Bible- Matthew 25:35) where the faithful are rewarded, not for being balanced as is implied by the Aristotelian view, but by feeding the hungry unconditionally.

It is interesting to note the history of communication here. Around AD 100, Roman couriers had begun carrying government mail across the empire (Fang, 1997). Therefore, correspondence brought in by the couriers was regarded as authoritative since it was from the Roman government. Correspondingly, the Apostles administered the church through epistolary delivery of information to all the regional religious communities. As such, the decision for creating an office to care and plan for food distribution by a respected, elected person such as Stephen may have been communicated through the epistolary means that we see the Apostles administering the church. Such epistles were regarded as authoritative and led to the inclusion of the Apostle According to St. Paul, and other epistles in the biblical canon. For our purposes, therefore, apostolic decisions and actions became a precedent for dealing with food distribution and entitlement. While I do not engage in speculation to the effect that this may have contributed to the religious tradition transmuting to Roman Christianity in the medieval period, it
serves as an interesting observation. During this period in Church tradition, the distinct Roman Christianity thrived, which upheld charity through the religious community as a high virtue.

Furthermore, Tannahill (1973) observed that Imperial Rome had been preoccupied with two things: *annona*, and its public spectacles. *Annona* was the distribution of free grain by the authorities, but the number of people receiving it grew so fast that they used political regulations. The religious community adopted the *annona* model of collective virtue in food aid. Generally, food supplies were mainly natural, supplied by rivers, domestic fowl, occasionally rabbit, all sorts of plants and other domestic animals. Even monasteries and royal courts were self-supporting. Eventually, the huge advances in communications, including the discovery of the printing press and the increase in copy production, both served the medieval roman religious community to set up and eventually to be undone. Food aid to the less endowed in terms of food entitlement because of resources was arduous to offer individually; thus, the collective nature of food aid.

By 1500, Fang writes, approximately 35,000 books had been printed and about some ten million copies. This increase characterized the enlightenment factors that corresponded with an increase in knowledge in the Renaissance, which Webber refers to as the Reformation Era in religious community history, which immediately preceded modernism. Among the most significant books to be reproduced was the Bible, which became much more available to both clergy and laity, and as more people began to read the scriptures for themselves, they questioned certain traditions of Roman Christianity, including the role of the religious community in alleviating hunger, and thus there came the rise of Protestantism. The thoughts of Thomas Aquinas articulate the unfolding food entitlement perspectives in this period.
A food-entitlement perspective defining conflict presents the earliest such perspective in the early Church in the first century (approximately between BC 70-AD 800-1000), sometimes referred to as the antiquity era. The narrative unfolds in a utopian social arrangement in Acts 4:34-35 (Bible, NIV, 1984) where there were no needy persons among them because the more endowed brethren sold their property and brought it to the apostles' feet and it was distributed to the needy. However, as some began to hold back, as in the case of Ananias (Acts 5:1), the ugly head of racial prejudice reemerged, thus setting the stage for the ultimate conflict where it was reported that Grecian widows were being denied food aid (Acts 6:1-7) because of the ambiguity of distribution, and preference went to those perceived as socially superior, i.e. the Hebraic brethren. The leaders faced the crisis by redistributing responsibility and specifying stipulations, while restating the mission of the fellowship as a focus on the ministry of the Word. The arrangement that emerged was participatory and democratic, representing the guarantee and right to use components of food entitlement.

Thomas Aquinas is a significant philosophical and religious personality whose ideas link both pre-modern and the modern thinking. His thoughts have influenced institutional perspectives, including food entitlement, through the modern and post-modern eras. Although Thomas Aquinas lived long before the modern period (1225-1274), Thomism forms a central place in modernistic thoughts either for or against. Through the ideas of *Summa Theologica*, his ideas have formed a central role in church history, especially Roman Catholicism. For instance, Chesterton (1956) describes Thomistic thought as being realist in a more robust sense than his medieval contemporaries, and as informing later modernistic moral realist ideas of such diverse scholars as Immanuel Kant, Karl Marx, and, more recently, Richard Weaver, in his *Ideas have Consequences* writing. According to Chesterton, Aquinas believed in the reality of things, and
that even doubts and difficulties about reality such as deceitfulness and relative reality drove Aquinas to believe more. He argued that things deceive us by being more real than we think and relative reality is only because of potential reality awaiting fruition and fulfillment, such as seeds (Chesterton, 1956), reflecting a philosophy of the common man. Aquinas’s assertions on food entitlements echo similar assertions that Sen (1982) alluded to. For instance, in Aquinas’s flagship work *Summa Theologica*, he argues that the perfection of the moral good is when man is moved to be good, not only in respect of his will, but also in respect of what he calls “sensitive appetite,” a natural law basis for food entitlement which places an obligation on individual entities (individual people, individual communities and states) to take into consideration both the needs of others and their obvious needs or appetites. He talks of a buyer’s discretion in buying from the starving, a basis for justice and human weakness which constitute the “sensitive appetite” (ST I-77 A1 AD 1250).

*Modernistic food entitlement perspectives.* Key philosophical thinkers, institutions and events such as food riots shaped the modernistic view on food entitlement. Growing institutional and religious realities in that era produced profound conflict on who “eats first, what and why,” basically defining and redefining the notion of food entitlement for the era, as well as highlighting it for the first time along with emergent regional discriminative views of class. The modern era was shaped by the scientific philosophy that placed emphasis on reason, and led to the denial of a supernatural Christianity. This led to the proof-oriented Christian apologetics (Webber, 1999). Scholars such as Rene Descartes, Martin Heidegger, Karl Marx and Immanuel Kant contributed their voices in creating a scientifically-inclined, human-driven modernistic culture that was personified in Friedrich Nietzsche’s agnostic “man as a model of the universe” (Frost, 1989) argument. According to Nietzsche, the will to power is central (Frost, 1989), so it is
unnatural to replace it with forced equality. Therefore in the perspective of food entitlement, the strong/able demonstrate their power in society through according or restraining access to food for the less entitled, the poor.

Rene Descartes held that everything in nature must be explained mechanically and that anything spiritual must be reconciled with this (Frost, 1989). Descartes’ extreme dualism of mind and body/matter formed the basis of a skeptical modernistic establishment that knowledge comes to man through careful reasoning from fundamental principles and that every idea can be accepted if reasoned out clearly (Frost, 1989). Immanuel Kant believed in two universes: the phenomenal (experience), which is practical, and the noumenal (reason), which is scientific (Frost, 1989). As such he suggests a practical basis for moral law; act on the maxim that you can and will was Kant’s categorical imperative. But this view, while appearing helpful, dwells on the abstract and does not cover all areas of thinking regarding food entitlement in the occasion of a famine or crisis. Karl Marx presented a profound meta-theory of power and inequality, Marxism, which has its place, both in modern and post-modernistic thought. Marxism claims hegemonic causality and fragmentation (Frost, 1989) and presents a vision of social coherence and equality. This develops a reasoned, modernistic basis for Imperial Rome’s *annona*, and has been used as a basis for socialism in its extreme sense. Martin Heidegger held that man’s individual experiences, *existentialia*, defined by mood, understanding and speech, helped define the individuals’ identity in order to assert their destiny (Frost, 1989). As such, Heidegger’s vision mirrors the central modern belief that theory mirrors reality (Best & Kellner, 1991). He argued that man is in charge of his destiny, including food security and provision, through reasoned ideas of distribution that justify any of the reasonable means of maintaining this reasoned
process, but which may sometimes manifest themselves as hegemonic hierarchies like the colonial experience.

*Food riots in Europe and legislation.* Interestingly, just as the modern era was ignited by conflict over scarce resources in the pre-modern world, and hence the explosion of invention that improved agriculture, it also suffered considerably from conflict that set off growth on many frontiers, especially political, and which drew from the well of scholarly modern thoughts as discussed earlier, including Marxism (Best & Kellner, 1991), and from within the Church, the onset of Protestantism and the growth of denominations (Webber, 1999). Famine and conflict in Britain and France after the 1600s through the nineteenth century set off patterns of food riots that led to the observation that dearth and famine were caused by human acts and could be prevented by public correction (Tilley, 1983). Tilley observes that the end of Napoleonic wars provoked post-war demobilization in Europe with the British industrial slump, unemployment, and the droughts of 1816 and 1817 sharply affecting food prices, thereby sparking food riots. The food rioters expressed the opinion of government obligation to protect the poor consumers from unfair prices. The French food riots were termed as “entrave,” which included blocking the passage of grain to the markets. The famous market-women’s march on Versailles in 1789, along with several other groups that followed (industrialists, workers, and reformers) helped form fairly enduring conditions for food entitlement.

Thereafter, such riots have evolved considerably around the world and have centered more on wages as the entitlements have shifted (Tilley, 1983). Meanwhile, huge advances in communications from Marconi’s telegraph invention in 1894, newspapers, radio and the 1915 radio-telephone that carried speech across the Atlantic, as well as the invention of the electric loudspeaker in 1915 (Fang, 1997), helped fuel a wider trans-Atlantic and later global impact of
the food riots and the subsequent legislation based on justice informed by such scholars as John Locke. Tilley argues that the European governments operated on the economists’ view of free trade that worked itself to a balance of supply and demand, but examples from around the world in the modern era have revealed a weakness of the market to reach those who had weak entitlements, such as the poor, the rural communities, and the vulnerable. The increasing division of labor and growth of capitalism did not seem to help much. The European examples and the following examples of shifting entitlements that brought shortages in the African colonies in the more recent modern era, for example, reveal that government policy undermined entitlement by moving food to those who could buy and not necessarily to those in need. These entitlements are mechanisms that link ordinary people’s experience to the large-scale processes.

Food entitlement legislation has since been handled by respective government departments and has often been tied to poverty eradication initiatives. The move by large multinational aid agencies to legislate within their organizations has also added to the literature on food entitlement and legislation. The modern period also saw the decline and eventual collapse of British Imperialism in Africa and other parts of the world, which ignited spirited nationalist movements of new states that always included the notion of entitlement for residents in their emerging legislative arrangements, but which have inherited the curse of inadequacy and inequality from their imperial mentors.

Such inadequacies were lamented by a chorus of scholars and philosophers, as I have discussed herein, speaking on the problem of man and state and the problem of morality. But in a practical sense, the Church was among the more prominent institutions that organized food aid and other entitlement-enhancing services such as job training. The different denominations held different views on charity and food entitlement. For instance, the African American church has
had an enduring policy on the significance of the Church on the social, economic and political
development of their members and the social communities around them. The feared occasional
lack of food due to climatic challenges had been long conquered by technological and legislative
means, both in individual institutions and the state, as well as internationally. Or so the
apparently elusive modernist vision promised.

*Post-modern food entitlement perspectives.* The indulgence of everything modern in
thought and culture, and a more animated global interaction eventually gave in to those that
opposed the structural constructions of modern man’s scientific investigation, and instead
proposed a deconstructive post-structuralist approach to ideas that eventually gave birth to the
emerging meta-narrative of post-modernism. Among the prominent post-modernist thinkers are
Jacques Derrida and Jean-François-Lyotard. Although eclectic at best, the apparent post-
modernist agenda is to deconstruct the modernist assertions. These contentions shattered
definitive interpretive boundaries established by the modernists.

For instance, it is our view that Amartya Sen’s food entitlement approach proposed in
1982 was a critique of modernity’s institutions and foundations that established international
hierarchies and multinational “aid agencies” that have instead failed to deliver on the real needs
in the communities, which is the protection of, and creation of entitlement on the occasion of
legislature and in the event of adventitious entitlement (Tilley, 1983), such as drought and other
calamities. True to the “spirit” of post-modernism, Sen’s entitlement model has been interpreted
in any of the ways which fits the context of community as in Aquinas’s “sensitive appetite,” and
in this study it is applied to the reality of an engaged social player.

Jean-François-Lyotard asserts that post-modernism is “incredulity towards meta-
narratives” [quotation marks original] (Smith, 2006). According to Lyotard, the modern
establishment has three derisory conditions: (a) the appeal to meta-narratives to legitimate foundationist claims, (b) the inevitable outgrowth of legitimization, and (c) a desire for homogeneous epistemological and moral prescriptions based on consensus that creates false universality. As such, Lyotard attacks these totalizing and universalizing theories and methods in his works, *Just Gaming* and *The Postmodern Condition*. In *Just Gaming*, he reveals that the “justice of multiplicity” has the advantage of a “universal value” (Best & Kellner, 1991).

Similarly, Jacques Derrida’s “Deconstruction” of the modernist had the goal of revealing the hidden mechanisms that influence meaning in written language, and to demonstrate the concealed power of symbols in text. As such, Derrida sought to destabilize discourse by challenging traditional assumptions concerning text, language and meaning. Smith (2006) applauds Derrida’s claim that “there is nothing outside the text” as alluding to the centrality of Scripture for mediating the Church’s understanding of the world as a whole. Smith observes that deconstruction has value for the post-modern era in recovering the role of community in interpretation of text in social good, including food entitlement.

On the question of the role of community in a hungry world, Toton (1982) maintains that the presence of poverty and hunger in the world cannot be interpreted as anything but a fundamental break in our relationship with our neighbor and God. It is a flat refusal to respond to our neighbors’ needs and to make them our own as in the Synoptic Gospels’ record of Jesus’ teaching. Toton maintains that sin manifests itself in concrete political, economic, and social decisions, structures and systems and calls to Aquinas’ reality of the concreteness of hunger and entitlement inequalities. Therefore, the post-modernist thinkers and institutions emerge with largely eclectic views on food perspectives, placing more emphasis on the value of the individual’s food-rights in the context of a specific community or organization.
An African philosophical perspective on food entitlement

Since pre-modern, modern and post-modern eras are mainly Western philosophical constructs, food entitlement has been defined in the context of events, policy and socio-cultural perspectives in a time epoch. Since our current study is in Sub-Saharan Africa, making sense of food entitlement in an African setting therefore requires philosophical legitimization. This study’s quest for philosophical legitimization exists because I am studying institutions in Africa which have emerged from a strong modernist institutional food-aid perspective, but which are trying to define food entitlement through post-modernistic fragmented/diversified “truth-telling” (Eilerts, 2012), as epitomized in the FEW NET- KFSSG institutions in Africa, which were formed through the efforts of USAID and other peer institutions in 1984 and 1998 respectively. There is need to decipher the philosophical reception of the perspectives and not to assume unquestioned, wholesale application of aid-givers’ perspectives in the African context.

There has been considerable debate on the connection of Western philosophy to African philosophy with some, on the one hand, taking on the universalist notion of philosophy, such as Kwasi Wiredu (1998, 2004) and Taiwo Olufemi (1998), who see a concomitant historical philosophical presence, albeit at different levels, which has found contact and continuity through the Church and colonialism. This way, as Wiredu observes, African philosophy can afford a universal contribution to philosophy by acknowledging the natural progression through the ages that defies geographical and temporal boundaries. On the other hand, there are also those with an opposite point of view who belong to the philosophic sagacity school, which yearns for the autonomy of African philosophical thought, and which has advanced individual nationalist-ideological philosophy and ethno-philosophy as uniquely African, according to Oruka (1990) and Ochieng' (2002), along with Mbiti (1991).
Both polarities dispute to some degree that Western philosophy is entirely synonymous with universal philosophy. However, one meeting point of these two polarities is that the spread of the Church or Evangelism represents a more authentic “contact” of the development of both worlds than its impervious companion - colonialism. Masolo (in Wiredu, 2004) notes that first century African thinkers such as Augustine helped mold the basic tenets of Christianity, which ironically seems foreign upon its reentry even to be implicated in colonial conquest. Masolo observes that Augustine helped universalize Christianity through such works as *Confessions*. Essentially, the Church and Christianity doctrinally emerged as a practical system, a revealed way of life rather than a system of theory or knowledge (Masolo, 2004). I argue herein that the current post-modern phase of Western philosophy has acquired a salient amiable disarray that is reflective of a global culture and which finds many points of contact with other regional schools such as those of Asian and African philosophy, ironically taking on Hegels’ vision of a universal philosophy in what he calls “the Philosophy of Right,” which manifests a principle of Spirit as expressed through a dominant culture.

**Need for an “African” Perspective.** The need to establish a distinctly African perspective on food entitlement, and therefore Famine Early Warning Information Systems in Africa, is imperative so as to grasp the context of the FEWI social experiment that I discuss in this study. It is crucial to establish that the distinction ought to go beyond the often cited “African-isms” of descriptive arrays of infrastructural impediments and community intimacy nested inside hierarchical male-hegemony and class-power distance. Food entitlement requires authentic Afro-centric cutting-edge theoretical and methodological contributions. As Molefi Kete Asante (2012) noted:
Congruent theories of African phenomena have symmetry to African life. … scholars in the discipline must devote more attention to works of theory and method than to description and polemics [own emphasis]. Since we have argued that our paradigm has brought about a shift in the way identity, culture, and thought are examined, we must create reflective works that tease out the critical issues remaining to be unveiled in our quest for intellectual light. (Asante, 2012)

Asante continues his observations on the task of legitimizing an African perspective on research done in Africa by suggesting an Afro-centric meta-theoretical basis for the examination of African phenomena that overall refutes the marginality and peripheralization of Africans. As such, he suggests that the Afro-centric study of African phenomena [emphasis original] is grounded in the Maat principles drawn from the ancient people of Kemet, which seem to hold for all African societies trans-generationally and trans-nationally. These principles, as Asante (2012) suggests, include harmony, balance, order, justice, righteousness, truth, and reciprocity.

Current African perspectives on food entitlement and FEWI. The African perspective on food entitlement has been defined by such current scholars as Amartya Sen and agricultural innovation specialist Calestous Juma. While Amartya Sen defines food entitlement as an economic concept, he sought third world realities for some of his economic models and samples, which encompass Africa. Calestous Juma, on the other hand, has sought to redefine food entitlement by drawing from Sen’s thoughts and by suggesting specific implementation scenarios that, according to Calestous, are already in progress in Africa and which, if acknowledged and encouraged, may lead to food security in Africa in just one generation. His thoughts on food entitlement fuel this pursuit and the agricultural innovation model, as a review of his book The New Harvest captures below.
The Famine Early Warning Information System Network (FEWS NET), along with the Kenya Food Security Steering Group (KFSSG), and the other peer institutions of famine warning information systems such as the Global Information Early Warning System (GIEWS), have had to work within the African socio-political context to carry out the task of both determining early famine indicators, and of convincing stakeholders of the need and methods of famine mitigation approaches. Both tasks have had their share of Afro-centric changes, influences, and unique means to ever improving strategies towards famine mitigation.

**Topics/issues in Food Security conversation and framing.**

In talking about framing food security management and famine mitigation, there are several areas of conversation that experts cover. Conversations herein are constructed from the 1996 definition of food security, which has continued to be amplifiable to many more emerging areas contributing to the issue/concept of food security. The Food and Agriculture Organization of the United Nations (UN FAO)’s World Food Summit met in 1996 to renew a global effort to eradicate hunger. The forum’s results included the “1996 Rome Declaration on World Food Security” and the “World Food Summit (WFS) plan of action” documents which gave the most comprehensive, although parsimonious, definition on food security so far. It read: “Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life.”

World Food Summit (WFS) (13-17 November, 1996).

UN FAO’s four pillars of food security (Access, Availability, Use and Stability) touch on the major topics of the food security conversation today with topics which include: (a) Production, (b) Biodiversity, (c) Genetically Modified Crops, (d) Climate change adaptation, (e) Storage/ waste reduction and recycling, (f) Distribution, prices and livelihoods, (g) Nutrition, (h)
Energy efficiency, (i) Afforestation, reforestation and forests for food, and (j) Gender and economic equality. Each conversation topic is presented as a “frame” because each topic acts as an element used to organize experience and which allows experts (and us) to locate, perceive, identify and label concrete occurrences in the food security conversation, policy and action.

(a) Production frame. Food production is the major face of the food security conversation. It aligns with FAO’s “availability” maxim on food security. In order for a community to be food secure, they need to produce more food in an efficient and sufficient manner, safely and sustainably. In fact, the term “food security” was first used in international development literature to refer to the ability of a country or a region to assure adequate food production and supply for its current and projected population (Ramachandran, 2013).

The FAO World Food Summit (WFS) document footnotes that the reference to “agriculture” also includes livestock. The initiatives for increasing agricultural production also includes livestock and will therefore include support for research and development for more dairy and meat production and increasing poultry production among other areas for increasing food output. There must be production of crops, produce from livestock and related food products in the first place before even considering other related but important issues to food security. Various initiatives have been implemented successfully by local governments towards directly increasing agricultural production (Ramachandran, 2013, p 375), including investment in irrigation, fertilizer production and subsidy, land tenure reforms, research and development support for development of high yielding strains, laboratory-to-land extension education, and farm level procurement at minimum support price as is the example of India’s Green revolution from the ‘60s through the ‘90s.
Further, food production is labor and space intensive. Reforms in organizing land ownership and organizing labor have been directly related to planning production. For instance, Community Supported Agriculture (CSA) initiatives were introduced to improve commercial food production in the Upper West Region in Ghana. CSA agriculture is a mutually beneficial partnership between a community and farmers where community members gain access to fresh local and seasonal farm produce directly from farmers who supply supermarkets with fresh products daily or weekly from their farms. The growers and consumers provide mutual support and share the risks and benefits of the production and, in most cases, members are shareholders of the farm and pledge in advance to cover the anticipated costs of the farm operations. Research on the effectiveness of CSA in enhancing food production reveal that the farmers lacked funds for farm preparations, purchase of quality seeds and technical support for their farming activities as well as a lack of sufficient water (Darimani, Rahaman, & Amankwah, 2012). Larger issues such as problems in land acquisition, market for their produce and lack of cooperation among the farmers point to the need for training and more funding in order to efficiently manage this collaboration.

(b) Biodiversity frame. Biodiversity refers to the variety of life in the world or in a particular habitat or ecosystem and the uniqueness of its processes. I argue that it aligns with FAO’s “availability” and “stability” maxims on food security. Agricultural (crop and livestock) or just agro-biodiversity is fundamental to food production and as a valuable ingredient of environmental conservation (Thrupp, 2000). Genetic diversity adds protection to our food system (Giridhar & Sridevj, 2011). Thrupp argues that agro-biodiversity includes a wide range of species and generic resources that a farmer may exploit to produce and manage, crops, land and water and biota (animal and plant life of a particular region). It includes all forms of life directly
relevant to agriculture: rare seed varieties and animal breeds (farm biodiversity), but also many other organisms such as soil fauna, weeds, pests, predators, and all of the native plants and animals (wild biodiversity) existing on and flowing through the farm in a given region. This also includes aquatic ecosystems that support the fisheries industry.

Agro-biodiversity has value in science and technological discovery in increasing and improving production. The reverse is true as well; that decreasing biodiversity decreases food security because it essentially increases vulnerability. Reduction in biodiversity often increases vulnerability to climatic variations and other stresses such as pests and raises risks to the individual farmers and undermines the stability of agriculture. Reducing agro-biodiversity happens through commercialization and corporatization, for instance; people consume approximately 7,000 spices of plants but only 103 species account for the world food crops and only 3 (rice, wheat, corn) account for 60% of calories (Thrupp, 2000, p.5). Action to maintain a range of varied food sources protects against climatic disasters, and diversity in plants and animals provides a rich source of essential secondary metabolites as therapeutic compounds (Giridhar, & Sridevj, 2011).

Tscharntke et al., (2012) maintains that conserving biodiversity while working to achieve efficient and productive agricultural land use is a global challenge. They argue that wildlife-friendly farming and agro ecological intensification are crucial ecosystem services provided by “planned” and “associated” biodiversity, whereas the land sparing concept implies that biodiversity in agro ecosystems is functionally negligible. However, loss of biological control can result in dramatic increases of pest densities; pollinator services affect a third of global human food supply; and inappropriate agricultural management can lead to environmental degradation. Hence, the true value of functional biodiversity on the farm is often inadequately
acknowledged or understood, while conventional intensification tends to disrupt beneficial functions of biodiversity.

In conclusion, linking agricultural intensification with biodiversity conservation and hunger reduction requires well-informed regional and targeted solutions. Various efforts need to be ongoing to preserve and to safeguard agro-biodiversity with reference to sustainable food production to protect domesticated and wild crops, along with traditional less known foods so as to maintain biodiversity of food, dietary diversity, better nutrition and health (Giridhar & Sridevj, 2011). It is crucial to note that both sustainable use and sustainable development require healthy ecosystems and viable communities and societies. Scientists will play an important role in providing synthetic projections of the implications of proposed options, which should help policy-makers find coherent answers and adopt policies and practices that serve both humanity and sustain ecosystems (Rice & Garcia, 2011).

(c) Genetically Modified (GM) Crops frame. Proponents of genetically engineered crops or biotech foods argue that GM is necessary as a possible response to the biodiversity question and the climate change adaptation question and in seeking to grow plants that are resistant to climate change while aligning with FAO’s “use” and “availability” maxim on food security. GM food is a product of genetic engineering techniques with the aim to introduce a new, hopefully beneficial trait, to the plant which does not occur naturally in the species. Examples of traits include resistance climatic and environmental conditions, resistance to chemical treatments, pests, or diseases. One side of the GM food debate in Kenya has included such renowned local scientists as Dr. Florence Muringi Wambugu, a plant pathologist and virologist who advocates the use of biotechnology to increase food production in Africa. Dr Willy Kiprotich Tonui, the National Biosafety Authority (NBA) chief in Kenya, confirmed that
the board had approved the importation of corn-soya blend and maize meal for humanitarian assistance and relief supplies during drought seasons (Ngotho, 2013, 6 May). This was in accordance to NBA’s role in regulating research and commercial activities involving GMOs by establishing transparent science–based and predictable process that guide decision-making on the application for approval of research and commercial activities involving GMOs.

However, there has been a simmering policy debate on genetically engineered food and its alleged contribution to food security in Africa. The yawning differences in views culminated to a ban in GM food in 2011/2012 in Kenya seen as conflicting with some at the National Biosafety Authority, established in 2009. The widely circulated GM foods protest campaign started after Prof. Gilles-Eric Séralini, a molecular biology professor, and his colleagues published papers on the risks of GM foods. The papers’ research was funded and published by the Committee of Research and Independent Information on Genetic Engineering (CRIIGEN). In their argument, they included health risks through GM food by the multinational food corporation Monsanto. This in part drove the Kenyan government to impose the GM food ban in Kenya in 2011/2012. The ban remains with significant pressure from the United States (Zhulieta Willbrand, senior US trade specialist) accusing the Kenyan government of sending the wrong signal about its commitment to technological advancements (Nakweya, 2013, August 8). Recently, some Kenyan universities also joined the protest against the ban on GM foods in Kenya.

(d) Climate change adaptation frame. Climate change adaptation is a major discussion point in food security conversation. It aligns with FAO’s “stability” maxim on food security. Among the major focus of famine early warning information is climate data gathering, synchronization and interpretation towards forecasting possibilities of drought to inform a
heavily rain-fed agricultural that is the Sub-Saharan Africa region. FEWS NET and KFSSG rely on climate data by USGS to inform their rhetoric on famine early warning information.

There are two responses to the available climatic information: one is to help steer action towards climate mitigation through policy on conservation, and the other is to plan on appropriate agricultural and general policy adaptation towards building resilience to climate change. The move towards climate change adaptation is seen as a major departure point to ensure sustainability of gains in food security planning as the effects of climate change continue to spiral. The strongest argument that practically and sustainably links food security to practice in response to climate change and climate change adaptation is represented in the 2013 *Climate-Smart Agriculture Sourcebook* by UN FAO released in June 2013. The sourcebook puts together decades of experience in promoting agricultural practices and policies that safeguard the natural resource base for future generations for achieving food security and improving livelihoods. The sourcebook gives a practical framework for local policy and action to achieve food security and agricultural development goals. Adaptation to climate change and lower emission intensities per output will be necessary to support sustainable and increased production by 2050. The World Bank endorsed the Climate-Smart Agriculture (CSA) sourcebook initiative, citing that CSA is a “triple win” for agriculture, the climate and food security.

Current debate in the news in 2013 has seemed to push climate change adaptation as a major determinant of sustainable food security, rather than just one of many issues. For instance, the recent The Warsaw Climate Change Conference 2013, convened by the United Nations framework convention on climate change, heard an emissions report that put the cost of a 2-4°C degree warming climate change in Africa at a staggering 350 billion dollars per year in the business of adaptation. Measures would include developing drought-resistant crops, providing
early-warning systems for floods, droughts and fires and building seawalls, dykes, and wave breaks, among other adaptation activities. The Warsaw forum concluded with a mandate for governments to work on a draft text of a new universal climate agreement to be tabled at the next UN Climate change conference in Peru and concluded at the Paris forum in 2015.

(e) Storage/ waste reduction and recycling frame. UN FAO estimates that a third of all food produced in the world is wasted, the equivalent to $750 billion a year. It aligns with FAO’s “availability” and “stability” maxim on food security. Storage and recycling is useful to help regulate pricing in the context of informed policies on food distribution and prices. Lack of storage leads to wastage, environmental degradation and in adverse conditions may lead to famine. According to the UNDESA, approximately 30% of the food produced worldwide is lost or wasted every year. This is approximately 1.3 billion tons of wasted food. As agricultural products move along extensive value chains and pass through many hands—farmers, transporters, store-keepers, food processors, shopkeepers and consumers—wastage occurs due to a breach in storage.

Food storage, as a part of the sustainable food frames, will be included as a significant factor in the analysis of the commitment to famine early warning. Just as the biblical Joseph’s model of Famine Early Warning (FEWI) that we are studying had food storage as a major factor of early action, so is it a major part of the sustainable food frames. Part of the measurements and research instruments include food storage as a sustainable food frame. A participant’s view on food storage is part of their commitment to early action from their perspective of FEWI.

The founders of Food Tank Think Tank, Ellen Gustafson and Danielle Nierenberg, argue that the food system is broken when some people don't have enough food while others are eating too much or the wrong kinds of foods. They call for collaborative crowd sourcing efforts to fix
the complex issue. For instance, in her efforts to sensitize people of wastage, Danielle Nierenberg ran the “Food waste free NYC” among her projects to sensitize the public about food storage and the ripple effects of best practices in our daily habits that ultimately contribute to “fixing” the broken food system.

(f) **Distribution, prices and livelihoods frame.** The incidence of famines brings a subtle reminder of the notion of access to food through purchasing power. It aligns with FAO’s ‘availability’ maxim on food security. People or households who are more vulnerable, through various definitions of vulnerability, are more likely to be affected by the prices and livelihoods aspects in accessing food and nutrition for a healthy lifestyle. Since vulnerability is intricately linked to poverty, poverty eradication has been seen to contribute directly to food security for households. That is why the first Millennium Development Goal (MDG) established by the United Nations for 2015 paired poverty eradication with working to achieve food security in the world. Amartya Sen’s ideas (discussed earlier in this study) on livelihoods, distribution, prices and food entitlement have been central to defining role of livelihoods in defining, analyzing and managing food security in the local and international levels.

(g) **Nutrition frame.** Nutrition is the process of providing or obtaining the food necessary for health and growth. It aligns with FAO’s “access” and “use” maxim on food security. Both under- and over-nutrition are associated with health hazards. Danielle Nierenberg of the Food Tank refers to the two extremes as “a broken food system” that requires sustainable solutions through a series of actions and stands on food security and nutrition that should be adopted both regionally and locally.
(h) Energy efficiency frame. The energy efficiency of a food item can then be defined as the total amount of energy required to produce the food divided by the total amount of energy the food contains. It aligns with FAO’s “use” and “stability” maxim on food security.

(i) Afforestation, reforestation and forests for food security frame. The role of forests in food security has been linked to helping mitigate climate change effects and rain levels that support food production. It aligns with FAO’s “stability” and “availability” maxims on food security. Forests not only contribute to climate regulation and rain but are also important food sources themselves. For instance, according to FAO, millions of households in the developing world depend on food and fodder from forests to supplement their own and their livestock's diets through nuts, roots, fruits or sap.

Recent conversation, especially in the just concluded International Conference on Forests for Food Security and Nutrition (13-15 May 2013), has moved forests as peripheral to central contributors in food security through unique products and technology. The conference called for much greater attention to the role of forests in the conversation of food security and nutrition. The conference also recommended the training in the management of sustainable forest enterprises to help forest-dependent communities, particularly women and youth, to gain access to equitable value-chains, such as those applied in fair trade, thereby improving the food security and nutrition of such communities and also helping governments capitalize on traditional knowledge on the better use of forests as contributors of food security. Afforestation entails the conversion of bare or cultivated land into forests (originally for the purpose of hunting), while reforestation includes replanting trees in previously deforested areas for reasons such as farming or settlement. The Kenya Forestry Research Institute (KEFRI) established in 1986, has been involved in research on forest and allied natural resources. KEFRI also hosts the secretariat for
two FAO projects to develop the gums and resins subsector within the framework of the Network for Natural Gums and Resins in Africa (NGARA), a regional African network with 15 member countries (FAO, 2010).

(j) Gender and economic equality frame. Gender and economic equality was included in the United Nation’s millennium development goals (MDG) as the third goal and its main argument is that the more empowered women and the vulnerable are, the greater the food security. It aligns with FAO’s “access” and “availability” maxims on food security. This is due to the fact that women make up 51 percent of the agricultural labor force worldwide (International Alliance against Hunger 2009), but have the least access to the means for increasing output and yields and for moving from subsistence farming to higher-value, market-oriented production (FAO gender Website). A study of farm credit schemes in Africa found that women’s share of loans was just 10 percent (FAO gender Web site). In sub-Saharan Africa, agricultural productivity can increase by up to 20 percent if women’s access to resources such as land, seed and fertilizer is equal to men’s (Africa Commission Facts and Figures).

Framing Famine

Famine is a resultant phenomenon to a range of man-made and natural catastrophes, which may include agro-climatic causes (drought), distribution, governance, misinformation and conflict, as well as other man-made catastrophes that fail to solve the drought problem and instead let society escalate towards famine. Therefore, perspectives on famine, which is the concern of framing famine, are informed by the prevailing societal views. The concept of framing is presenting information, especially in the media, in a predictable and patterned way and is therefore a process by which individuals construct meaning in public discourse (Gamson and Modigliani in Scheufele, 1999).
Framing is the way in which something is outlined or highlighted with implicit cultural roots (Goffman, 1974). As such, frames can be defined as schematic structures that depict delineation of thoughts and ideas, therefore introducing the idea of culturally-informed categorizations. Further, the idea of categorization may be differentiating or integrating. By integrating, the categorization or frame integrates otherwise disparate pieces of information to serve a specific unified function, thus organizing experiences and ideas into frames and a new way of viewing reality that has a specific interpretation for the selected purposes. Framing traces its roots to psychology and is characterized by the assumption that how an issue is characterized in the news or reports can influence audience understanding (Scheufele & Tewksbury, 2007).

**Framing Research Studies**

Framing studies in communication have mostly been media effects studies (Scheufele, 1999). It is probable that the professional message selection processes by the media for a mass audience and their subsequent effects on the audience’s attitudes and beliefs may have attracted as much attention from scholars studying framing. However, there is much more literature on framing outside of media framing studies, both of which take on the same ideas in terms of the nature of message framing. Since famine early warning seeks to design messages about the state of natural, social and economic conditions and indicators for food security to share with an audience, the insight from media frames studies is appropriate in a discussion about framing food security or famine.

Media frames connote frames as independent versus dependent variables in observable audience characteristics, as they constitute a central organizing idea or storyline that provides meaning to unfolding events (Gamson & Modigliani in Scheufele, 1999). Similarly, the media’s role in defining and responding to famine was well documented in the case of the conquest of
famine in South Asia (De Waal, 1998). According to De Waal, India’s independent press played a key role in the successful implementation and maintenance of an anti-famine social contract. At crucial moments, the media influenced public mood and triggered governmental action through determined investigation and critical analysis. As such, famine became an issue in a wide range of papers and was theoretically informed. Thus, the preparedness of the press to take on the issue of famine meant that politicians and administrators were vigilant to the signs of distress, and the people were ready to take the relevant action. The anti-famine contract was not maintained by tradition or symbolism, but by power and interest (Waal, 1998).

Media framing studies center on the contexts of messages and their range of outcomes. Understanding literature on media framing helps to create a background understanding of how the framing of messages through third party reporting may impact an information campaign such as the early warning information systems utilized by FEWS NET-KFSSG to organize early responses to food insecurity. The project for Excellence in Journalism (PEJ, 2010) embarked on a multi-year study to establish what narratives journalists use to frame news and on whether some news items contain discernible underlying messages or ideologies in determining the nature of the news. They found that the media was more thematic than interpretative. They also found that the media took on more combative lenses in news reporting, indicating that the news stories focused on the conflict rather than the details. Famine early warning can compare to media framing with combative lenses because it focuses on the famine or food instability conflict in highlighting the information for use to drive famine mitigation action.
The application of the current status of framing studies onto this study. Equivalent frames vs. emphasis frames in early warning information systems. The perspectives on framing famine are informed by the prevailing societal views, as they construct meaning based on the type or mode of communication. There is, however, a huge debate on framing studies in communication over the direction of “framing” research, which essentially takes framing as a “communication emphasis” study or a “communication equivalence” study (Scheufele & Iyengar, 2011). Past studies in framing have been ambiguous by equating framing to agenda-setting or priming. “Priming” is placing a spotlight on an issue and pushing it as a highly salient issue to audiences, therefore setting activation tags that make the issue a standard for policy (Collins and Loftus in Scheufele & Iyengar, 2011). On the other hand, agenda-setting is the subtle placing of salience on an issue in the media so as to influence discussion in the marketplace.

Framing has been argued as incorporating some aspects of priming and agenda-setting in the “emphasis-frames” studies, which Scheufele and Iyengar argue introduce duplication and ambiguity into framing research. Instead, Scheufele and Iyengar (2011) recommend “equivalent frames” framing studies that, according to them, are schema-dependent, and therefore address how people make mental shelves for information that they have received, and which are culturally shared.

This study on framing famine makes an inference to schema-dependent effects of FEWI in attempting to understand the systemic schemas inherent in the makeup of FEWS NET-KFSSG, which presents a schema or a distinct representation of famine and the food security situation. Below is an illustration of “emphasis frames” versus “equivalent frames” using picture frames as epistemological representations of the state of famine (see illustration below):
Figure 8.1 Emphasis frame in FEWI (– 3 scenarios)

“Emphasis Frames” – selective emphasis such an agenda-setting, priming or even persuasive communication -

Illustration: Emphasis frames have a specific focus on an issue. This illustration shows frames putting emphasis on certain aspects of the picture, such as lack of water or loss of livestock.

Photo courtesy: Google pictures
Figure 7.2 illustrates that equivalent frames have a focus on the presentation of the “whole” issue within a certain schema. This illustration shows different frames portraying a famine or drought situation but are conceptualized as one schema or mental shelve of early warning information. The current study, in mapping the entire FEWS NET-KFSSG composition and a representative sample’s view on FEWIS information, presents equivalent frames of the EWS information. The schema-dependent equivalent framing approach is recommended by leading framing scholars (Scheufele & Iyengar, 2011; van Kesteren M, Fernández G, Norris D, Hermans E., 2010). van Kesteren et. al (2010), in studying hippocampus, the part of the brain that consolidates information from short-term memory to long-term memory, found that manipulation of prior schema leads to modulations in and between memory-related schemas; and that a lack of prior schema leads to enhanced partial connectivity of this region with the
hippocampus during learning. Similarly, the repackaging of drought information as a new entity pursued, rather than previous eclectic frames with traditional setbacks, by a community of scholars and professionals in FEWI may enhance connectivity to an effort towards early action.

**Six sustainable food interpretative frame packages (Gorp, & Goot, 2012)**

Framing food has been a concern for scholars since the convincing shift in ideology that food insecurity was a product of human institutions and organizations, and not just climatic changes and drought (Sen, 1981, 2001; De Waal, 1989; Mooney, 2009). As such, the need to define food and food insecurity or famine within specific frames arises. Since frames are tools that are used in communications to decide which means of reality should be selected and highlighted so as to present as clearly as possible the issue in context, I argue that the business of famine early warning information systems (FEWIS) seeks to elicit an inoculation effect in cultures, and demonstrates sustainable food security parameters. This means that a FEWIS is not only about impending climatic or insecurity indicators, but it is a system that models sustainable food security and the means to both fight impending climatic or other types of disaster, and to also sustain resources and the means for the attainment of food security systems. FEWS NET’s and KFSSG’s work is directed towards the decision-makers, and therefore the stakeholders, in food security.

I have therefore adopted Baldwin Van Gorp and Margot J. Van der Goot’s (2012) proposed sustainable food and agricultural stakeholder frame packages so as to organize culturally comprehensible FEWI information frames upon which I am basing our enquiry into FEWI information commitment. Studies on food security concur that that the notion of knowledge and action towards FEWI is a deeply cultural endeavor and thus there is a need to
adopt a system of food frames that are located at the cultural level (Sen, 1981; FAO Corporate document, 1998 and Van Gorp & Van der Goot, 2012).

Table 3. Frame Matrix of the Six frames used for Communication about Sustainable Food and Agriculture. (Van Gorp & Van der Goot, 2012)

<table>
<thead>
<tr>
<th>Reasoning Devices</th>
<th>Framing Devices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frame</td>
<td>Problem definition</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>1. Responsibility value (pg 134)</td>
<td>Human kind has been given temporary stewardship but is failing</td>
</tr>
<tr>
<td>2. Undermining-of-fundamental-values frame (pg 135)</td>
<td>Agriculture and the food industry disturb the fragile balance within the ecosystem</td>
</tr>
<tr>
<td>3. Frankenstein frame (pg 136, 139)</td>
<td>Actions of intensive farming and the food industry are leading the World down</td>
</tr>
<tr>
<td>4. Natural Goodness frame (pg 136)</td>
<td>Nature is inherently good and hence comes before all else</td>
</tr>
<tr>
<td>5. Progress frame (pg 137)</td>
<td>Scientific progress yields solutions to food production and should not be stopped</td>
</tr>
<tr>
<td>6. Good mother (archetype) frame (pg 138)</td>
<td>Agriculture and the food industry guarantee the supply of nourishment</td>
</tr>
</tbody>
</table>
In their research of the culturally embedded frames that stakeholders use in their communication about sustainable food, they examined the defined frames connected to specific stakeholders. Van Gorp & Van der Goot (2012) conducted an inductive framing analysis, which was a systematic identification of manifest framing and reasoning devices that led them to identify which cultural phenomena functioned as core frames.

They studied communication about sustainable food, which was distributed to a general audience and to stakeholders. The sample in the study consisted of 272 messages published from 2005-2009. These messages included 67 food advertisements, 81 articles, 47 brochures, 21 websites, and 56 assorted message products (teaching materials, reports, annual reports, TV commercials, TV programs, stickers and gadgets). They then compiled unstructured lists of manifest framing devices and reasoning devices connected to sustainable food and agriculture and used axial coding (Strauss and Corbin, 1997). The framing analysis process yielded a frame-matrix of six mutually exclusive frame packages that each satisfied three main conditions: (i) they were complete in the description of the frame, (ii) they had a degree of abstraction, and (iii) they demonstrated the possibility of defining other issues with the aid of the frame.

All frames contained reasoning devices that could be described in a logical and consistent way (Van Gorp & Van der Goot, 2012). The resultant interpretative frame packages included: (a) the responsibility frame, (b) the undermining-of-foundations frame, (c) the Frankenstein frame, (d) the natural goodness frame, (e) the progress frame and (f) the good mother frame (illustrated in Table 3).

Van Gorp and Van der Goot’s (2012) study provided insight into the manner in which the principal stakeholders use culturally embedded frames in their public communication about sustainable food and agriculture. The analysis therefore provided insight into how frames are
deployed and showed that frames act as basic exchanges of meanings about the topic of food sustainability in order to communicate problems, solutions, causes and consequences in a clear way. These frames can serve as a starting point for further quantitative content analysis and framing studies. More importantly, the suggested frames help formulate reliable expectations of how people perceive messages related to sustainable food and agriculture.

Overall, sustainable food and agriculture is a dictum in FEWIS which essentially attempts illocutionary rhetoric to trigger inoculative action towards sustainable food security as a cultural shift towards early action. In order to apply culture-perceptive framing labeling of the mapped/revealed networks, the present study adopted Van Gorp and Van der Goot’s (2012) six frame packages. These frame packages define sustainable food frames and are therefore relevant frame packages to define food security. Therefore, the six frames are plausible indicators in testing information commitment to sustainable food information contained in the FEWI information.

**Managing famine risk by linking early warning to early action and the media.**

A major tenet of the FEWNET approach is the tenth maxim, which stipulates judging whether the FEWS NET’s FEWI campaigns’ success is based on evidence that information prompts correct and timely action. This section discusses the elusive link to early action reflected in the timing of FEWI reports, media coverage and stakeholder initiatives for the implementation of famine mitigation action. According to Mosley and Logan (in Wisner et al., 2005), the conceptualization of hunger in contemporary Africa is a discursive process in which meanings assigned to key concepts such as hunger, famine, vulnerability, and food security often reflect the ideological position and interests of major donors (p. 133). Mosley and Logan outline a four-fold check-list (p. 134) on food security: economic and physical access to food, food self-
sufficiency, security of access (political and economic stability) and sustained access over a long period. Famine early warning systems are in place to systematically harvest data supporting the existence of all four areas in food security and to trigger appropriate action should there be an incoming deficit.

Mija-Tesse Ververs (2011) wrote an opinion paper which analyzed the regional early warning systems in East Africa and their ability to predict the just-ended food crisis that was declared from July 20, 2011 to February 2012 in the Horn of Africa. Ververs (2011) set out (see Table 3 below) with all five early warning systems, and ranked FEWS NET as the credible and leading famine early warning body in the region. According to Ververs (2011), of the five early warning systems examined, only FEWS NET’s special reports, together with their food security alerts and FSNWG’s alerts, demonstrated high accuracy in predicting major food insecurity in the region in a timely manner (at least six months ahead). Early warning information systems are only useful if they are accurate and timely. Therefore, FEWS NET’s system was functional to potentially avoid famine in 2011.

However, with early warning information systems improving and growing rapidly, the rather pragmatic problem is transferring these early warning indicators to action through the very media that decries and reports famine when it eventually happens. Paradoxically, there is often a readership boom for the media when famine-disaster news breaks. This is simply because famine early warning information (FEWI) ranks low in newsworthiness because it does not involve any fatalities yet or any major policy changes yet. Therefore FEWI may sometimes be termed as non-news for local news and information coverage. FEWI information’s call for early action, may sometimes be seen as regular policy implementation activities and therefore ranks lower than disaster in news-worthiness. On the other hand, the prevailing media perspectives have blamed
both intrinsic and extrinsic political reasons for a culture of “non-action” and not the media’s failed agenda-setting responsibility towards famine/disaster mitigation to drive early action.

Table 4: The Five Regional EWS systems examined in relation to the food crisis in E. Africa 2011-2012

<table>
<thead>
<tr>
<th>Name</th>
<th>Organizational setup</th>
<th>Information format and frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>FEWS NET</td>
<td>FEWS NET Staff 21</td>
<td>Special reports and food security alerts (depending on severity), food assistance, outlook (monthly), price watch (monthly)</td>
</tr>
<tr>
<td>FSNWG</td>
<td>Group of NGOs, United Nations agencies, Red Cross/Red Crescent, food security information systems, technically-supported FAO.</td>
<td>FSNWG update on Central and East Asia (approximately monthly)</td>
</tr>
<tr>
<td>IPC (8)</td>
<td>National and Regional (at each level multi-agency and national governments and forums)</td>
<td>Maps with current ideas situation and trends (biannual) for Kenya, Somali, Uganda and East Africa, and special briefs/updates on Uganda (irregular), Somalia (quarterly): information of EA as a region.</td>
</tr>
<tr>
<td>GIEWS</td>
<td>FAO</td>
<td>Crop prospects and food situation (trimestrial), special reports (dependent on emerging crisis, often after crop and food security assessments missions, food outlook (biannual) and global food monitoring (monthly).</td>
</tr>
<tr>
<td>HEWS (18)</td>
<td>Inter-agency standing committee and WFP (The WFP is responsible for co-ordination/management of content)</td>
<td>Maps on website-specific tools/reports and links to organizations dealing with specific hazards. Various website tools related to hazards like locust infestation, flooding, weather, storms etc. Seasonal and hazards calendar including seasonal calendar with marked food-security hazard.</td>
</tr>
</tbody>
</table>

For instance, the recently released Chatham report by Rob Bailey (April 2013) makes a sound attempt to assess the purported essential missing link between early warning and early action to mitigate famine, which is also the goal of both FEWS NET and the KFSSG. Bailey’s report evaluated the political, institutional and organizational barriers to making the essential famine mitigation link in the recent famine crisis in Somalia. Bailey describes a converse relationship where, as the sophistication of early warning systems has grown, the corresponding appropriate triggering for early action by stakeholders has lagged behind. Bailey paints a grim picture in his words below:

The link between early warning and early action fails and the opportunity to mitigate a gathering crisis is lost. This disconnect was starkly apparent in Somalia during 2010/11, when increasingly urgent early warnings accumulated for 11 months before famine was finally declared in July. Only after that did the humanitarian system mobilize….The long lead times offered by famine early warning systems provide the opportunity for decisive early action, but also the opportunity for prevarication, delay and buck-passing. This disconnect persists despite major improvements in the sophistication and capabilities of modern systems. Continuing technological and methodological advances mean the gap between early warning and early action is set to widen. (Bailey, 2013)

Bailey (2013) maintains that the delays or outright broken bridges between warning and action are magnified by a *disparate collection of responders and deep accountability deficit*. This essentially implies an unsynchronized network of actors throughout the cycle from the collection and dissemination of the warning information and the action by supposed stakeholders. Bailey even questions whether the stakeholders do in fact consent to their responsibilities and the allocation of funding to responders both in a non-emergency, and eventually in an emergency.
food crisis situation. Therefore, this study seeks to map the stakeholders of both the early warning organizations (FEWS NET) and the action-implementing institutions, including government-sanctioned (KFSSG) ones, and to evaluate their individual attitudes to sustainable food frames. If Bailey’s view is true, then their attitudes, it is assumed, could be equally converse.

The Bailey report makes four main findings in his investigation. Firstly that the risk of famine is well-understood, fairly well-anticipated, but is badly-managed since risk reduction efforts are not commensurate with the scale of risk in other areas, such as political risks. Secondly, he found that famine early warning does not lead to early action because of institutional cultures such as “delay dynamics,” which are magnified by a disparate collection of responders and a lack of accountability. For instance, one relief agency may hope that another will have funds for the response and a wait-and-see game contributes to the myriad of reasons for delays in response. Thirdly, there is the absence of strong accountability to vulnerable populations; governments do not give priority to humanitarian needs. This point provides a strategic overlap with the second point in donor and government delay in action being a rational strategy financially, politically and otherwise. In its conclusion, the Bailey report highlights the alarming notion that governments anticipate political reward from acting to reduce famine risk in their own countries, adding that they should also expect to be penalized for failing to do so. As such, a paradoxical strategy manifests itself in that governments in at-risk countries may downplay or suppress early warnings since political risk trumps humanitarian risk. The cure for this would be, the Bailey report submits, a freer media with civil and political attitudes in order to help align humanitarian and political risks in affected countries. This freer context, in Bailey’s view, is likely to revive the early warning - early action paradigm as it would possess the
following advantageous characteristics: (a) Improved official early warning capacity and
effectiveness with EWS providers exploring opportunities to develop and deepen linkages
between early warning systems both vertically (community to national level) and horizontally
(across countries); (b) enabling vulnerable communities to take early action themselves; and (c)
news coverage of the operational reforms outlined in the report, mainly funding reform,
institutional reform, and research-based financing approaches that test new approaches in
“resilience labs” that would incorporate innovative risk-financing approaches from the private
sector that would reduce dependency on donors.

The media response to this report was mainly cynical about the possibility of making the
famine mitigation links that the Bailey report believed it could salvage somehow. For instance,
the *AllAfrica* publication (April 5, 2013) focused on political failure as the reason for failed
famine mitigation efforts on the continent, noting that further scientific improvements to famine
forecasting will do little to save more lives without reforms in the way in which the humanitarian
community uses the data, as famine crises continue to be deadly because warnings are
systematically ignored by donor governments, agencies and governments in affected countries.

Similarly, Tom Murphy, a guest blogger at the *Christian Science Monitor*, argued that
donors must deploy flexible and prevention-oriented funding in order to ensure that future food
crises and famines do not take place. However, this kind of preemptive donor funding was stifled
by the fear that rebel groups would take aid money. This fear was also infused with further
problems of a greater burden of long reporting hoops by the agencies. The palpable solutions
would require collaboration and a shared responsibility among donor countries on the reports
suggested idea of “resilience labs,” which would create a cushion for investment returns on
prevention efforts.
The Guardian, a British publication, calls the unlinking of famine early warning information (FEWI) and early warning a “familiar paradox” that boils down to politics (April 5 - Roopanarine, L.). Reuters is less condescending in their analysis, as it refers to the failure of making a ripple effect on action by referring to early warning as a “political risk” (April 5 – Rowling, M.), observing that governments are failing to prevent hunger emergencies in developing nations, despite ample warning, because they see more political danger than reward in acting early to avert famine. They applaud the Bailey report for their suggested development of “resilience labs,” where governments, aid agencies and early warning providers would test new approaches, demonstrate their success and come up with policies on how to properly reward decision-makers for taking decisions to respond early despite the prevailing circumstances.

Finally, the BBC’s Mark Kinver (April 5, 2013) observes the stark “disconnection” by early warning systems for predicting food shortages but unable to trigger early action.

However, a lack of information or a lack of information-triggered action being a main cause of food insecurity is just one side of the coin, argues a local commentator, Ruth Karuu. In her article in the Standard Newspaper, titled “Kenyan food insecurity is a contradiction of sorts” (September 5, 2011), she identifies several other factors in Kenya, including: 1) delay by the government in inviting outside help by declaring a disaster, 2) lack of journalists trained and specialized in food security to cover the impact of the warning and the impending famine, 3) faster policies and infrastructure for effective food distribution, 4) irrigation, 5) land policy, and 6) the implications of the Price Control Bill of 2009. The Price Control Bill, while seen as an option to ensure affordability, raises household food security by lowering vulnerability. It was also seen as a possible production killer and an obvious conflict of interest by the very lawmakers who determine what essential goods are and their prices, who also are the main movers...
in the production sector in the Kenyan nation. Therefore, there is a need to grasp local realities and policies, as well as climate change and the need for information to trigger famine mitigation.

The media and early action – the FEWI professional link towards early action.

The 1994 World Conference on Natural Disaster Reduction and the Round Table on the Media, Scientific Information and Disasters, discussed the role of the media in disaster mitigation and concluded that it plays a unique role, although the aims of the media and those of disaster mitigation organizations are not synonymous. They stressed the need to cross-pollinate useful public information in the interest of saving lives, while maintaining the integrity and independence of media organizations and disaster research information organizations. The World Conference concluded that communications technologies, skills, and the media play an essential role towards a cost-effective means of saving lives, reducing property damage, and increasing public understanding, irrespective of location, population, or level of economic development, through communications to educate, warn, inform and empower people to take practical, timely and accurate steps to protect themselves from natural hazards (Cate ed., 1994).

The forum came up with seven recommendations: (a) The scientific and disaster mitigation organizations would seek to develop working relationships with the media based on mutual trust and the recognition of differing characteristics, goals, and needs; (b) Disaster mitigation organizations would seek to provide reliable information to the media, as early as possible, in a concise and readily understandable form, and linked, where possible, to newsworthy events; (c) Disaster mitigation organizations would seek to identify and communicate specific themes and messages, both through the mass media and in other alternative forms of communication; (d) Media and disaster mitigation organizations would take advantage of opportunities to work together to provide relevant training for reporters and field
personnel to enhance disaster preparedness, mitigation and relief efforts and the timeliness, quality, and accuracy of reporting about natural hazards; (e) The media organizations would address disaster prevention and reduction in coverage relating to disasters. Disaster mitigation organizations and the media should identify and communicate to the public specific measures that have either succeeded or failed to reduce the impact of natural hazards; (f) The media organizations are encouraged to evaluate their reporting about natural hazards and disaster preparedness, and, where appropriate, to work with disaster mitigation organizations to improve the quality, accuracy, and thoroughness of such reporting; and (g) The need for the IDNDR Secretariat to develop an international Convention on Disaster Communications would be implemented. (Source: Cate, Fred H. (ed.), 1994)

The question remains on whether FEWS NET did exhaustively implement the above seven steps in their communications about the just-ended Horn of Africa famine persists. Although according to Ververs (2011), FEWS NET did offer credible alerts at least six months ahead, it is clear that a much harder push in the prevailing social-political context may have yielded a higher marshalling of early preventive action. The mutual trust and the recognition of differing characteristics and goals between disaster mitigation and the media are often elusive. Journalists need training in reporting disaster warning information. There may often be a more informed disaster mitigation body working with a less informed media in terms of the special place of such an organization, or vice versa, where an accurately informed environmental journalist, for example, may encounter a less-engaged donor or early famine warning organization due to the other prevailing factors in the culture of inaction.

With training, comes the sensitization to the values of others. Like public relations professionals, disaster mitigation organizations ought to highlight the newsworthy events in their
communication of early warning information. The question is if such framing would compromise the disaster organizations’ very purpose, for they should seek to provide reliable information on time. As any communication message design has its audience, the trend to address the media may eventually cause the disaster/famine mitigation bodies to align with prevailing agendas at the expense of objectivity.

New media and multimedia options for alternative forms of communication provide the opportunity for disaster organizations to reinvent themselves so as to reach both the decision-makers and grassroots-farmers with useful mitigation information, while offering the media the opportunity to use the extensive information in their multimedia reporting to allow citizens access to information previously aimed only at stakeholders. For instance, FEWS NET information was meant for stakeholders, but the current accessibility of their reports on their website and their social media through Twitter and Facebook allow an even wider reach without the use of traditional media.

Planning on how to better protect ourselves as a society and as individuals must not be underestimated in working within research organizations, the media, governance and the marketplace. Just as meteorologists have a separate reporting slot after the local news, so should food security production, pricing and distribution reporting, thus seeking to effectively curb the menacing culture of inaction that has seen recurring famines in Africa. Such sentiments are shared by organizations making such efforts, such as the Media for Environment, Science, Health and Agriculture (MESHA) organization started in 2005 in Kenya. The organization’s theme is to promote the development of agriculture and environmental communication through an interactive and holistic approach that involves all stakeholders so as to improve science journalism, including famine early warning coverage, in Kenya and the wider East Africa region.
Rhetorical Analysis of a historical biblical story of networks in famine early warning.

The task of rhetorical analysis of a specific textual artifact aims to unpack the parts of the work in terms of the rhetorician’s focus, their goals, examples used and the capacity of the artifact to inform or persuade. Barry Brummett (1991:39-45) discusses the three functions of rhetoric: exigent, quotidian and implicative. Brummett maintains that rhetoric is usually regarded as a kind of extended verbal discourse in the public space to support any given range of propositions. He argues that rhetoric needs to be conceptualized as the social function that influences and manages meaning. In the same way, the Joseph narrative in the Bible serves to influence famine mitigation historical rhetorical myth of fate decided by systemic mitigation.

The study of famines and famine response leads to a deeper understanding of the dynamics of a particular society. This is because a food crisis is a consequence of the breakdown of the systems of production, distribution and consumption of essential food stuffs (Garnsey, 1989). During and after the Hyksos age (circa 1630–1523 B.C. to the Greco-Roman age (circa 332 B.C.- A.D. 395), food supply shortages were eclectic, poorly documented and kept recurring in different parts of the world. Therefore, the uniqueness of Joseph and the Pharaoh’s meticulous organization that saved the ancient kingdom and helped feed the entire region during a seven-year famine stands out. Most of the lands in the region surrounding Egypt, including Judea, were not as organized and prepared for this prolonged famine, which led to the migration to Egypt by Jacob’s (Israeli) family, a central part of Israelite history.

The famine during Joseph’s tenure (Genesis 41:27; 47) was due to climatic factors and was aptly anticipated. The Bible also narrates several other famines that were caused by different factors, including climate change, pests’ destruction of crops, man’s activities (political (in)stability and environmental habits), or even man’s disobedience (incidences of punishment).
Every famine was eventually resolved, but with significant casualties that were also fuzzily documented in terms of toll and impact on populations. As a result of efforts towards normalcy, famine caused significant societal reorganizations, including immigration, tax-laws, political treaties, religious repentance and redirection and changes in agricultural practices and food practices (what they considered acceptable as food). Few famines (possibly two) were resolved whilst also sending a ripple-effect help to the surrounding communities and regions as the Joseph famine did. Only the Joseph famine organization led to lasting laws for the Egyptian people/subjects of the Pharaoh, with 1/5 or 20% tax, the priesthood being exempt (Garnsey, 1989).

Biblical examples of famine and their ripple effects (expected or unexpected) are numerous. For instance, during the Genesis 12:10 famine, Egypt was not as affected by the famine, and Abram moved there; later, in Genesis 26, a recurrence of the famine did not trigger migration to Egypt, but instead Isaac planted crops and had a bountiful harvest the same year (Gen 26:12). A famine in Bethlehem forced Naomi and her family’s immigration to Moab (Ruth 1:1) and they settled there. The three-year drought and famine during David’s reign in Israel forced policy changes to avenge the Gibeonites’ historic suffering under King Saul (2 Samuel 21:1-14). Elijah, the prophet, foretold the climatic drought and famine in Samaria due to disobedience; after this prophesied drought, it eventually rained heavily after another prophesy of rain (1 Kings 18:2-45). Later, the famine at Gilgal during the prophet Elisha’s time forced people to eat wild plants for food, and the famine was resolved by food being brought to the starving people (2 Kings 4:38-44). Haggai 1:10-11 is another example of a famine due to a lack of rain, which affected the people, their livestock, and other activities such as trade.
Further, a unique famine due to land tenure and tax policies and a lack of access to grain-food by the peasantry occasioned government action (Nehemiah 5:1-3; 2 Kings 8:1). However, there were incidences where famine was caused by pests such as locusts, caterpillars, and incidences of blight and mildew destroying essential food crops (Jeremiah 14:12 (plague), Joel 1:4 (locusts), Amos 4:9 (blight and mildew), Haggai 2:17 (blight, mildew and hail)); and sometimes famine was caused by human activities such as conflict/war or general mismanagement (Isaiah 1:7, 2 Kings 6:24-25, 2 Kings 25:2-3). These famines elicited various responses from the people according to their level of development, the resources available, and human organization at the time (Garnsey, 1989).

Among the earliest or most prominent historical depictions of famine early warning and subsequent early action is the Joseph story in the book of Genesis in the Bible (Genesis 41:13-26). The story has many roots in activities that lead to a climax of actions that I will seek to evaluate in order to discover a plausible Joseph model for Famine Early Warning Information (FEWI) and sustainable food security. Perspectives that I will evaluate in the story include networks in the Joseph Story, Famine Early Warning Information and its link to early action, human capacity/human resources, food storage and management, food distribution, food prices and livelihoods, land tenure policy, the role of the divine in culture and food entitlement.

**Social networks in the Joseph story.** The study of networks investigates the nature of individual components, while others study the nature of the connections or interactions and yet others study the behavior of the systems of patterns of connections between components (Newman, 2010). A network study on Joseph would investigate the nature of Joseph as an actor, his connections and interactions and what patterns those interactions seem to yield direction for his impact within the historical context. Since a social network is a set of socially relevant nodes
connected by one or more relations/nodes or network members (Marin and Wellman, 2011), it follows therefore that social networks have vertices as people or groups of people and the edges represent some form of social interaction between them.

It is essential to study the social network’s purpose or relevance to a certain notion, in this case to the successful story of famine mitigation in Egypt in Genesis 41-47. Joseph’s centrality (number of direct links both in and out, his closeness to other actors and the potential for mediation between them) may accord him the status of a star (an actor who is highly central to a network, (Monge & Contractor, 2003) in the famine mitigation network and the possible link to early action in the story. Joseph is at the center of a historical triumph and his connections are largely responsible for his opportunity. Joseph is given the name Zaphnath-Paaneah (most likely meaning “the man whom mysteries are revealed”) by the Pharaoh after he made him a viceroy over Egypt upon interpreting the Pharaoh’s dream to mean food planning. (Gen 41:45).

Subsequently, he is chosen by the Egyptian king, the Pharaoh, to lead and manage a seven-year national food program (food harvesting and preservation), a seven-year famine mitigation program (food distribution, prices, storage and policies) and a lifetime land and food management program (land tenure policies, food production and management, tax policies).

Joseph’s story begins at his birth to the biblical patriarch Jacob and his wife Rachel in Genesis 30:22. He immediately joins a family of six half-brothers (Reuben, Simeon, Levi, Judah, Issachar and Zebulun – Leah’s sons and daughter), a half-sister Dinah, and later (Dan and Naphtali – Rachel’s servant’s sons and Gad and Asher – Leah’s servant’s sons) four more half-brothers are born as well as a brother, Benjamin. Rachel, Joseph’s mother, dies while giving birth to Benjamin. As the story is told, Joseph becomes his father’s favorite son and he is sold into slavery by his jealous brothers. In captivity, a trail of Joseph’s social contacts ascertain his
integrity as a successful official (all the workers he supervised) in Potiphar’s house in Egypt (Genesis 39:21-23) and later, when he is falsely accused of rape by Potiphar’s wife, as a prisoner who demonstrates high integrity and responsibility.

Among Joseph’s growing group of contacts are two fellow prisoners who previously worked for the Pharaoh, the King of Egypt: a former baker and a former chief butler. Joseph interprets the former loyal servants’ dreams while at the same time he (Joseph) continues to demonstrate good leadership qualities as a prisoner leader. Just as a network representation utilizes elements (individuals, groups, organizations, activities) and their relations (reflexive, dyadic, polyadic) (Freeman, White & Romney, 1989), these network relational principles play out two years later.

The Pharaoh dreamt two dreams: the first was about seven fat cows feeding on a meadow and then seven thin cows that swallowed up the seven fat cows, and the second was about seven ears of grain/corn that sprung up but were eaten up by the seven thin ears of grain that sprung up after them (Gen 41: 2-7). Due to former (dyadic and polyadic) networks with the King’s butler, Joseph is identified as a dream-interpreter and he is called in to interpret the dreams, and it turns out that they were dreams about a famine in the future. Joseph is appointed as the highest official (governance) to head the food management project ahead of the anticipated famine crisis. His networks would play out during his tenure as a manager of the food program and in bringing his family to live in Egypt and their land allocations among other emergent issues and events during the famine years that ensue, and the post-famine years when his relations settle down.

The ‘Joseph Model’ (Genesis 41: and 47: 13-26) and link to early action. Just like the present day famine early warning information systems, Joseph’s warning had both the descriptive aspect and the climax or declaration phases that were both useful to understanding
both the magnitude and the timing of early action. When Joseph, in his words, by the revelation of God, managed to interpret the king’s dream as a famine early warning, there was an immediate need for early action (Gen 41: 30-32). The magnitude of the predicted famine was severe (vs. 31) “The famine shall be so bad that no one will remember that once there had been plenty.” There was also the need to give a plausible recommendation by a declaration, just as there is a famine declaration to marshal action. (Verses 32-33) describes the declaration that recommends early action through leadership (human capacity) of food management prior to and during the impending famine.

The human capacity institutional framework is manifest throughout the Joseph famine mitigation saga. The UNDESA (United Nations Department of Economic and Social Affairs)’s statement on food security cites human capacity as key to achieving food security as a human right (UNDESA survey on Sustainable Development Goals). According to UNDESA, the focus on human capacities and institutional framework at the smallholder level will help create ownership and participation. The immediate pragmatic need after Joseph interprets the dream is for a skilled workforce and governance in famine mitigation. These would include an overall visionary leader (Gen 44:33) and several commissioners (Vs 34) helping to collect food. Both position rankings were to be central to sustainable food security. Just as human capacity helps to interpret the magnitude of the famine warning and to implement corresponding early action to combat the crisis when it comes, so the plan for human capacity in Genesis was clear. Genesis 41: 34 NIV states: “Someone who is wise and will know what to do, so that you can put him in charge of Egypt. Then appoint some other officials to collect one fifth of every crop harvested in Egypt during the seven years when there is plenty.”
There was a need of a visionary leader who fully understood the impact of the impending famine, and experts to collect a fifth of every cup of grain harvested, and with their expertise to store the grain in the government reserves safely. I derive that these experts would be faithful, skilled, hardworking, prompt and thorough in storing the grain safely for an unlimited time. Genesis 45-47 details that there was a food supply in the years that the people came to get food, indicating that the officials were successful in the consolidation and storage of grain.

In food management and storage, agricultural products move along extensive value chains from farmers to transporters, store-keepers, food processing plants, shopkeepers and consumers. Sometimes, wastage may occur due to a breach in storage. During Joseph’s tenure, the officers were able to manage the entire food value-chain process and had huge amounts of usable stored food for the drought years. I infer here that wastage was efficiently checked through ancient Egypt’s food preservation methods such as salting, drying, and the use of silos for grain storage. The quantity of the food stored was incredible, and as recorded, immeasurable. It fed all the Egyptians for years and was even sold to neighboring countries in the region. It is recorded that the different towns had separate food banks in each region (Gen 41:48), so as not to spread bugs coming from any other town’s grain. This was due to the high expertise of those employed who made the food preservation successful. With the anticipated famine finally here, Joseph used his established organizational acumen to manage food distribution, price management and the ensuing tax laws. The laws acknowledge the central regard of the Divine in their organization. The famine mitigation process began with the Divine by the Pharaoh’s dream interpretation and later the priests are exempt from the land and tax laws.
Table 5. The Joseph Model: FEWI and links to early action

<table>
<thead>
<tr>
<th>Agency and Co –Agency Actors/Networks types in the Joseph Story</th>
<th>Networks’ role in Famine Early Warning</th>
<th>Network’s role in Early Action</th>
<th>Networks’ role in Long term policy output</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Intrinsic networks</strong></td>
<td>- Joseph proposes massive food storage after interpreting Pharaoh’s dream being about a coming famine. - relationship with butler gave him audience.</td>
<td>Human capacity, food storage - power through Pharaoh’s promotion, - known work ethic - new status (respectable) may have helped in cooperation of all towns in food storage and mgt.</td>
<td>Human capacity/leadership - Food distribution - Food prices</td>
</tr>
<tr>
<td>Singular - Joseph, Pharaoh</td>
<td>- Parallel or opposing networks helped to steer Joseph to his role as dream interpreter to butler, then Pharaoh, hence early action</td>
<td>- Joseph’s work ethic renown for action by the greater community.</td>
<td>- settled his family in the land of Goshen - assigning of chief shepherds.</td>
</tr>
<tr>
<td>Dyadic – King’s Butler Complex – Joseph’s father, Divine predisposition, Joseph’s later family with Asenath his wife (Priest of On’s daughter).</td>
<td>- Pharaoh’s rule in Egypt, context of organized society. Dream initiated the famine early warning after Joseph interprets dream - People who knew his work ethic, build royalty.</td>
<td>-Food storage and mgt. - All Egyptian people participate in harvest and food storage and management (early action).</td>
<td>- Food prices and livelihoods, - Food distribution, - Land tenure policy, - Tax policy (1/5 of produce on govt. land to govt.).</td>
</tr>
<tr>
<td><strong>Adjacent/Adversarial networks</strong></td>
<td>- Pharaoh’s rule in Egypt, context of organized society. Dream initiated the famine early warning after Joseph interprets dream - People who knew his work ethic, build royalty.</td>
<td>-Food storage and mgt. - All Egyptian people participate in harvest and food storage and management (early action).</td>
<td>- Food prices and livelihoods, - Food distribution, - Land tenure policy, - Tax policy (1/5 of produce on govt. land to govt.).</td>
</tr>
<tr>
<td>Singular - Potiphar’s wife</td>
<td>- Parallel or opposing networks helped to steer Joseph to his role as dream interpreter to butler, then Pharaoh, hence early action</td>
<td>- Joseph’s work ethic renown for action by the greater community.</td>
<td>- settled his family in the land of Goshen - assigning of chief shepherds.</td>
</tr>
<tr>
<td>Dyadic - Warden, inmates Complex – Joseph’s Family</td>
<td>- Pharaoh’s rule in Egypt, context of organized society. Dream initiated the famine early warning after Joseph interprets dream - People who knew his work ethic, build royalty.</td>
<td>-Food storage and mgt. - All Egyptian people participate in harvest and food storage and management (early action).</td>
<td>- Food prices and livelihoods, - Food distribution, - Land tenure policy, - Tax policy (1/5 of produce on govt. land to govt.).</td>
</tr>
<tr>
<td>Complex collective relations- former workmates and inmates - the Egyptian people</td>
<td>- Pharaoh’s rule in Egypt, context of organized society. Dream initiated the famine early warning after Joseph interprets dream - People who knew his work ethic, build royalty.</td>
<td>-Food storage and mgt. - All Egyptian people participate in harvest and food storage and management (early action).</td>
<td>- Food prices and livelihoods, - Food distribution, - Land tenure policy, - Tax policy (1/5 of produce on govt. land to govt.).</td>
</tr>
</tbody>
</table>

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Figure 9. The Joseph ego-centric model in the successful FEWI and action plan

Criticism of the “Joseph Model” to organized societies food security profile. The described “Joseph Model” symbolizing success due to early warning and the centrality of cereal and livestock management in food security (Gen 41:47:13-26) has four main criticisms as a model for FEWI, including storage, distribution, tax policy and ownership. First, with regard to storage, it is recorded that the centralized storage of the food in each town, and managed by Joseph, soon became an overwhelming exercise, and the food stores were stocked to an incredible degree. (Verse 49) “Joseph stored up huge quantities of grain, like the sand of the sea; it was so much that he stopped keeping records because it was beyond measure.” Therefore, overstocking of food preserves may compromise the quality of the food preservation. Probably
when they could not keep measure, the silos were all full, and the safety of the food could have been compromised.

Secondly, when the anticipated famine finally sets in, the distribution of food happens at the town level since the stores are located in each town separately. This decentralized management of food distribution that has centralized ownership may have been a problem in ensuring fair food distribution practices and the minimization of labor. Besides, distribution of food to the hungry was only through trade, which could be seen as an unfair enriching of the leadership from their own people, who had themselves contributed to the food preserves, but who had to buy the food during the famine and even to surrender ownership of their farms to the State to continue to be able to afford to buy food.

Finally, a major critique is that Joseph’s strategic leadership for famine mitigation quickly became the regime’s launching-ground for oppressive tax laws that required the Egyptian people to pay 1/5 or 20% tax, with the priesthood exempt (Garnsey, 1989). The rationale was that harvesting any crops on government-owned land required taxation; the practice continued for many years, raising concerns of denied ownership and property rights of individuals. A long term government solution to revenue and food security management also yielded the other extreme of oppressive or unfair taxation for the citizenry, a mixed bag of destiny.

Communications theories in the Multi-theoretical, Multi-level (MTML) approach to examining the emergent communications network in this study.

In proposing the Multi-theoretical, Multi-level, Multi-analytical model (MTML) in network research, Monge & Contractor (2003) sought to solve four main problems in communications networks research: (a) the tendency to be non-theoretical, (b) single-level
analysis, (c) simplistic network analysis studies that tend to use descriptive rather than inferential statistics, and (d) generalization. Inferential statistics would provide conclusions that extend beyond the immediate data. To resolve the stated issues in network research, Monge & Contractor (2003) instead offered the MTML model, which they argue makes use of a variety of theories to articulate network components at various levels and complex analytical inferences so as to provide contextually sound network inferences in research.

The use of multiple theories in this research is informed by Monge & Contractor’s (2003) MTML emergence of a communications network framework. The MTML approach allows us to study the creation, maintenance, development and reconstitution of network linkages of both human and non-human agencies, in organizational and inter-organizational contexts (Monge & Contractor, 2003). Table 4 below provides the multi-level theorizing model that Monge & Contractor designed, providing network theorizing at the macro, meso and micro levels.

The proposed macro-level theorizing about network nodes can be studied through what they call the “family of theories,” used to develop network formulations (p. 22). Monge & Contractor suggest five epistemic perspectives on the emergence of structure from chaos in communications networks. Emergence suggests levels of phenomena going from lower to higher levels but whose configurations may entail nesting (lower levels partially included in higher levels), entanglement (relations are overlapping), or incorporation. The epistemic perspectives include (Kontopolous, 1993 in Monge & Contractor, 2003): (a) reductionism (observable phenomena can be explained by the behavior of elementary particles), (b) construction/compositional emergence, (c) heterarchy (tangled composite structures with multiple overlapping and relations), (d) hierarchy (nested structures where higher levels include lower levels), and (e)
holism/transcendence (emphasis on the totality of a structure over the individual components in
the network).

The MTML also includes the theories of self-interest, which place an emphasis on the
individual, value maximization, and cost minimization. Close to the theories of self-interest are
the mutual and self-interest theories, whose focus is on joint maximization. The cognitive
theories and contagion theories offer opportunities of theorizing about semantic and knowledge
networks, as well as cognitive mechanisms for shared interpretations and learning. Contagion
theories suggest that an opportunity for contact in communications networks exposes actors to
the behavior of others’ information and learning. Homophily and proximity theories focus on
shared attributes and space. They suggest the selection of others who are similar within a
communications network. This similarity eases communication, predictability, trust and
reciprocity within a network. Similarly, proximity facilitates the likelihood of communication by
increasing interaction opportunities.

Further, Monge & Contractor’s (2003) model provides a three-tiered approach to network
analysis as seen in the theorizing above. They explain:

The MTML model provides a three-tiered approach to network analysis. The first tier is
the decomposition of networks into their potential multilevel components. The second
examines the attributes of the nodes. The third explores the role of other networks or the
same network at earlier points in time. Not all three tiers need be examined in the same
analysis, but a complete analysis will often use all three. (p. 295)

This research attempts a complete analysis of network frames by using multiple theories to
deconstruct the multi-level components of actors/nodes, and then by making inquiries into the
nodes’ attributes. Finally the nodes’ role in the network at a point in time is examined by
investigating the nodes’ attributes and their relations’ connection to commitment to FEWI information and early action.

Monge & Contractor (2003) argue that their review of vast amounts of literature exposed the above four problems. Therefore, their book sought to develop the MTML perspective as a way to help compare and integrate diverse theories and to increase the explanatory power of research efforts. The uniqueness of their approach is that the rules assigned to agents are derived from social theories (thus multi-theoretical) and that they make observations at a given point in time at different levels, employing agent-based modeling, which is the behavior of agents who are connected in a local environment.

Critique

Whereas the MTML multi-theoretical analysis promises to improve the ability to account for specific network configurations, its three-tiered analytic approach does a great deal in capturing the complexity of the multiple levels of network manifestations. However, the suggested quantitative analytic techniques are prone to “false results” or predictions often associated with statistical inferences given the fluidity of network configurations at any one time, as Stanley Wasserman (2005) observes.

Secondly, the limitations imposed on the use of a single theory in limiting explanations will still be limited in the use of multiple theories. Instead, an inductive, rather than a deductive, approach may avoid certain impositions and derived assumptions in the process of network analysis. The inductive approach has still neither been suggested by the authors nor extended as an option in this study as yet. The odds of an inductive study versus a deductive study do not completely eliminate the use of multiple theories in filling the gaps, or that a single theory may accomplish. Besides, it is the position of our current study that an inductive approach would
constitute a completely different contribution, and which would only be applicable as an option for further research into any gains or gaps realized at the end of this study.

Moreover, the validity of the networks analytics’ claims about relational content and the ability to capture the complexity of a naturally occurring relations (Freeman, White & Romney, 1989), are yet to be soundly verified or vilified in communications research. This study is, therefore, another complimentary work that does not seek a critical deconstruction of their claims, but rather seeks to capture extra layers of inquiry for a more holistic description of network relationships within the FEWI community in Kenya. In the foreword in Monge & Contactor (2003)’s book, Stanley Wasserman argues that data generated from computational models is not data in the conventional sense. Therefore he recommends that computational models be blended with proper statistical models towards improved network data analysis.

According to the above, this study will seek to confirm if indeed Monge & Contractor (2003)’s MTML claim for a fuller view of perspective in networks research does provide a more practical application of emergent issues and their proposed solutions as being fuller, or still bears the same weight of suggested solutions in previous network research. As such, in order to conceptualize the imbricating role of various actors in the FEWS NET-KFSSG communications network, I have employed the complex adoptive systems perspective (Monge & Contractor 2003), which allows me to observe the organizations’ emergent communications networks. Thus, here I am using thoughts from the following four communications theories: social network theory, general systems theory, social exchange theory and organizational knowledge creation theory. The amalgamation of the main propositions of the theories provides a research perspective on the current mixed method study.
Social Network Theory (SNT)

Social network theory (SNT), also sometimes referred to as network theory, was proposed by J. Barnes in his 1954 study titled “Class and committees in a Norwegian island parish,” sought to understand all the various ways that members interact with one another. Later studies have developed Barnes’ ideas by studying simple communities to great levels of sophistication and with differing views on the social network. Essentially, SNT views social relationships in terms of nodes and ties, with the nodes being the individual actors within the networks, and the ties being the various types of relationships between the actors. The nodes and ties are displayed in a social network diagram, sometimes referred to as a sociogram, where the nodes are the points and the ties are the lines in the diagram, which range from simple to highly complex and differentiated.

Network theory in general can refer to several different kinds of ideas linked to connections and relations such as tie formation, or social capital (Borgatti & Lopez-Kidwell, 2011 in Scott & Carrington, 2011). Borgatti & Lopez-Kidwell (2011) define SNT as the proposed processes and mechanisms that relate network properties to outcomes of interest. These processes, they argue, are the foundations of most networks theorizing. They give such examples as Granovetters (1973), who in his strength of weak ties theory, argued that strong ties are rarely bridges and tend to be overlapping, while weak ties are links and provide novel information. Therefore, Granovetters argued, weak ties are “surprisingly” strong in a network (p. 41) because of their fecund potential to illustrate aspects of relations. He goes ahead to define ties as a combination of the amount of time, emotional intensity, intimacy and the reciprocal services which characterize a mutual tie between two actors or in SNT interacting nodes.
Other studies have contributed to SNT in introducing the interesting rescind concept of holes in describing the event of a relation or contact. For instance, Butt’s (1992) structural holes theory of social capital, replaces “bridges” in a social interaction with “holes” and argues that if network-actor A is said to have more holes than network actor B when A has more redundant ties. The ideas of structural holes serve to explain the concept of novel information as explained by the strength of weak ties model.

Finally, the small world theory (SWT) (1950s-60s) propounded by Milgram (1967) and further contributed to by Pool & Kochen (2011), proposed that network information may be studied in three layers: deep, middle, and surface layers. Borgatti & Lopez-Kidwell (2011) deconstructed SWT, observing that the deep layers consist of very simple models of how social systems work, which is essentially that they are networks through which information flows from one node to another or what they refer to as “true flows” (Scott & Carrington, 2011). The middle layer consists of slower network information flow due to clustering. The surface layers are also seen as a “personalization” of the theory [emphasis original] purporting that how well nodes are connected increases the chances of information within the network.

Overall, the goals of SNT center on social capital, coordination, contagion, adaptation, and convergent evolution among others (Scott & Carrington, 2011). People or actors are enmeshed in networks of relationships that include occupational colleagues, organizational members, kinships or friendships. The effectiveness of different rules of collective choice depends greatly on the precise configuration of individual preference orderings. Collective choice requires that social preference orderings be reflexive, complete and transitive (Sen, 1984, p. 47). Thus, social structures comprise of clustered networks with various ties, different liaison rules, and different
degrees of interconnectedness, which provide diffusion paths, psychological paths and different transactions that have a bearing on adoptive behavior (Craig & Muller, 2007).

There is no cookie-cutter SNT theorizing, and each study adopts its own form of theorizing that aims to provide a framework for explaining the variables in the network to generate outcomes. For our current study on network frames, I theorize that our SNT structure comprises of the agencies and co-agencies of the FEWS NET-KFSSF staff and organizations which both play imbricate roles of formulating, collaboration, sustaining and decision support and commitment to famine early warning information (FEWI); and that their networked relationships’ maze does have an impact on messaging and commitment to the FEWI towards early action. The social network theory (SNT) falls under the sociopsychological tradition, where communication is conceptualized as a process of social interaction and which is infused with causal forces for social influence, and that these forces can be understood empirically (Craig & Muller, 2007).

**General Systems Theory (GST)**

Ludwig von Bertalanffy is known as the father of general systems theory, which he formulated from his lifelong attempts to reconcile the sciences with the humanities. Bertalanffy believed in isomorphic laws in science, or simply “having a similar form” as a major viewpoint that drew him to make conclusions across a multi-disciplinary forum. He saw the origins of the incidence of isomorphism across the sciences as laws of the kind considered, and are characterized by the fact that they generally hold for certain classes of complexes or systems, irrespective of the special kind of entities involved. Bertalanffy therefore asserted that there exists a general system of laws which applies to any system of a certain type, irrespective of the particular properties of the system or the elements involved. He wrote:
The fact that certain principles apply to systems in general, irrespective of the nature of the systems and of the entities concerned, explains that corresponding conceptions and laws appear independently in different fields of science, causing the remarkable parallelism in their modern development. Thus, concepts such as wholeness and sum, mechanization, centralization, hierarchical order, stationary and steady states, equifinality, etc., are found in different fields of natural sciences, as well as in psychology and sociology. (Bertalanffy, 1950)

As a young scholar, Bertalanffy was interested in biology, the philosophy of science, history, and the humanities in general. His main influence was neo-Platonist renaissance philosopher Nicholas of Cusa and Hans Vaihinger (Weckowicz, 2000). Vaihinger believed in idealistic positivism, which holds that human norms and truths are relative and are created for individual and social survival. Bertalanffy’s writings in psychology and the social sciences did not amount to a definite theory, but offered some general ideas and metaphors that drew the attention of psychologists and social scientists to the dangers of an atomistic and mechanistic model of man and society, which did not take into consideration the relationships between the elements or to their organization into systems (Weckowicz, 2000).

According to Locker (2006), the origin of general systems theory (GST) is two-fold: a critique towards certain sciences and an aggregation of the different disciplines. He wrote:

On the one hand it was developed out of a critical stance towards the particular sciences’ claim of reaching universal insights and truths like for example physics’ or chemistry’s claims about the origin of life. … scientists always recognized the inherent limitations of any one discipline … systems are designs set apart from a surrounding environment.
Clearly differentiated from their environment through a conceptual or real border, systems, to a certain degree, constitute self-contained and self-referential entities.

The application of the GST to communication is a direct outgrowth of the budding operations research (use of analytical methods to help make better decisions) during World War II, which sought to systemize decision-making and therefore improve the efficiency of the management of projects. It is in this context that GST took off within the social sciences, combining psychology, management, sociology, mathematics and engineering. GST constitutes components in a “system,” which functions within a specific field, context or environment. Certain distinguishing attributes of the individual components define it within the context of its environment with ever-evolving definitions within the system.

Most systems interact and communicate with their environment. Open systems that come into existence through deliberate design and action alter the environment by their presence as they actively communicate and even transform it (Locker, 2006). Locker maintains that a system can never be fully illustrated by its properties alone, but in conjunction with its properties, presuppositions, interactions, borders and the designer/observer.

Figure 10.1: GST - Classical system: Properties and communication (Locker, 2006)
In Locker’s view, therefore, any genuine system theory cannot avoid the question of the human being. The greater the extent replicate of an environment of the system, the more self-referential which allow and activate a permeability of the border system. On the other hand, movement towards the center of a system would stress the system’s independence from its environment.

GST combines a strategy of enquiry from diverse fields, and offers a processual logic of relationships rather than formal Aristotelian logic. GST does not follow a linear logic; it therefore denies idealistic formalism and materialistic determinism (Ball, 1978). Therefore, GST has shown that most empirically normal systems follow a naturalistic logic of multi-linear discontinuity rather than formalistic logic of linear continuity (Boulding, 1956 in Ball, 1978). It incorporates the concept of positive feedback as a complement to the idea of negative feedback implicit in functionalism; therefore it is useful in applied research and theory construction. GST framework is more alert to the variety of organizational and relational possibilities to the empirical factors surrounding each of the institutional problems and goals (Ball, 1978). GST has been fronted as a paradigm for unifying the conceptual framework of the multifaceted, sometimes chaotic, world of social work (Hudson, 2000).

GST as a paradigm of social work is an important inquiry into the role of the famine mitigation organizations in this study, FEWS NET and KFSSG, in defining food security: the
actors, concepts, elements, interactions, actions and changes in the perceived environment of a
famine mitigation society in Kenya. GST provides a theoretical framework for an inquiry into
how the networks in a society function, and their propensity towards change or commitment to
early action based on available famine early warning information by the actors in the system who
work towards famine mitigation.

The GST falls under the cybernetic tradition in communication that deals with such
concepts as systems, processing, information, messages, senders, receivers, probability, entropy,
self-organization, autopoiesis, and feedback (Craig & Muller, 2007) with a strong bearing on the
components of the “Information Theory” by Shannon and Weaver (1949) on how
communication occurs. GST’s application in communication finds its finest placement in Niklas
Luhmann’s theorizing, where he examines the psychic system or the individual consciousness
versus the social or communication system in studying self-organizing systems. According to
Luhmann (as cited in Craig & Muller, 2007), only communication can communicate [emphasis
original]. Luhmann observes that, just like life and consciousness, communication is an
emergent reality through a synthesis of information, utterance and
understanding/misunderstanding.

Social Exchange Theory (SET)

Social exchange theory (SET) was proposed by Thibault & Kelley in their 1952 article on
the social psychology of groups. Their propositions were further highlighted by Blau (1964) who
wrote on exchange and power in social life. According to Blau (1964), much of social life is an
intricate exchange where each participant or actor in an interaction approaches and withdraws in
patterns that add to or subtract from their store of power and prestige. The resulting action or
decision to act is made to support it, which means that our interactions with others involve calculations towards our power goals in the incidence of interaction or social exchange.

Cook & Emerson (1978) argue that the social exchange theory involves power and equity interaction, and exceeds dyadic economic or functional exchanges to include analyses of more sophisticated systems that may be referred to as exchange networks [own emphasis], ranging from power and equity analysis to more macroscopic n-person social and bargaining structures that define the resultant balance relations based on costs and rewards. SET, therefore, is based on the exchange of costs and rewards to quantify the values of outcomes from different situations by different actors or individuals. The theory’s general assumption is that people will try to minimize costs and maximize rewards in the process of navigating or growing their relationship based on the perceived possible outcomes.

This study attempts to explore exchange networks in their various power and equity calculations to create a comprehensible network frame that constitute the famine mitigation community that is FEWS NET – KFSSG, and how these amalgamations of social exchange incidences may result in commitment to the famine mitigation message of FEWI systems. SET has its foundation in the socio-psychological tradition of communication as proposed in an article on the socio-psychology of groups, but its application to communications research and discourse accords its rightful categorization in the critical tradition, which conceptualizes communication as discursive reflection, and therefore illuminates hidden social mechanisms that distort communications based on power or truth in context (Craig & Muller, 2007).

The scenario of social exchange is articulated by Jurgen Habermas (as cited in Craig & Muller, 2007) where he wrote an essay on truth and society and the discursive redemption of factual claims to validity. Habermas theorized the problem of communicative hope which is a
basic assumption in social exchange theory. He argued that the hopeful anticipation of undistorted communication is built on the very structure of human interaction. This expectation of legitimacy precedes reciprocity. According to Habermas, communicative action takes place in habitualized and normatively maintained language meant to bracket all motives and that the fundamental norms of possible speech that are built into universal pragmatics contain a practical hypothesis justified in a theory of communicative competence, a basis of the critical theory of society.

Organizational Knowledge Creation Theory (OKCT)

Organizational knowledge creation is the process of highlighting and amplifying knowledge created by individuals, as well as crystallizing and connecting it to an organization's knowledge system (Nonaka, von Krogh, & Voelpel, 2006). Organizational knowledge creation theory (OKCT) was propounded by Ikujiro Nonaka (1994) in his article on OCKT. Prior to Nonaka’s proposition, organization theory centered on each specific entity of an organization, including production, division of labor, bureaucracy, and rationalization, and had long emphasized the processing of pre-given information of a weighted definition of knowledge as the universal “justified true belief” (Nonaka, von Krogh, & Voelpel, 2006). The “justified true belief” is a Platonic philosophic epistemological tradition. Instead, OCKT is based on an existentialist epistemological framework, in which the key platform for knowledge creation is a “phenomenal” space, rather than a propositional one.

OCKT epistemological tradition is founded on the rejection of “pre-given” knowledge in organization knowledge. The theory is also distinguished by its ontological tradition of “Ba” (the Japanese term for “place”), which simply highlights the concept of an organization (community of practice) as a shared place for applied knowledge, integration and utilization, and which
possesses certain enabling organizational attributes for knowledge creation. In proposing OCKT, Nonaka (1994) argued that the notion of an organization in the environment of the present information age is defined, and exists, in its efficient use, creation and integration of knowledge. He wrote:

Any organization that dynamically deals with a changing environment ought not only to process information efficiently but also create information and knowledge.… However, it can be argued that the organization’s interaction with its environment, together with the means by which it creates and distributes information and knowledge, are more important when it comes to building an active and dynamic understanding of the organization. (Nonaka, 1994)

Nonaka held that organizational knowledge is created through a continuous dialogue or “social interaction” between tacit and explicit knowledge via four patterns of interaction: socialization, combination, internalization and externalization, where one type of knowledge is converted to another, and new knowledge is created (see illustration). Tacit knowledge is the continuous activity of knowing, and can be also referred to as skill or acumen that includes many forms of knowing, experiencing, codifying and performance. On the other hand, explicit knowledge can be articulated, codified and stored in media. OCKT holds that organizations play a central role in mobilizing tacit knowledge held by an individual to provide a forum for a “spiral of knowledge” (Nonaka, 1994). Therefore, the model takes us from mere “organization learning” to internalization, part of the four models of conversion.
Figure 11: The Socialization, Externalization, Combination, Internalization (SECI) process


The context for knowledge creation in OKCT takes into cognizance several important factors, including enabling conditions, conditions and context for knowledge creation, knowledge vision, knowledge activism, organizational forms, leadership, the nature of the firm, and knowledge strategy (Nonaka, von Krogh, & Voelpel, 2006). OKCT synthesizes insights from different epistemologies and theoretical perspectives in order to enrich both the academic and practical knowledge of organizations and management. OCKT’s open boundaries accommodate different perspectives and approaches, as well as a broad range of methods and a forward-thinking use of theory.

Chen & Edgington (2005) assessed value in organizational knowledge creation, attempting to quantify the decision criteria required by managers and knowledge workers with regard to knowledge creation process investment decisions using organizational and economic theory. In their study, Chen & Edgington (2005) focused on the analytical and decision-making complexities for knowledge workers, whose job was composed of a set of tasks which required a specific skill from a worker in order to accomplish the work satisfactorily. They found out that
the more frequent the participation in knowledge creation, the higher the match of skills for tasks with corresponding significant organizational benefits.

Song, Yoon & Yoon (2011), used content analysis of 314 codable units and 153 units to identify core-contextual factors that facilitate or hinder organization knowledge creation practices. Their research added to organizational knowledge creation theory by clarifying key organizational knowledge creation enablers and barriers at three core levels: organization, team/subgroup, and individual. At the individual level, the vital enablers to knowledge creation include creativity, positivism, self-reflection, open-mindedness, and adaptation to change; these attributes can be harnessed at the meso and meta-levels of an organization.

Criticism of OKCT. Chen & Edgington (2005), while commending OKCT’s premise of knowledge creation’s role in overall organizational benefits, however caution against homogeneous knowledge creation participation. They argue that sending everyone to the same knowledge creation process predisposes homogenous tasks by individuals. They argue that instead of the ability of managers to productively utilize knowledge worker competency over time, there is a critical element of strategic management which affects organizational outcomes.

Other criticism has questioned the theory’s distinction between tacit and explicit knowledge, arguing that either reflects and manifests the other, hence the distinctions that OCKT relies on are fluid, and at best vague, pointing to the notion that the OCKT treats managers as primary knowledge creators (Tsoukas, 2005 in Song et al., 2011). The SECI model has been criticized as a “content” model rather than a process model as Nonaka (1994) argued (Gourlay, 2003). Gourlay examined the empirical data within the SECI model, also central to Nonaka’s OCKT, and found that the claim that the model (whether of knowledge or information creation) was validated by a survey cannot be sustained. According to Gourlay (2003), the survey only
found support for two of the four modes (socialization and combination). Finally, the detailed case materials reveal that the notions of combination and internalization were not clearly described, and are multi-activity processes involving activities between which no common features were demonstrated.

**Contributions of OCKT in the current study.**

OCKT provides the SECI model with both the “content” and the “process” for the tri-level analysis of the FEWI in the work of FEWS NET-KFSSG in this study, integrating the socialization, externalization, combination, and internalization processes captured in the network frame analysis. It addresses three of the processes (socialization, externalization and combination) in FEWI, internalization being addressed by the inquiry into the role of these frames in their commitment to FEWI-sustainable food frame information towards early action in famine mitigation.

OCKT falls under the socio-cultural tradition of communication, which is mainly concerned with concepts of social structure, identities, norms, rituals and collective belief systems (Craig & Muller, 2007). Taylor, Groleau, Heaton, & Every (2007) discussed the problem of coordinating communication so as to bring about organized collective action. They argued that communication aligns different perspectives (co-orientation) and how imbrication (overlapping) of levels of communication constitutes an organization. This is a central premise of OKCT, where an organization’s life comprises the content and process of knowledge creation so as to meet organizational intrinsic and extrinsic goals. Taylor et al. argue that the organization is considered a unit of self-action, and that although there are multiple levels of discourse and interaction, the challenge of the organization is to make itself into a collective agent to get things done. Taylor et al. propose the concepts of *Construction of sense*, and the *Consequentiality of*
communication, both of which comprise of a four-fold process: (a) conversation, (b) text form, (c) circumstances and (d) frame knowledge. The construction of sense is dictated by conversation and circumstances, while the consequentiality of communication is dictated by text and frame knowledge (Craig & Muller, 2007).

See Table 6 below (page 151) that summarizes the theories framework of study on network frames and their link to commitment to FEWI in FEWS NET-KFSSG organizations (Monge & Contractor, 2003; Kontopoulos, 1993; Craig & Muller, 2007).
Table 6: Theories framework of study on network frames and their link to commitment to FEWI in FEWS NET-KFSSG organizations (Monge & Contractor, 2003; Kontopoulos, 1993; Craig & Muller, 2007).

<table>
<thead>
<tr>
<th>THEORY</th>
<th>Main theoretical input</th>
<th>Theory’s Contribution to FEWI</th>
<th>MTML Equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Network Theory</td>
<td>SNT view on social relationships as actors (nodes) within networks (ties) with the goals of social capital, co-ordination, contagion, adaptation, convergent evolution among others.</td>
<td>The agencies and co-agencies of the FEWS NET-KFSSF play imbricate roles of formulating, collaboration, sustaining and decision support and commitment to FEWI through their networked relationship maze.</td>
<td>1. Theories of Network Evolution, Homophily and Proximity, Exchange and Dependency, Contagion Theories, Cognitive Theories, Mutual Self-Interest and Collective Action, Theories of Self-interest. 2. Individual value maximization, joint value maximization, cognitive mechanisms leading to shared interpretations, exposure to contact leading to social influence, exchange of valued resources, choices based on similarity, variation, selection and retention. 3. Reductionism, construction/compositional emergence, heterarchy, hierarchy and holism. 4. Socio-psychological theory tradition.</td>
</tr>
<tr>
<td>General Systems Theory</td>
<td>GST focuses on the relations among the elements and organization into systems designs set apart from a surrounding environment through a conceptual border, combines a strategy of inquiry from diverse fields, and offers a processual logic of relationships. Open systems with deliberate design transform their environment.</td>
<td>GST provides a theoretical framework upon which inquiry of the networks in the society function and their propensity towards change or commitment to FEWI by the actors in the system.</td>
<td>1. Theories of Network Evolution Homophily and Proximity Exchange and Dependency Contagion Theories. 2. Exposure to contact leading to social influence, exchange of valued resources, choices based on similarity, variation, selection and retention. 3. Heterarchy, hierarchy and holism. 4. Cybernetic tradition theory.</td>
</tr>
</tbody>
</table>
### Social Exchange Theory
SET involves power and equity interactions, and exceeds dyadic economic or functional exchange to include analyses of more sophisticated systems that may be referred to as *exchange networks*.

<table>
<thead>
<tr>
<th>How FEWS NET-KFSSG social exchange incidence may influence commitment to the famine mitigation message of FEWI systems.</th>
</tr>
</thead>
</table>
| 1. Exchange and Dependency Contagion Theories  
2. Cognitive Theories  
4. How FEWS NET-KFSSG social exchange incidence may influence commitment to the famine mitigation message of FEWI systems.

### Organizational Knowledge Creation Theory
OKCT highlights knowledge created by individuals, crystallizing and connecting it to an organization's knowledge system, known as “Ba” or a shared place for applied knowledge, integration and utilization; and which possess certain enabling organizational attributes for knowledge creation.

<table>
<thead>
<tr>
<th>OCKT theory provides the SECI model, with both the “content” and the “process” to the tri-level analysis of the FEWI in the work of FEWS NET-KFSSG</th>
</tr>
</thead>
</table>
| 1. Mutual self-interest and collective action, homophily and proximity, Exchange and Dependency Contagion Theories, Cognitive Theories.  
2. Joint value maximization, cognitive mechanism leading to shared interpretations, exposure to contact leading to social influence, exchange of valued resources, choices based on similarity, variation, selection and retention.  
3. Construction/compositional emergence, heterarchy, hierarchy and holism.  
4. The socio-cultural tradition.

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Table 6: Theories framework of study on network frames and their link to commitment to FEWI in FEWS NET-KFSSG organizations (Monge & Contractor, 2003; Kontopoulos, 1993; Craig & Muller, 2007).
Research Studies

Networks and network analysis studies

The field of social network analysis began in the 1930s in the sociological tradition with such works as the work of Jacob Moreno (1934) and Kurt Lewin (1936), among others. Today, complex systems analysis explores the behavior of the networks of people, groups, organizations, or other agents generally called agents or actors (Monge & Contractor, 2003). Social network analysis is a structuralist paradigm rather than a theory or method that conceptualizes social life in terms of structures of relationships among actors, instead of in terms of categories of actors (Scott & Carrington, 2011). Social, economic and semantic networks, among others, are related systems of associations that necessitate joint and collaborative action towards a certain goal. According to Jan Van Dijk, networks are the nervous system of our society, so that the potential consequences of choosing a certain kind of communication infrastructure are perceivable. At the level of society and on a global scale, there are media networks, social networks and economic networks that reach the furthest corners of the world (Van Dijk, 2006).

Networks are a powerful means of representing patterns of connections and interactions between parts of a system. The study of networks investigates the nature of individual components, while others study the nature of the connections or interactions, or the behavior of the system of the pattern of connections between components (Newman, 2010). From a more structural perspective, a network consists of a graph and additional information on the vertices or the lines of the graph (Nooy et al., 2005); the type of network is determined by the nature of the connected nodes. Like biological networks, such as neural networks, and ecological networks as the food web, the direction of the flow of the network is a convention and can certainly make a
reverse choice (Newman, 2010). However, Nooy (2005) notes that the direction of the network is just what he calls “additional information,” which he thinks is irrelevant since the network structure depends on the pattern of ties. However, certain networks, based on their function, are dependent on the direction of the connections to make sense, especially social networks, which are based on directionality to define centrality and other functions in their various transformations, as I have already discussed in this study. The behavior of these ties can be explained in a multidimensional model, as defined by Monge & Contractor’s (2003) MTML model and affords us the detail to input “additional information” in learning about the message framing that occurs as a result of network interactions.

For instance, one of the most studied networks is the Internet, the Web, as it involves the transport of data between terminals such as computers, and it also plays a central role in the development of new communication standards. Since it is man-made, the Web is a directed network of information in the mold of older information networks such as the citation networks (Newman, 2010). The Web represents the directed network in Network Theory and is directed between the linkages’ sources and their destinations, which are the nodes of the Web network. Utilization of the Web’s networks has created entrenched social phenomena such as Google search engines in knowledge retrieval, connection, utilization and synchronization as never seen before. Emergent social networking services have brought a social and therefore human-connectivity dimension to the Web, with the most recognizable being Facebook, Twitter and Google Plus, among others. It is crucial to mention other Web utilizations that essentially promote a social interaction agenda, such as conferencing and business services, such as banking, shopping and news-making/consumption.
Similarly, a social network, which this study adopts as the mode of analysis based on the MTML model, comprises of people and groups of people who form the vertices of the network and represent connections of some kind, such as a friendship, contact or business relationship. A central factor or notion of social networks is that the involved or interacting individuals’ knowledge and their interactions impact their knowledge based on the highlighted connections. Monge & Contractor (2003) argue that this perspective explains attitudes and behavior based on an individual’s actual interactions and they observe that researchers have used four concepts to gain insight into the structure of an individual’s cognition: (a) semantic networks, (b) knowledge networks, (c) cognition networks, and (d) cognitive consistency. Just as the means for interaction are diverse, so are the possible definitions of an edge in a social network. Social network analysis attempts to capture these permutations in their respective contexts with a classic problem being the problem of devising the interconnectedness of interactants’ ideas about an issue, which ultimately constructs a semantic network and serves to define certain groups or organizations.

Semantic networks, introduced by Monge & Eisenberg (1987) and Monge & Contractor (2003), are said to be established when an interactant has knowledge that is best understood as a set of concepts that are related to one another and is a systematic treatment of message content in networks where words or ideas are the nodes of the related network. FEWS NET is a semantic network which, through the amalgamation of pieces of scientific knowledge, livelihood economic reports, and weather and satellite imagery, designs a united image and body of knowledge useful for monitoring food security and famine conditions. Social networks act through the interaction of professionals at the three levels (micro, meso and macro) and as an organizational network as different organizations work together (FEWS NET- KFSSG) towards famine mitigation.
Properties of networks. In order to analyze and understand a network, we must have one (Nook, Mrvar & Batagelj, 2005). In order to understand the property of networks in the FEWS NET-KFSSG, a clear definition of the network is imperative. First, a network consists of a graph and additional information on the vertices or the lines of the graph. The structure of the network depends on the linkages or pattern of ties by the various actors forming the network; in our case, this would be people, organizations, and FEWI information involved in the FEWS NET-KFSSG network. The linkages or relations or ties can be measured in seven ways (Monge & Contractor, 2003): (a) frequency (how often a link occurs), (b) stability (existence of a link over time), (c) multiplexity (the extent to which actors are linked by more than one relationship), (d) strength (amount of time, emotion, intensity, intimacy a reciprocal relation consists of), (e) direction (extent of a link from one actor to another), and (f) symmetry/reciprocity (extent to which relationship is bidirectional), or as indirect links (a path between two actors intercepted by another).

Recent studies on networks not only perceive them as simply connections or linkages as described above, but as emergent processes, and the organizations they create are called network organizational forms (Monge & Contractor, 2003). As such, this notion accords a wealth of organizational network properties that are not stagnant but emergent and ongoing. The application of dynamic actors (people, groups, organizations) in dynamic organizations such as FEWS NET-KFSSG, yields three distinct communication networks: production, maintenance, and innovation relations (Farace, Monge & Russell, 1977 in Monge & Contractor, 2003).

Therefore the following individual actor and network properties are conceptualized and measured individual dynamic actors in a network take on any of the following eight measures or properties as outlined by Monge & Contractor (2003): (a) degree (number of direct links with
other actors), (b) in-degree (directional links towards an actor), (c) out-degree (directional links from an actor to others), (d) range/diversity/bridge (number of links to different others), (e) closeness (extent to which an actor can reach another, a direct link being “1”), (f) betweenness/liaison/gatekeeper (extent to which an actor mediates), (g) centrality (extent to which an actor is central to a network), and (h) prestige/star (actor is the object rather than the source of relations). The isolated actor has no links or relatively few as compared to other actors in the network. However, in a progressive, productive and enduring network, the isolated actor may be playing certain important roles such as maintenance or other subtle roles, thus their importance cannot be dismissed. As a cluster of entities, network properties manifest themselves in at least nine ways, as Monge & Contractor (2003) proposed: size (number of actors in the network), inclusiveness, component, connectivity, connectedness, density, centralization, symmetry, and transitivity.

**The guiding principles of network analysis** According to Scott and Carrington (2011), network analysis has an especially strong emphasis on relations and context, and differs from conventional paradigms in data investigation and analysis in three major ways: (a) network analysis focuses on relations, not attributes, in describing causation, (b) the network analytic approach studies networks, not groups, or uniform group membership versus the network strength of the relations approach, and finally, c) SNA analysts study patterns of relations in a relational context. The three differences in data investigation therefore act as guiding principles in instrument preparation, administration, data treatment, and the interpretations and discussions of the actors in a relational context as network analysis demands.
Communication network studies

Various communication network studies have attempted to study the behavior of communication network members as individuals and as groups in terms of diffusion of knowledge, innovation and even commitment. Studies of networks as groups have assumed imitation and diffusion as underlying aspects of communication network behavior (Chang & Harrington, 2003), while others have studied individual network actor behavior as a microcosm, or as representative of a larger identical whole.

One communication network study that studies the individual agent within the collective context of the functions within the evolving network structure is Chang & Harrington’s (2003) study, whose purpose was to explore the evolution of the structure and performance of a social network in a population of individuals who searched for local optima in diverse and dynamic environments in their choice on whether to innovate or imitate, and from whom to learn. They created a model using agents, tasks, goals and performance. They modeled turbulence in a task environment and measured the network structure. They found that by inducing the population to concentrate more on diffusing local innovations across the social system, a reduced capacity for innovation could lead to superior performance.

Chang & Harrington’s (2003) main contribution is that they modeled three primary forces of progress driven by innovation on the discovery of ideas, the observation and adoption of ideas, and the endogenous development of a social network. As such, they maintained that these three forces drive the quality of a social network, beginning with the exogenous reliability of communications technology to enable initial impressionable observations of ideas. The other two endogenous processes are the value of ideas leading to a decision to adopt them, and the quality of the links between the agents. Chang & Harrington (2003) highlighted the probability that the
subjects’ possible actions were linked to an individual’s past experiences and the exposure served as reinforcement learning; thus network reliability is only moderately food for imitation, and although it reduces the development of new ideas, it leads to a more developed social network and thus, greater diffusion of ideas.

A key communications network study was carried out by three leading network communications scholars: Noshir Contractor, Stanley Wasserman, and Katherine Faust, who presented a top paper at the 2000 Annual Convention of the International Communication Association in Acapulco, Mexico. They carried out an analytical empirical study testing the multi-theoretical multi-level hypotheses in organizational networks as “network organizations.” They used the nine theoretical mechanisms that explain the emergence of networks at different levels of analysis (Monge & Contractor, 2001), and the p* techniques (Wasserman and Pattison, 1996) to develop a comprehensive multi-theoretical, multi-level model to test hypotheses that explain the emergence of network organizational forms.

Contractor, Wasserman & Faust (2000) argue that networks in an organization’s research agenda have evolved from studying networks in (or between) organizations to the notion that the network is the organization, so they need to be studied as relational systems. They argue that there is a methodological shift in focus from examining emergent networks to explaining emergence, yielding studies focused on: (a) Exploratory and descriptive to confirmatory and inferential techniques; (b) single level, single-theoretical network analysis to multi-theoretical, multi-level analysis; and (c) purely network explanations to hybrid models that also include attributes of the actors.

The authors analyzed communications that occurred in the month prior to the signing of the Cooperative Research and Development Agreements (CRADA) between the 17 members
representing various private and government organizations. They investigated the dichotomous relationships in the network ties from a member in one organization to a member in the same or another organization, if the member reported communication during the month of study. They employed an integrative analytic framework to examine the extent to which the structural tendencies of organizational networks were influenced by multi-theoretical hypotheses operating at multiple levels of analysis to describe how the hypothesized properties of networks influenced the probabilities of graph realizations. They tested eight hypotheses derived from four theories on three levels (dyad, triad, global), using the use the p* family of statistical models. Logistic regression was used to fit a series of nested models, where the response variable was the presence or absence of a tie between each pair of actors.

They found that there was a greater-than-normal probability for mutual ties in the CRADA network, and that, given the number of other possible realizations of the observed graph, there were more transitive and cyclical structures in the CRADA communication network than would be expected by chance, which is consistent with balance theory. The resultant empirical illustration suggested that there were structural tendencies in the CRADA network to reciprocate communication ties, to engage in transitive communication triads, to foster a centralized overall network, and to communicate more with individuals in organizations of their own type, government or industrial. Findings confirmed the notion that the new network forms of organizing are supplanting the hierarchies and markets that dominated the better part of the 20th century “workscape.” While network researchers have made substantial progress in examining networks in organizations, they are less prepared to understand organizing as networks (Monge, & Contractor, 2003).
Communication and commitment in organizational studies

Commitment presupposes sustainable action towards a specific goal. Camargo, et al. (2012) noted that commitment represents the will of two parties to maintain a valuable relationship. As such, the constructs of commitment and trust are key mediating variables in a relationship between exchange partners and both contribute to value creation in the process (Morgan & Hunt, 1994 in Camargo et al., 2012). Therefore, information commitment in organizations is the tendency to actively attend to information, and to enter into a deliberate implementation and sustainability process as an individual, as a member of an organization, and a community.

Studies in organizational commitment have proved that increased communication and strengthened network relations are central to commitment (Wiesenfeld, Raghuram, & Garud, 1999; Watson & Papamarcos, 2002; Leiter & Maslach, 1988). Communication plays a huge role in the prognosis of commitment, since commitment is largely characterized and defined by attitude change, action and verbal-acclaim. Commitment to social identities has been postulated as a central organizing feature of the self-system and is nurtured by strong network relations in the organization.

Camargo et al. (2012) studied a collaborative network and evaluated the variables of commitment and confidence as mediating in the collaborative network relationship. They found that there was a harmony of interest between the elements valued in the relationship, including loyalty and credibility of information. The trust in the relationship, according to the findings, was fostered by annual group/network support and the exchange of experience gained. Although the study focused on commitment, it also demonstrated the organizational commitment. Essentially,
studies that investigate commitment always find positive applications or plausible
generalizations within the organizational commitment context.

Wiesenfeld, Raghuram & Garud (1999) carried out research on communication patterns
as determinants of organizational identification in a virtual organization. They evaluated the
communication patterns of the sales division of a large international computer company that was
six months into a new mandatory virtual work program. They investigated the virtual workers’
use of various means of communications, including documents, electronic, face-to-face and
telephone. They asked the workers to complete a questionnaire on their use of these means of
communications and correlated this use to organization identification, which was measured using
the Mael and Ashforth (1992) scale. They found that the virtual workers’ strength of
identification with the organization depended upon the frequency of electronic communication
with other organization members. They found that, as the intensity of relations and frequency of
communication in the network by virtual workers with other members in the organization
increased, organizational identification or “organizational glue” and commitment to the
organization grew.

Another study on communication and organizational commitment found that trust in
management, reliability of communication, and employee focus significantly and positively
influenced levels of organizational commitment. Watson and Papamarcos (2002) investigated
whether an employee’s perceptions of the quality of social networks and relationships at work
served to develop organizational commitment. They investigated three aspects of communication
patterns among employees: reliable communication, interpersonal trust, and positive perceptions
of normative frameworks.
However, the luster of the concept of commitment has been critiqued as being responsible for both positive and negative effects on the individual in the network, including burnout, and on occasion the suppression of individual creativity. For instance, Leiter and Maslach (1988) studied the impact of the interpersonal environment on burnout and organizational commitment. They interviewed 52 out of 74 nurses and support staff members of the emergency room inpatient facility of a small private hospital in an urban area of northern California with the goal of assessing both positive and negative contacts in the job, and to investigate their separate contributions to burnout and organizational commitment. They used three self-administered instruments, including: (a) the Maslach Burnout Inventory (Maslach and Jackson, 1981, 1986) to measure burnout, which is a 22-item measure which produces three scores on emotional exhaustion, depersonalization and personal accomplishment, (b) the Rizzo, House and Lirtzman (1970) scale, which measures role conflict, and (c) the Organizational Commitment Questionnaire (Mowday et al., 1979). They found that emotional exhaustion was positively related to role conflict ($r = 0.65, p < 0.05$) and unpleasant supervisor contact, while personal accomplishment and pleasant coworker contacts were positively correlated ($r= 0.37, p < 0.05$). They concluded that various aspects of coworker contacts affect organizational commitment directly, in addition to the effects mediated through a subject’s burnout level.

**Information commitment**

The studies and discussions above mentioned information commitment in the context of organizational commitment. This kind of information commitment, as part of OKCT, presupposes information commitment to be an integral part of an organization’s existence and growth. Information commitment will entail specific attention to information, and will plan for sustainable implementation. In the context of the current study, it seeks to investigate if the
FEWS NET-KFSSG individual stakeholders’ information commitment is nested within the organizational networks and commitment. The current study maps networks and uses the information commitment survey (Tsai, 2004; Wu & Tsai, 2007), to discover the types of information commitment present.

However, there is a need to separate the concept and study how experts have treated the notion of “information commitment” in isolation. Experts have studied information commitment as a process of information attention/gathering, and also as a means of managing information. Wu and Tsai (2005) coined the conceptual framework terminology “information commitment” to refer to the evaluative standards which Web users utilize in order to assess the accuracy and usefulness of Web-based materials. Wu and Tsai, (2007), in developing their Information Commitment Survey (Tsai, 2004; Wu & Tsai, 2007) for assessing students’ online information searching strategies and evaluative standards for online materials, held that learners’ information commitments are related to their epistemological beliefs. He therefore proposed a tool to evaluate information commitment along the concepts of elaboration, matching, multiple sources, authority, content usefulness, and technical usefulness.

Hirashima et al. (2011) conducted a study to explore the relationship between students’ information commitment and their experience of mental loads and efforts. He interviewed 341 college students about their experiences of using the Internet and online search engines. They found that their mental load was relative to the types of information commitment present. They therefore suggested that it was necessary to guide appropriate sophisticated strategies for students in an online environment to reduce their cognitive load. Content, usability/function and presentation guided information commitment. Since information systems comprise the entire network of all communication channels used within a given organization or program,
information commitment is the tendency to navigate the terrain of the information systems based on epistemological beliefs on content usability and presentation. Information commitment, therefore, can be said to be a matter of choice influenced by the context.

**Communication networks campaign studies**

The Cambridge Academic Dictionary defines a “campaign” as a plan consisting of a number of activities directed toward the achievement of an aim. Within innovation studies, campaigns include information, education, communication, a collection of techniques for exchanging and sharing information, and attitudes, ideas or emotions with the goal of promoting the adoption of a new behavior by members of a specific target group (Center for Health, 1996). Leading innovation scholars have noted the importance of networks and planned communication as prerequisites for any campaign. Backer, Rogers and Sopory (1992) held that a campaign is an effort to persuade individuals to adopt a specific innovation perceived as new by the individual or the organization. Rice and Atkin (2001) define public communication campaigns as purposive attempts to inform and therefore influence the behavior of a large audience so as to produce non-commercial benefits. They observe that a communication campaign begins with a conceptual assessment of the situation to determine opportunities and barriers, and the process involves content, forms and channels that exploit opportunities and attempt to overcome barriers.

Campaigns can be defined as having five essential ingredients: (a) a goal which is purposive and seeks to influence individuals, (b) an audience - campaigns are aimed at a large audience, (c) a plan – campaigns have a relative, defined, time-limited plan, (d) a communication activity which involves an organized set of communication activities, and (e) a model – a campaign is part and parcel of the persuasive message through identification with a model, individual or entity whose further details enhance the message as part of the campaign’s
activities (Rogers and Storey, 1987 in Backer, Rogers and Sopory, 1992; Fraser and Brown, 2002).

Since campaigns are intentional social influence strategies for getting the word out in order to influence the targeted behavior, the model addition to Rogers and Storey’s (1987) four principles plays the role of identification. Campaigns tap the theoretical aspect of “identification” to capture the target audience’s interest in the message coming from social influence studies. Identification is a fundamental process of social change and is a process of persuasion that brings about a transformation of personal values. The changing role of communications technology enables para-social interaction with celebrities, and has an international influence on popular media and influential disseminators of values and lifestyles across cultural boundaries as new communications media makes our planet smaller and our role models more widely-shared (Fraser & Brown, 2002). Likewise, organizations’ celebrity statuses in their role as champions of moral good in the community also tap into the notion of identification in influencing social change. Taking FEWS NET-KFSSG in their role as agents for food security, the organizations’ elevated status evokes identification from within and without to drive the social influence agenda towards FEWIS and decisions towards famine early action values and behavior by stakeholders.

Coffman (2003) identifies two type of campaign; individual behavior change versus policy change campaigns. She notes that individual behavior change campaigns try to promote behavior that leads to improved individual or social well-being, while policy change campaigns attempt to mobilize public and decision-maker support for policy support or change. The FEWS NET-KFSSG campaign is mainly a policy change campaign which begins with an attempt to persuade individual stakeholders of the need to individually identify and believe in FEWIS messaging and action towards early action for famine mitigation. Coffman’s dichotomy captures
the extent and growth of the notion of identification in campaigns in a continuum, as shown below:

<table>
<thead>
<tr>
<th>Behavior Change campaigns</th>
<th>Policy Change campaigns</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitudes</td>
<td>Social Norms</td>
</tr>
<tr>
<td>Awareness</td>
<td>Public Will</td>
</tr>
</tbody>
</table>

The organizations offer information, and model the famine mitigation purpose on each of the levels represented in the continuum at any one time. Coffman (2003) studied five cases to demonstrate how to evaluate organized communications efforts. For each case study, she studied five aspects of a communications campaign, including the theory of change, focus/methods, design/analysis, key findings and evaluation lessons. The case study evaluations revealed that information alone is insufficient to produce behavioral change; there is a need for paying attention to social context as a necessary ingredient. Furthermore, the case studies revealed that in policy change campaigns, community-level organizing combined with media advocacy can lead to effects on media coverage, key leader support, and subsequent policy change.

Gültekin and Gültekin (2012) studied the importance of public communications campaigns and art activities in social education as part of their university’s initiative to create awareness and to convince the public about social issues in Turkey. From their study, they observed that before launching public campaigns, the plan should be elaborately structured to meet expectations and necessities. They further submit that it is crucial to capture the sensitive points in public opinion through communicational campaigns, and in turn to conduct the campaign focused on that point, integrating methods, issues and contextual ideas. Integration boosts the originality of a campaign. Gültekin & Gültekin (2012) argue that strong campaign management, effective communicational and public relations strategies, and creative and
sensitive artistic activities are the most basic constituents, particularly for the social education program of a university.

Integrated within the communication campaign is the more personal campaign with its interpersonal conversation aspect. Hwang (2012) studied the social diffusion of a campaign-generated interpersonal communication/conversation of a mediator in the generation and diffusion of the effects of an anti-tobacco campaign. Hwang used Hornik’s social diffusion model of campaign influence to test the campaign conversations and campaign exposure, and how they affect a person’s perception on the healthiness of tobacco use. Hwang found that the number of indirect effects conveyed by campaign conversations was significant, but very small compared to the number of indirect effects conveyed through campaign exposure. He recommended future longitudinal studies, so as to measure the effects of conversations independently from those of exposure.

A communications campaign study directly related to food security by McBeath & McBeath (2009) sought to study environmental stressors and food security in China. The core of the article examined six responses to the question of food security, to both perceived and actual environmental stressors, including: policy restricting arable land conversion, China’s one-child policy, investment in irrigation systems, the South–North Water Diversion Project, large-scale afforestation and reforestation campaigns, and the program to convert marginal agricultural lands to forests and grasslands. This is a very intense article on communications campaigning, since the notion of food security included much on livelihoods, production and action areas in each of the policy areas. It examined the integrated policy campaigns by the government and activists. It failed to address the issues of climate change and biotechnological responses to genetically modified foods increasing productivity, but it leaves us with a clear picture of huge, ongoing and
largely successful work to keep China food-secure. This article’s main contribution to the notion of communications campaigns is the integration of eclectic ideas and activities towards the meta-goal of food security and the continuing nature of the task, just like the FESNET-KFSSG attempt in Kenya.

**Theoretical Framework**

Theory in mixed method research provides theoretical lenses or perspectives in both providing an explanation or prediction about the relationship of variables (quantitative), as well as providing an emergent pattern inductively inferred (qualitative) (Creswell, 2010). Creswell explains Mertens’ (2003) views on the use of theory in mixed method research, which Mertens suggests mixes both the value commitments of the different traditions so that we incorporate both the bias-free (quantitative) research and the bias-laden values of qualitative research so as to emerge with a fuller picture of the contextual picture of the variables at play. The current study’s theoretical grounding demands such a theoretical design in mapping the inter- and intra-organizational network relations (bias-laden values), and how these are linked to commitment to EWS information (bias-free value).

This study’s theoretical framework therefore applies the multi-theoretical, multi-level, multi-analytical (MTML) model (Monge & Contractor, 2003) on three levels: the micro, meso and macro analysis of the FEWIS community and its information system networks, to propose the notion of *network frames* and their relation to EWS information commitment among the target audiences/stakeholders. The theoretical framework builds upon networks in FEWIS as a basis for framing FEWIS information, and finds inspiration in four theories of social and communications studies: social network theory, general systems theory, social exchange theory and organizational knowledge creation theory. The use of multiple theories in this research is
informed by Monge & Contractor’s multi-theoretical multi-level (MTML) emergence of communications network frameworks.

The MTML approach allows us to study the creation, maintenance, development and reconstitution of network linkages of both human and non-human agencies, in organizational and inter-organizational contexts (Monge & Contractor, 2003). This research takes into account the consensus-framing processes involved in the monitoring and rationalization processes, from the initial purely scientific data collection by the remote-sensing technologies and economic indicator research initiatives, to the harvesting of information and its interpretation by FEWS NET and other implementing partners and peer donor analysis groups, and then through the various levels of communications machinery towards the anti-famine EWS goals for food security in the region. Therefore, the three-phase model can be conceptualized as one famine early warning system or a body with the framing agencies and co-agencies all contributing to the main framing model both intrinsically and externally, working towards famine prevention goals. The information, agencies and co-agencies play imbricating roles in the EWS monitoring and rationalization processes. The theoretical framework illustrated below is informed by the tri-process modeling of MTML:

Figure 12. The MTML network structuring processes

The role of agencies in driving action towards famine mitigation in Famine Early Warning.

The history of the notion of food entitlement, through the ideas of the philosophical views of the respective scholars from the pre-modern, modern and post-modern eras, along with developments in communications (Fang, 1997), have helped generate perspectives on and a consciousness of food entitlement throughout various historical epochs. This study reveals that food entitlement has been a subject of intense debate, and that perspectives have changed significantly during periods of “transitioning entitlements,” such as conflict, drought, and social struggle.

The “transitioning entitlements” to food have followed similar trends of the information age. As such, the focus of the food sector has shifted from traditional price policies towards a broader regulatory framework (OECD, 1998). Therefore, according to the Organization for Economic Co-operation and Development (OECD), the main issues in food entitlement include: (a) increasing transfer efficiency, (b) ensuring competitiveness and flexibility through deregulation, (c) paying attention to the environment, (d) facilitating adjustment, (e) promoting rural development, and (f) exploring new areas, including food safety, biotechnology, and globalization. These six emphases on food entitlement are driven by food security agencies to formalize their work. This is no doubt a comprehensive look at the question of entitlement with contextual relevance to the individual in community. The OECD global forum in November, 2012, mirrored the move to regulatory framework by focusing on policy coherence for food security in developing countries, assessing the role of donors and cooperation in fostering food security and stressing the need for investment in agriculture and areas of opportunity contributing to improved food security, an obvious focus on regulation.
Unless commitment to information by agencies, including such indicators as record-keeping, budgetary considerations, implementation plans, political accountability and economic disparity, is adequately addressed within the context of African governance and civil society by international humanitarian interventions and local development planning, the hunger crisis will continue to plague most African nations well into the twenty-first century (Baro & Dubel, 2006). The future of food security for Africa depends on good governance, sound economic growth policies, and active preparedness (Webb & von Braun, 1994). In other words, agriculture needs to be viewed as a knowledge-based entrepreneurial activity (Juma, 2011). The onset of famine signals deeper infrastructural problems that eventually affect vulnerabilities to food insecurity. Waal listed the food insecurities as mainly caused by poverty, rising food prices, unrest, drought, and, in Sen’s view, distribution problems. The food security problem in Africa has defied the emergency aid model, government planning and scientific interventions. Can an agency network model present a more culturally-embedded approach to sustainable food security in the region? The models below represent this study’s view of the imbricate role of agencies and co-agencies in determining FEWIS’s information, relevance and timing.
Further, the FEWI concept model’s zoom-in (below) reveals the actors’ communicative roles machinery with agency and co-agency input driving action towards early action goals.

Figure 14. Communication and commitment FEWI concept map zoom-in: the imbricate role of agencies and co-agencies

Research questions from the foregoing review

The above discussion on truth-telling as famine early warning information systems, theory and research and eventual model on how FEWI works, leads to several predictions on the nature of the emergent theory-supported connections in the FEWS NET-KFSSG community.

Network frames discussed yield a composite variable which I will refer to as “network connection,” which entails the various outcomes within a network frame classification of the communication networks operating in the network, including frequency of contact, topics of
discussion, level of communication, and network stability (node proximity, reciprocity, homophilous and ascribed links (Rogers & Kincaid, 1981 p. 316). In addition, “information commitment” is an important factor in food security planning, management and in famine mitigation. Here, the information commitment of stakeholders to the six “sustainable food frames” (Van Gorp & Van der Goot, 2012) is an essential component of assessing the effectiveness of famine early warning information.

Finally, the relationship between the attributes of “information commitment” to the sustainable food frames among stakeholders and their involvement in their own networks is an essential factor to consider; therefore, “organizational commitment” of the stakeholders to their primary network structures or their organization is an important factor in fulfilling the need captured by the research questions for this study. The main research question is:

RQ1 – What is the effectiveness of FEWI since 2007 as perceived by members of the network? (Has FEWI information, managed by FEWS NET-KFSSG at specific levels in guiding decision-makers’ actions, helped solve the famine mitigation problem?)

Below are the secondary/derivative research questions that will serve to provide context to the main question in this concurrent research question in the three areas of inquiry on FEWI effectiveness:

RQ2 - What are the attributes of the connectivity (network connectedness – NC) among stakeholders of FEWI from 2007-2013? (Strength of ties)

RQ3 – What is the level of stakeholders’ information commitments (IC) to the “six sustainable food frames” (Gorp & Goot, 2012) in FEWI since 2007?

RQ4 - What is the relationship between the level of organizational commitment (OC) and the level of collaboration (C) of individuals at the FEWI community since 2007?
RQ5 - What is the relationship between (a) the level of a stakeholder’s network connectedness (NC), with (b) their level of organizational commitment (OC) and (c) collaboration (C) to their level of information commitment (IC) to sustainable food frames in FEWI since 2007?

RQ6 - What are the relationship between the use of either FEWS NET or KFSSG websites to perceived effectiveness (PE) of the FEWI network?

Further, the qualitative in-depth interviews will focus on team-leaders stories from the field in the business of famine early warning, to further serve the main research question. It reads:

RQ7 - What are some of the field narrative examples that may demonstrate the usefulness or otherwise of famine early warning information (FEWI) systems, managed by FEWS NET-KFSSG networks in Kenya at specific levels, in driving famine mitigation and management of food security in general since 2007?

Chapter 2 Summary

This section/chapter has served to provide background of a theoretical framework that builds on networks in the FEWIS community as a basis for framing nested within the four theories of social and communications studies, including social network theory, general systems theory, social exchange theory and organizational knowledge creation theory, informed by the epistemic perspective of the multi-theoretical, multi-level, multi-analytical (MTML) model (Monge & Contractor, 2003) in studying why communication networks emerge, and the effects of those communication networks (in our case, the effects of the mapped network of FEWS NET-KFSSG on their commitment to their organizations and to famine mitigation information for early action by targeted stakeholders).
The extrication of the truth-telling narrative on FEWI in this chapter provides studies in framing, theory and research components and integrates the following topics: frames and framing etymology, framing studies, sustainable food frames, communications network studies, network framing and how it affects commitment to information, and food entitlement perspectives in history and how these inform FEWI information systems networks, including Biblical models of FEWIS. These studies lay the groundwork for investigating network frames in FEWIS, and their effects on commitment towards famine mitigation by FEWS NET-KFSSG. The next chapter outlines the methodology plan in network mapping strategies to discover and explain working networks in the FEWS NET – KFSSG organizations. Further, it describes instrumentation, variables, sampling, data treatment plans, and human subject protection plans.
CHAPTER 3

METHODOLOGY

Overview of Methodology chapter

The methodology chapter outlines the strategies used to examine the effectiveness of Kenya’s famine early warning information (FEWI) network from 2007 to 2013. Strategies planned herein include the network mapping strategies to discover and explain working networks in famine early warning information systems (FEWS NET) and Kenya food security steering group (KFSSG); the former a famine warning information originator, and the latter a famine mitigation response implementer, so as to examine and explain the emergent social and semantic networks in famine early warning information (FEWI) systems. Additionally, the study examines the information commitment and organizational commitment of participants/stakeholders at the network in order to gain further insight on the effectiveness of the network in FEWI towards early action and famine mitigation. Further, the chapter describes the research model, sampling, instrumentation, data collection and treatment plan and the human subjects’ protection plan that was carried out.

Research design

This study adopts a concurrent embedded mixed methods research model that incorporated both the quantitative research and the qualitative inquiry, centered on the question of the effectiveness of the famine early warning famine information community networking and the link to commitment. This study seeks to examine FEWNET’s – KFSSG’s respective originator-implementer collaborative networks roles in defining the famine prevention phenomenon, and the FEWI stakeholders’ information commitments and organizational commitment.
According to Creswell (2011, p. 214), the concurrent embedded strategy approach is characterized by its use of one data collection phase during which both quantitative and qualitative data are collected simultaneously. There is a primary database and a secondary database; the secondary database provides a supporting role in the procedures and is therefore embedded or nested within the predominant method. This means that the secondary question may address a different but complementing question to the main research question. An explicit theoretical perspective can be used in this model to typically inform the primary method. The concurrent embedded strategy is useful to gain a broader perspective due to the use of different methods as opposed to just using one predominant method. For instance, the quantitative data addresses the outcomes expected from the treatments while the qualitative data explores the process experienced by individuals in the treatment groups by seeking information at a different level of analysis (Creswell, 2011, p. 214). Since the researcher is able to collect two types of data simultaneously during a single data collection phase, the study has the advantages of both the quantitative and qualitative data, and offers balance as the equal numbers of units used in each group in each different method are hence comparable. A further advantage of the concurrent embedded strategy include cross-validation in critically assessing data from two methods.

Moreover, the concurrent embedded method is used when a researcher chooses to utilize different methods to study different groups or levels, which are referred to as the multilevel design (Tashakkori & Teddlie, 1998 in Creswell, 211, p. 215). This means that it leads to perspectives from different types of data or from levels within the study, matching with the multilevel epistemic nature of this study and adoption of the analytical inclines of the multi-theoretical, multi-level, multi-analytical (MTML) model (Monge & Contractor, 2003) in studying the emergence of dynamic communication and organizational networks at three levels.
This research design took on a threefold design that describes framing of FEWI information in stakeholders’/decision-makers’ communication network relations, their FEWI information commitment, and the FEWI organizations’ organizational commitment. The FEWNET-KFSSG networks are manifest and mapped along three layers: (a) implementing partners’ (intrinsic networks), (b) local/governmental food security institutions (contextual networks), and (c) other peer-institutions in food security, early-warning and relief non-governmental bodies (adjacent networks).

Figure 15. Research design - Network framing famine analysis map

**Research Questions.** This study sought to gain insight on the effectiveness of the networks in famine early warning information towards early action and famine mitigation by examining the network members’ information commitment and organizational commitment. Since the study is a concurrent embedded strategy method, the primary research question may be different from the research questions used by the secondary method(s). The mixing of data from
the two methods is often used to integrate the information and compare one data source with the other at the discussion section (Creswell, 2009, p. 214). As such, the study analysis was shaped by the primary research question and five supporting derivative questions covering the scope of the research (see research questions for the present study: R1 – R7 on pages 160-162 at the end of Chapter 2).

**Hypothesis.** A hypothesis is the untested assertions of the relationships between variables. They are statements about relationships among phenomena that can be tested by empirical means. As such, the hypothesis is in fact a statement about the relationship that ought to be observed in the real world if the theory is correct (Buddenbaum & Novak, 2001). Thus hypotheses are derived from theory and then tested using empirical methods (Creswell, 2009, p. 141) and are specified predictions of expected outcomes.

There were three main composite variables in this study that emerged from the literature review on framing, food entitlement, theory and research that condenses/leads to four predictions/hypothesis statements below. The composite variables that emerged were as follows: (a) network connectedness, (b) information commitment, (c) collaboration and (d) organizational commitment variables.

As such, the three main composite variables lead to the following predictions:

- **H1** Network connection (NC) will be positively correlated with organizational commitment (OC).
- **H2** Organizational commitment (OC) will positively correlate with collaboration (C)
- **H3a**, **H3b**, **H3c** Network connectedness (NC), organizational commitment (OC) and collaboration (C), will lead to information commitment (IC).
H₄ Information commitment will lead to greater perceived effectiveness (PE) of the impact of FEWI information in the network.

Research Model

In examining the effectiveness of Kenya’s famine early warning information (FEWI) network from 2007 to 2013, the study assessed the following: (a) the strength of collaborative networks, (b) the number/types of information commitments, and (c) organizational commitment and perceived impact by stakeholders - at the FEWI strategy- capacity-building network, FEWS NET, and the coordination-implementer network, KFSSG, between 2007 and 2013. As such, to carry out this assessment above, the study adopted a concurrent embedded research design that triangulated the three functions of the FEWI system in revealing how famine is framed and linked to commitment to famine mitigation. Using the research question and predictions made above, this study’s research model (see figure 16.) was as follows:

**Composite variables.** Given that the various aspects that constitute the strength of collaborative networks (represented in the measurement tool) may be represented by NC *(Network Connectedness)*, and the number or types of information commitments (six sustainable food frames) is represented by IC *(Information commitment)* and the indicators of organizational commitment (three organizational commitment aspects) were represented by OC *(Organizational Commitment)* and finally, the entirety FEWI effectiveness is represented by E *(Effectiveness)*, then our research model is best represented by the illustration below:

**Research model.** The research model predicted that if the following variables [NC *(Network Connectedness), IC *(Information commitment), OC *(Organizational Commitment), C *(Collaboration), and PE *(Effectiveness)] interact, their interaction would yield the following relations:
NC is positively related to IC; that higher NC correlates with higher IC

NC and IC will lead to OC; that higher NC leads to higher OC, and higher IC leads to higher OC

All being true means higher E; that higher NC, positively correlated to higher IC and higher OC means that the model is E (effective).

The model therefore illustrates that when all the variables are positively related (holding all other factors constant) means that FEWI is effective, subject to confirmation by the other confirmatory processes in the model including qualitative data.

Therefore, the following was carried out: (a) A social network analysis visualizing the various communication and collaboration constituted in the network and their specific concerns as organization in the network or as individual players and decision makers towards subsequent community anti-famine action; (b) survey questionnaire on types of information commitments to FEWI information, linking the opinions of agency and co-agency actors to specific sustainable food content/frames proposed by Van Gorp & Van der Goot (2012); (c) stakeholders’ organizational commitment; and (d) perceived impact (qualitative, through stories on the field) by stakeholders about the FEWI efforts since 2007.
Description of the population

A population is the aggregate of all of the cases that conform to some designated set of specifications (Pedhazur & Schmekin, 1991, p. 419). The basic elements of a population need not be individuals but can also be organizations, events, occasions or regions. The aggregate is the target population which one wishes to generalize. Therefore, the sampling frame is a list that
identifies the individual elements of the population and could include all elements in the population.

The famine early warning information (FEWI) community studied consisted of FEWNET’s staff and associates, KFSSG’s staff and associates, and everyone who contributed to the collaborative network of food security management, famine prediction and prevention activities in Kenya. Staffers from all parallel/collaborating organizations who have their representatives in the KFSSG committee are eligible participants. This means that the staff who work in the Kenya government food security and nutrition sector, whose organizations are represented at the KFSSG committee are eligible participants. Since FEWS NET is sponsored by USAID, staffers in the five participating US agencies are part of the network through FEWS NET.

Moreover, all staff and associates at the non-governmental organizations currently working in Kenya towards contributing to food security, and who may also have representation at KFSSG are also eligible participants. This effectively included UN FAO (Food and Agriculture Organization) staffers, WFP (World Food Program) staffers and associates and all other NGOs and contributing organizations. Further, students, professors and researchers working in food security and nutrition management and who contribute significantly to the conversation on food security and nutrition in Kenya, who are also considered by KFSSG, are eligible participants. Therefore, the typical participant is over 18 years old, with a deliberate interest in food security in Kenya because of their work affiliation, contribution to the work of FEWS NET-KFSSG, study major and interest, and specific interest in Kenya’s food security.

**Sampling.** A sample consists of a subset of elements from the population. It is a collection of phenomena so selected as to represent some well-defined population (Williams & Monge, 2001,
Pedhazur and Schmekin (1991) define sampling as a process aimed at obtaining a representative portion of some whole, thereby affording valid inferences and generalizations to it. The general determination of sample size is done by sample design, which specifies the rules and operations by which the sample is to be chosen from the population. The benefit of both probability and non-probability sampling is the potential for increased accuracy (Pedhazur & Schmekin, 1991, p. 321).

The non-probability sampling is often used in socio-behavioral research, where there is use of “samples of convenience” with arguments for these methods including feasibility and economic constraints but which fails to allow for the opportunity to estimate sampling errors, thereby affecting certainty of inferences. On the other hand, probability sampling is the reliance on random methods of selection that enables one to calculate a probability of selection for each element in the population and protects against bias. Sampling statistics, in probability sampling, are calculated values that represent how sample characteristics are likely to vary from population statistics (Williams & Monge, 2001, p.13).

This study employed the non-probability sampling methodology of non-discriminative snowball sampling. According to Goodman (2011), snowball sampling allows the researchers to make estimates about the social network connecting the veiled population and assist in making network discoveries. Coleman (1958–1959) and later Goodman (1961) introduced the notion of snowball sampling and noted that snowball sampling in survey research is subject to the same scientific procedures as ordinary random sampling. Snowball sampling is uniquely apt for social networks data collection because it is relational in nature, and its relational nature has been described as “a method of sampling that makes possible, for example, the statistical estimation of
the number of mutual relations in a given population—the statistical estimation of the number of pairs of individuals in a population who would name each other (Goodman, 2011).

Figure 17: Snowball sampling-tree model

Figure 17 shows that the snowball sampling-tree model begins with a convenient sample that employs social networks to reach more and more people in the population. Noy (2008) argues that snowball sampling brings to the forefront social knowledge and power relations because it is essentially social [emphasis original]. This is because the methodology both uses and activates existing social networks. Noy (2008) noted that snowball sampling involves social networks and exploits the notion of “social capital” in sampling. The concept of social capital is based in part on participation in social networks. Social capital is distributed differentially within social networks, and it is this differential distribution that accounts for networks’ structure and dynamics (Bourdieu, 1984; 1986). The snowball sampling procedure takes on Giddens’ structurational approach that social structures are fundamentally processual and emergent, and are a result of interactions, and so through repetitive processes, social systems re-create themselves (Giddens, 1984 in Noy, 2008). Knowledge that is at the same time both researched and produced through snowball sampling is of a dynamic nature.
The non-discriminative snowball sampling method within the organizations being studied was used to solicit survey responses for this study. The organogram of FEWS NET and KFSSG was useful to help reach as many people as possible as trigger sampling agents or the convenient sample who relied on the people within the organization in helping to reach both colleagues within their organizations and others within the food security management community with whom they had had contact with since 2007. It is important to note that the two organizations were conceptualized as distinct networks for the purposes of sampling, although the two had an organic connection in that one sits at the other’s committee. Such is the nature of the complexity of the food mitigation network.

**Instrumentation**

Research instruments are testing tools that are used to collect information so as to systematically measure a given phenomenon in both quantitative and qualitative field study. Instruments help us to keep track of what I observe and to facilitate how to report it precisely and validly. The behavior or outcome that we seek to measure within a study is a construct, and is often revealed by the independent variable.

Since instrumentation is the application, arrangement and integrated use of instruments, this study employed a three-tiered instrumentations approach that integrated the organizational collaboration survey (Young, L., Pieterson, W., Hsieh, Y.-I., Wang, H., & Contractor, N. 2010), Information Commitment Survey (Wu, Y.T. & Tsai, C.-C., 2007) and the Organizational Commitment survey (Balfour & Wechsler, 1996).

The study employed the integrated instruments and further original modification to suit the research goals to form the *Networks and Commitment FEWI survey* which was available online and offline at [https://www.surveymonkey.com/s/FEWINetworksurveyKen], housed by
Survey Monkey Inc. The survey also included qualitative narratives questions. Afterwards, detailed in-depth interviews with one representative from KFSSG and one from FEWS NET/USAID were conducted to probe significant findings on the types of information and organizational commitments, networks, progress and impact of FEWI in the six year period.

**Instrument Reliability**

Validity and reliability indices are usually established with a test-retest reliability and Cronbach’s alpha coefficients of .700 or higher (Simon, 2006). If the researcher uses an established instrument then instrument testing is not necessary (Sproull, 2004). The FEWI networks survey instrument was sourced from four main instruments but the survey was also modified significantly based on theory. The FEWI Survey composition is illustrated below: [Organizational Commitment Scale (OCS), Information Commitment Survey (ICS) and South Chicago Organizational Collaboration Survey (SC-OCS)].

Table 7. Instruments used to construct the FEWI survey on their validity and reliability

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Author(s)</th>
<th>Year</th>
<th>Validity</th>
<th>Reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organizational Commitment instrument (OCS)</td>
<td>Balfour, D., &amp; Wechslers, B.</td>
<td>1996</td>
<td>- established validity using confirmatory data analysis. (Fields, 2002).</td>
<td>Coefficient alpha: Affiliation commitment 0.81, Identification commitment 0.72, Exchange commitment 0.83</td>
</tr>
<tr>
<td>Information Commitment Survey (ICS)</td>
<td>Tsai, C.-C.</td>
<td>2004</td>
<td>- (LISREL) structural equation modeling (SEM) analyses</td>
<td>Coefficient alpha: overall alpha 0.80, Elaboration 0.84, Match 0.74, Multiple 0.72, Authority 0.82, Content 0.88, Technical 0.76</td>
</tr>
<tr>
<td></td>
<td>Wu, Y.-T. &amp; Tsai, C.-C.</td>
<td>2007</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2010</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Survey scale development

The FEWI survey scale comprised the following items as illustrated in Table 9 below:

Table 8. Specific FEWI survey questions’ sources from the adopted instruments

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Author(s)</th>
<th>Year</th>
<th>Item order in the survey</th>
<th>Number of items (for analysis)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organizational Commitment instrument (OCS)</td>
<td>Balfour, D., &amp; Wechsler, B.</td>
<td>1996</td>
<td>Qs. 3, 4, 5</td>
<td>14 items</td>
</tr>
<tr>
<td>Information Commitment Survey (ICS)</td>
<td>Wu, Y.-T. &amp; Tsai, C.-C.</td>
<td>2007</td>
<td>Qs. 9, 10, 11</td>
<td>14 items</td>
</tr>
<tr>
<td>South Chicago Organizational Collaboration Survey (SC-OCS)</td>
<td>Pieterson, W., Young, L., Hsieh, Y., Wang, H., &amp; Contractor, N.</td>
<td>2010</td>
<td>Qs. 1, 12, 13,14</td>
<td></td>
</tr>
<tr>
<td>Additional FEWI Survey questions</td>
<td>By this researcher - Gichaga, L.Wanjiku</td>
<td>2013</td>
<td>Qs. 2, 6, 7, 8, 15, 16, 17, 18, Demographics 1, 2, 19, 20,</td>
<td>15 items</td>
</tr>
</tbody>
</table>

Measured Variables

A variable is an observable characteristic of an object or event that can be described according to some well-defined classification or measurement scheme (Williams & Monge, 2001). Since I studied the strength of the emergence of communication networks in two organizations, FEWS NET and KFSSG, the nature of the variables is unique for network data for the first assessment strategy. Below is an explanation of the major differences between traditional data and variables and network data:

The major difference between conventional and network data is that conventional data focuses on actors and attributes; network data focus on actors and relations. The difference in emphasis is consequential for the choices that a researcher must make in...
deciding on research design, in conducting sampling, developing measurement, and handling the resulting data. It is not that the research tools used by network analysts are different from those of other social scientists (they mostly are not). But the special purposes and emphases of network research do call for some different considerations.

(Hanneman & Riddle, 2005)

Taking cognizance of the network data, the different considerations in data treatment that Hanneman & Riddle (2005) suggest were taken into consideration. These considerations affected decisions in data collection using the seven means of measuring network strength and in data analysis making theory-supported conclusions. The variables for this study constituted three main composite variables: network connectedness, information commitment and organizational commitment.

The Network Connectedness (NC) composite variable comprised of seven aspects in measuring network strength, including: frequency (how often a link occurs), stability (existence of a link over time), multiplexity (the extent to which actors are linked by more than one relationship), strength (amount of time, emotion, intensity, intimacy a reciprocal relation consists of), direction (extent of a link from one actor to another), symmetry/reciprocity (extent to which relationship is bidirectional), and as indirect links (a path between two actors intercepted by another).

The Information Commitment (IC) composite variable comprised of:
motivation/responsibility frame, elaboration/Frankenstein frame, multiple sources/undermining-of-foundations frame, authority/the good-mother frame, content/natural goodness, and technical/progress frame.
These variables were drawn from two instruments: (a) six FEWI information commitments/ information use strategies’ terms of ratings, including elaboration, match, multiple sources, authority, content, technical (Wu & Tsai, 2007), and (b) six sustainable food frames, including: (i) problem definition, (ii) causal responsibility, (iii) solution/perspective for action, (iv) responsibility for solution, (v) moral basis, and (vi) emotional basis (Van Gorp & Van der Goot, 2012).

The Organizational Commitment (OC) composite variable comprised of identification, affiliation and exchange commitment variables. These are drawn from the organizational commitment scales (Balfour & Wechsler, 1996).

The Perceived Effectiveness (PE) variable was a dependent variable and was influenced by the behavior of the principle variables in the study. PE results were provided both by a direct question in our survey and by the qualitative in-depth interviews gathering field stories by FEWI stakeholders on their effectiveness. The PE variable will also be the sum-total/entirety of the study. That a strong, information committed and organizational committed FEWI community does, in fact, imply an effective FEWI campaign overall as data will demonstrate or not. Further, strategic in-depth interviews will be used to probe significant findings on the types of information and organizational commitments, networks, progress, and impact of FEWI in the six year period.

**Networks and Commitment FEWI survey distribution of variables.**

The Networks and Commitment FEWI survey provided the opportunity to collect data to determine the FEWI information network’s perceived effectiveness (PE) through: (a) Mapping the FEWI community’s organizations’ people, ideas, coverage, networking and coordination (network connectedness – NC and Collaboration - C); (b) determining the FEWI information
commitment of participating respondents and to the six sustainable food frames (IC) (Gorp & Goot, 2012); and (c) the stakeholders organizational commitment (OC) to their FEWI organizations.

The measured variables (perceived effectiveness-PE, network connectedness – NC, collaboration – C, information commitment-IC, organizational commitment-OC), and their measured statements equivalents in the survey helped to collect data through the questions listed below:

(a) To test network connectedness (NC), the following questions in the survey were employed:

Qs. 1, Qs. 2 - Organizational affiliation and length served an organization contributing to food security in Kenya

Qs. 17 Organizational attempted list of exhaustive inter-organizational contacts

Qs. 18 Snowball organizational contacts

Qs. 19 Frequency of interaction of top five inter-organizational contacts

Qs. 22 Reason for contacts – if famine relief/food or other

(b) To test information commitment (IC), the following questions were provided with a range of choices to choose from the following questions that were provided with a seven-point likert scale:

Qs. 7 Specific sources of information from FEWS NET/KFSSG information products

(skip logic question)/informational

Qs. 9 and its 6 mixed (disagree to agree) 7 scale- likert scale question- statements on the six sustainable food frames

Qs. 10 and its 4 mixed (disagree to agree) level of information commitment (search of information) scale 7 scale- likert scale question- statements
Qs. 11 and its 5 mixed (disagree to agree) level of information commitment (use of specific FEWI information) scale 7 scale- likert scale question- statements

Qs. 12 and its 5 mixed (disagree to agree) level of information commitment (use of websites) scale 7 scale- likert scale question- statements

Qs. 13 and its 3 mixed (disagree to agree) level of information commitment (finding unknown FEWI information) scale 7 scale- likert scale question- statements

Qs. 14 and its 4 mixed (disagree to agree) level of information commitment (accuracy of information) scale 7 scale- likert scale question- statements

Qs. 15 and its 5 mixed (disagree to agree) level of information commitment (navigating information) scale 7 scale- likert scale question- statements

Qs. 16 and its 4 mixed (disagree to agree) level of information commitment (perception of usefulness information) scale 7 scale- likert scale question- statements

Qs. 23 use of the FEWS NET website

Qs. 25 use of the KFSSG website

(c) To test organizational commitment (OC), the following questions were provided with a seven-point likert scale:

Qs. 3 and its 5 mixed (disagree to agree) 7 scale- likert scale question- statements

Qs. 4 and its 5 mixed (disagree to agree) 7 scale- likert scale question- statements

Qs. 5 and its 4 mixed (disagree to agree) 7 scale- likert scale question- statements

(d) To test collaboration (C) among the stakeholders at FEWI, the following questions were provided.

Qs. 12 Organizations you mostly interact with

Qs. 13 How often you interact with collaborating organizations, frequency of contact
Qs. 14 Topics of collaboration - 10 issues in food security conversation

(e) To test perceived effectiveness (PE) of FEWI, the following questions were provided: (Since this study examined the effectiveness of FEWI since 2007-2013, the time/date aspect of the question was included):

- Qs. 16 FEWS NET website and relation to effectiveness of FEWI
- Qs. 18 KFSSG website and relation to effectiveness of FEWI
- Qs. 19 overall perceived effectiveness of FEWI’s in mitigating famine or not
- Qs. 22 Qualitative field narrative(s) of FEWI effectiveness.

- For demographic information (enrich data analysis and discussions), the questions included:

- Qs. 1 Organizational affiliation of respondents
- Qs. 7 Located in Kenya or not
- Qs. 20. Respondents’ gender
- Qs. 21 Respondents’ level of education

Data Collection

Data collection was carried out on a two-phase process; the study was a concurrent embedded mixed methods approach. The three-fold surveys (the organizational collaborative survey, the information commitment and organizational commitment surveys), all embedded and adapted into the *Famine early warning information (FEWI) Networks and commitment survey*, were carried out in tandem.

[Survey Monkey link: https://www.surveymonkey.com/s/FEWISURVEY1]

The online survey was distributed to the target/relevant respondents and offline PDF copies were made available to people serving in hardship areas with little or no access to the Internet. Further, since the study contained some large question types, off-line versions of the
survey were made available to clients to facilitate accuracy. Thereafter, detailed in-depth interviews were conducted to probe significant findings on the types of information and organizational commitments, networks, progress and impact of FEWI in the six year period.

**Data Analysis**

The multi-tiered survey results were harvested from the survey monkey threshold and imported into SPSS for analysis. Descriptive statistics were used to make descriptions of the seven aspects of network connectedness, information commitment and organizational commitment patterns as well as stakeholders’ view of the effectiveness of FEWI.

Analysis of relations were used to fulfill the research model predictions (see research model – figure 22, p. 229). As such, correlation analysis was carried out to test the relations between network connectedness and information commitment, as well as information commitment’s relation to organizational commitment. Further, regression analysis was carried out to determine the effect of network connectedness to organizational commitment or information commitment’s effect on organizational commitment. Thereafter, a confirmatory structural equation modeling (SEM) procedure that combined both correlation and regression estimates in determining how relations fit theory was employed.

Finally, strategic in-depth interviews were conducted so as to probe significant findings on the types of information and organizational commitments, networks, progress and impact of FEWI in the six year period. Both Survey Monkey’s text analyzer and text analyzer with Word was employed to take into qualitative account stories about the role FEWI has played in the daily business of famine mitigation and food security management.

**Software.** The study used three main software applications and one online text analysis resource to test the hypothesized relations both quantitatively and qualitatively. These included:
(a) IBM SPSS Statistics version 22, (b) IBM AMOS version 22, (c) the IBM SPSS Modeler version 16 and (d) Survey Monkey essay qualitative text analyzer program.

The SPSS statistics software was utilized for data cleaning, factor analysis, descriptive statistics and multi-level modeling in analyzing the information commitment and organizational commitment of participants at various levels/organizations involved in FEWI using multiple regression function and simple correlations functions as specified earlier in this chapter. Further, the IBM AMOS program was employed to carry out structural equation model (SEM) that tested all the relations of the main variables for both confirmatory and mediatary exploration purposes.

The SPSS Modeler program’s networks visualizer function helped to perform the social networks analysis visualization/mapping of the FEWI network contacts, debates and collaboration activities. The program uses exploratory techniques useful for unpacking the strength of relations through visualizations and manipulation of concrete networks through highlighting networks affiliation, cohesion brokerage and ranking, among other processes using information harvested from sociometric data. The sociometric data drawn from the participants from the FEWS NET and KFSSG collaborating organizations towards mitigating food insecurity helped further describe the network patterns/dynamics of participating professionals and their organizations. The sociograms generated from the networks helped to define the internal structures of the networks working at and with FEWS NET as a system towards FEWI goals.

Data consisted of the definition of the connection between internal composition of FEWS NET as a system and their relation to the external features. Data treatment both tested the strength and direction of the relationships between the variables (issues frames and beliefs/attitudes/proposed actions). Studying phenomena from a network perspective requires that at least one theoretically significant concept be defined relationally (Marin & Barry

Finally, the Survey Monkey Inc.’s text analyzer helped to analyze qualitative narratives submitted online by survey participants. The Survey Monkey program also helped to organize discussions in themes so as to highlight key areas of discussions that the narratives focused on and which revealed the participants’ point of view as they carry out famine mitigation activities or food security management activities in the region.

**Margins: Limitations, Delimitations and Assumptions**

Creswell (2010, p. 214) observes that the concurrent embedded strategy of study has limitations in that the data need to be transformed in some way so that they can be integrated within the analysis phase of the research. Besides, he notes, the different databases’ comparison may introduce discrepancies that will need to be resolved as the two methods may be unequal in their priority, which may result in unequal evidence within a study that may be an impediment in the interpretation of the final results.

Further, the foregoing research assumes that FEWS NET has a significant and leading impact in Kenya and the Horn of Africa as a harvester, synchronizer and provider of FEWI information to the food security expertise community in the region. This assumption was taken from the report comparing the regional FEWI systems during the just-ended 2010-2011 Horn of Africa famine crisis, where FEWS NET was ranked top in providing high accuracy and timely FEWI information as compared to other FEWI agencies in the Horn of Africa region, including: FSNWG, IPC, FAO’s GIEWS and WFP’s HEWS (Ververs, 2011). This research design assumed that the network connections of the stakeholders focused on FEWI and their emphasis on early
action and famine mitigation. The possibilities of other motives for the relations/contacts are beyond the scope of this study.

It’s important to also note that FEWS NET’s impressive suite of 16 reporting products do not act alone. Their efforts are facilitated by national or government food security departments such as the KFSSG. This study assumed that a study of the most collaborative FEWI agencies, FEWS NET, along with its co-operating national partner, KFSSG, as well as peer agencies, would give a fair picture of the FEWI efforts within Kenya.

Further, the decision-makers’ or implementers’ perceptions on FEWI information on food security policies in the area under discussion were beyond the scope of this study. This may have had an impact on commitment and is a possible consideration for further research. Moreover, since FEWS NET’s target audiences were not the grassroots people being affected by food insecurity issues, but, rather, decision-makers, the study delineated the grassroots people.

A look at the actors in the network introduced some form of bias in that FEWI message-originators within have been largely outsiders (professionally, culturally and experientially), although there has been a deliberate push to reverse that. This means that FEWS NET data may be more international and relief in outlook than local application and relevant, a void which local professional teams may fill. Besides, FEWS NET-KFSSG faces a paradox of excellent working information against the backdrop of grim famine statistics in the region. This limitation may be solved by more research so as to prove the effectiveness of the measures in place. Overall, it is crucial to look at the challenge of famine relief early warning information in Africa as it presents a complex paradox of planning versus the reality of achieving desired food security goals on the ground.
Finally, a limitation of the study based on the method used in this study is that a longitudinal network development study was beyond the scope of this study. Therefore, the study may have alluded to, but failed to fully grasp, the nature of the network development of the network being evaluated. Otherwise, a study focused on network development could afford the opportunity to examine the network from its initial contacts levels with low-connectedness, to the possibly growing and therefore more stable and higher-connectedness states to the possibility of eventual attrition or creation of new composite organizational entities. The possibility of new irreversible organizational rearrangement from the collaborations, much like chemical reactions, may take any forms from the exemplar of a chain reaction (influencing trends) to elimination reaction, photochemical reaction or even neutralization reaction where the organizational collaboration actually cedes the organization’s relevance or absorbs its influence and its structure all together. The possibility of such exciting observation in network development may be useful as an idea for further research on networks and famine early warning information.

Protection of Human subjects plan

The Human Subject Review Board committee at Regent University approved my application based on provision of all the materials required for approval, including the completion of an application for research consent form, consent for research letter, and provision of the instruments for research and certification. Further, I used a self-generated logo on my survey (informative), an online board posting, social media (Twitter, Facebook), a consent letter, and emails to supervisors and research assistants to assist me in ensuring that respondents were well informed about the study before they participated and that they had adequate support as they participated.
Chapter 3 Summary

This chapter outlined a detailed plan of action for research towards examining the effectiveness of Kenya’s famine early warning information (FEWI) network from 2007 to 2013 through unpacking the network connections and studying the network-stakeholders’ types of information and organizational commitments. The chapter shed light on the independent and dependent variables that were examined. Strategies planned herein included the plan to discover and explain working relations and networks in famine early warning information systems (FEWS NET) and Kenya food security steering group (KFSSG), the former a famine warning information originator, and the latter a famine mitigation response implementer, so as to examine and explain the emergent social and semantic networks in famine early warning information (FEWI) systems.

Further, the chapter described instrumentation, variables, sampling, data collection and treatment plan and human subjects’ protection plan. The next phase in this study (Chapter 4 & 5) reports on the results of the study. These analyses will reveal the perceived effectiveness of FEWI networks by member of the network.
CHAPTER 4

QUANTITATIVE RESULTS AND THE STRUCTURAL EQUATION MODELING

Overview of Results (I) chapter

The purpose of the study is to explore and therefore to contribute to a better understanding of the perceived effectiveness of Kenya’s famine early warning information (FEWI) network since 2007, by members of the network. The FEWI Networks survey was conducted as part of a communication study of the organizational, collaboration and information commitment patterns of the food security and famine mitigation professional networks in Kenya. Respondents were drawn from the Kenya Food Security Steering Group (KFSSG) and the Famine Early Warning Information Systems Network (FEWS NET) and their main collaborating independent organizations, researchers and other professionals involved in food-security planning and management in/for Kenya. The final survey tally had 191 participants. The survey’s participation was voluntary and completely anonymous.

The survey results were harvested on the host Survey-Monkey account located at: https://www.surveymonkey.com/s/FEWISURVEY1. This results section describes the results of the quantitative tests and data collection methods and explores the following quantitative procedures and results: (a) data screening, (b) instruments reliability/validity indices and scale development, (c) the demographic data of the participants, (d) quantitative results according to research questions and hypotheses and (e) the confirmatory structural equation modeling (SEM) results and meditation effects of information commitment on perceived effectiveness results. Further qualitative results according to social network analyses (SNA) of network members’ connections and field narratives are discussed in Chapter 5.
Data Screening

The data were cleaned to check for irrelevant, incomplete and incorrect components such as typos in organizational references by the respondents and missing data. A key example is where respondents said that they were not affiliated to the listed organizations and proceeded to write their affiliation which was, in fact, included in the list of organizations listed. They misspelled the organizations’ name which would have affected the network analyses later if left misspelled and could likely be categorized as a separate organization. Respondents who answered fewer than three questions were omitted from the final quantitative data altogether. Out of the initial 191 respondents, 172 were retained.

Due to the anticipated quantitative tests of regression, correlation, chi-square and the structural equation modeling (SEM), data were screened and tested to check its conformity to the procedures’ main assumptions. The screening included tests for linearity, multicollinearity and homoscedasticity. Thereafter, a factor analysis was conducted to create a reliable scale developed from the 10 factors that loaded. These 10 factors were the scale items which, supported by theory, formed the five main composite variables used to test the main hypothesized relationships in this study.

The data test for linearity was conducted randomly within the data; for instance, a test for linearity on SPSS 22, between the level of education of respondents and some aspects of organizational identification and perceived effectiveness confirmed the assumption of linearity. The data test for multicollinearity was conducted with selected variables within the data. The resulting VIF scores were between 1 and 2 indicating that the data do not have problems with multicollinearity, an undesirable situation where independent variables are highly correlated and have an adverse effect on the stability of regression coefficients (Pedhazur & Schmelkin, 1991, - 204 -
p. 450). This was further confirmed by the correlation analyses where all the scale items and main composite variables all correlated moderately. However, the SEM’s extra-refined confirmatory tests suggested a higher correlation of the NC independent variable to C ($r = .82$ on the SEM) and proposed various permutations of the SEM model as discussed later in this chapter. Finally, for the data test for homoscedasticity, the scatter plots from pairs of various variables indicated that the error variance is non constant. This means the scatter plots were random and we can expect unbiased estimates. Other plots were used to check for plausibility of regression assumptions. All tests supported multivariate normality.

**Factor Analyses, Reliability Analyses and Measurement Scales**

A factor analyses was conducted to investigate the dimensionality of the 12 main variables in the study in order to create composite variables appropriate for regression analyses. 10 out of the 12 variables created 10 composite variables represented by ten measurement scales. The Scree plot below graphs the variance of each component in the data set so as to determine how many components should be retained in constructing the measurement scale. Figure 18. Scree plot using FEWI survey data.
The scree plot (figure 18) graphs the eigenvalue against the component number. The scree plot’s “elbow”, or the point at which the remaining eigenvalues are relatively small or become about the same size, as 10. Table 9 shows the total variance explained.

Table 9. Factor analyses total variance explained

<table>
<thead>
<tr>
<th>Factor</th>
<th>Initial Eigenvalues</th>
<th>Rotation Sums of Squared Loadings$^a$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>% of Variance</td>
</tr>
<tr>
<td>1</td>
<td>20.676</td>
<td>33.896</td>
</tr>
<tr>
<td>2</td>
<td>7.321</td>
<td>12.002</td>
</tr>
<tr>
<td>3</td>
<td>4.946</td>
<td>8.109</td>
</tr>
<tr>
<td>4</td>
<td>3.673</td>
<td>6.021</td>
</tr>
<tr>
<td>5</td>
<td>3.195</td>
<td>5.238</td>
</tr>
<tr>
<td>6</td>
<td>2.607</td>
<td>4.274</td>
</tr>
<tr>
<td>7</td>
<td>2.064</td>
<td>3.384</td>
</tr>
<tr>
<td>8</td>
<td>1.844</td>
<td>3.024</td>
</tr>
<tr>
<td>9</td>
<td>1.795</td>
<td>2.943</td>
</tr>
<tr>
<td>10</td>
<td>1.519</td>
<td>2.491</td>
</tr>
<tr>
<td>11</td>
<td>1.310</td>
<td>2.147</td>
</tr>
<tr>
<td>12</td>
<td>1.220</td>
<td>2.000</td>
</tr>
</tbody>
</table>

Extraction Method: Unweighted Least Squares.$^a$

**Reliability Analyses and Measurement Scales**

Reliability coefficients of the resultant composite variables were computed as shown in Table 10. The following 10 factors loaded were used to form the five composite variables for our study:

1. Network commitment variable formed by; NetConnect (factor 2), NetCollab (factor 9)
2. Organizational commitment variable formed by; OrgIdent (factor 1), OrgAffil (factor 5)
3. Collaboration variable formed by; CollabIssues (factor 4), CollabActivities (factor 6)
4. Information commitment variable composed of; InfoElab (factor 3), InfoAuth (factor 8) and InfoMulti (factor 10)
5. Perceived effectiveness variable composed of; FEWI_P.E (factor 7).
Cronbach's alphas for the 16 organizational commitment (OC) and 11 Collaboration (C) items were $\alpha = .94, .87, (\text{OrgIdent, OrgAffil}) .87$ and $.93 (\text{CollabIssues, CollabActivities})$ respectively. Therefore, the OC and C items were found to be highly reliable.

Cronbach's alphas for the 12 network commitment (NC), 18 Information commitment (IC) items and 3 perceived effectiveness (PE) were $\alpha = .93, .66 (\text{NetConnect, NetCollab})$ and $.94, .71, .69 (\text{InfoElab, InfoAuth, InfoMulti})$ and $.85 (\text{FEWI_P.E})$ respectively. Therefore, the NC, IC and PE items were found to be reliable.

Table 10. Reliability of scale items/variables

<table>
<thead>
<tr>
<th>Scale Item (Computed variable)</th>
<th>Cronbach's alpha</th>
<th>N of items</th>
<th>Mean</th>
<th>SD</th>
<th>Model item measuring</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. OrgIdent</td>
<td>0.94</td>
<td>11</td>
<td>63.1</td>
<td>11.45</td>
<td>OC (Organizational Commitment)</td>
</tr>
<tr>
<td>2. NetConnect</td>
<td>0.93</td>
<td>7</td>
<td>33.9</td>
<td>8.06</td>
<td>NC (Network connectedness)</td>
</tr>
<tr>
<td>3. InfoElab</td>
<td>0.94</td>
<td>10</td>
<td>55.1</td>
<td>11.24</td>
<td>IC (Information commitment)</td>
</tr>
<tr>
<td>4. CollabIssues</td>
<td>0.87</td>
<td>7</td>
<td>32.8</td>
<td>7.52</td>
<td>C (Collaboration)</td>
</tr>
<tr>
<td>5. OrgAffil</td>
<td>0.87</td>
<td>5</td>
<td>30.5</td>
<td>5.21</td>
<td>OC</td>
</tr>
<tr>
<td>6. CollabActivities</td>
<td>0.93</td>
<td>4</td>
<td>13.5</td>
<td>5.59</td>
<td>C</td>
</tr>
<tr>
<td>7. FEWI_P.E</td>
<td>0.85</td>
<td>3</td>
<td>15.9</td>
<td>3.75</td>
<td>PE (perceived effectiveness)</td>
</tr>
<tr>
<td>8. InfoAuth</td>
<td>0.71</td>
<td>5</td>
<td>28.6</td>
<td>5.01</td>
<td>IC</td>
</tr>
<tr>
<td>9. NetCollab</td>
<td>0.66</td>
<td>5</td>
<td>25.0</td>
<td>4.62</td>
<td>NC</td>
</tr>
<tr>
<td>10. InfoMulti</td>
<td>0.69</td>
<td>3</td>
<td>15.0</td>
<td>3.32</td>
<td>IC</td>
</tr>
</tbody>
</table>

[Key: $\alpha \geq 0.9$ Excellent internal consistency, $0.7 < \alpha < 0.9$ Good, $0.6 < \alpha < 0.7$ Acceptable, $0.5 \leq \alpha < 0.6$ Poor].

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Table 11. Correlations of the 5 main composite variables

<table>
<thead>
<tr>
<th></th>
<th>NC</th>
<th>OC</th>
<th>C</th>
<th>IC</th>
<th>FEWI_P.E</th>
</tr>
</thead>
<tbody>
<tr>
<td>NC</td>
<td>Pearson Correlation</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OC</td>
<td>Pearson Correlation</td>
<td>.44**</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.005</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Pearson Correlation</td>
<td>.62**</td>
<td>.31*</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.000</td>
<td>.03</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IC</td>
<td>Pearson Correlation</td>
<td>.59**</td>
<td>.63**</td>
<td>.44**</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.000</td>
<td>.000</td>
<td>.002</td>
<td></td>
</tr>
<tr>
<td>FEWI_P.E</td>
<td>Pearson Correlation</td>
<td>.67**</td>
<td>.33*</td>
<td>.36**</td>
<td>.32*</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.000</td>
<td>.02</td>
<td>.01</td>
<td>.02</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

The composite variables were all moderately correlated, eliminating the possibility of multicollinearity. The five main composite variables correlated significantly at between lower limit at $r = .31, p < .05$ and a higher limit at $r = .67, p < .05$.

Also from the results, all scale items which comprised the 5 composite variables, were moderately correlated between $r = .19$ [OrgIdent/CollabAct], $r = .25$ [OrgIdent/CollabIssues] and $r = .63$ [NetConnect/PE]. The highest correlations were scale items within the same composite variable of information commitment (IC), $r = .65$ [InfoEllab/ InfoAutho], $r = .85$ [InfoEllab/InfoMult].
Descriptive Statistics

Descriptive Statistics of the variables enabled us to make a collective report of the data.

Descriptive statistics of nominal data was computed as illustrated below:

Table 12. Descriptive statistics of nominal data (N=172)

<table>
<thead>
<tr>
<th>Question</th>
<th>N Statistic</th>
<th>Range Statistic</th>
<th>Minimum Statistic</th>
<th>Maximum Statistic</th>
<th>Mean Statistic</th>
<th>Std. Deviation Statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Choose Organization from the drop-down menu here: - Organization</td>
<td>160</td>
<td>58.0</td>
<td>1.0</td>
<td>59.0</td>
<td>42.3</td>
<td>18.9</td>
</tr>
<tr>
<td>How many years have you been working for this organization?</td>
<td>169</td>
<td>5.0</td>
<td>1.0</td>
<td>6.0</td>
<td>3.1</td>
<td>1.9</td>
</tr>
<tr>
<td>Are you involved directly with food security and/or famine management in and LOCATED in Kenya?</td>
<td>156</td>
<td>1.0</td>
<td>1.0</td>
<td>2.0</td>
<td>1.5</td>
<td>.5</td>
</tr>
<tr>
<td>What is your gender?</td>
<td>133</td>
<td>1.0</td>
<td>1.0</td>
<td>2.0</td>
<td>1.3</td>
<td>.4</td>
</tr>
<tr>
<td>Do you use the KFSSG - (Kenya Food Security Steering Group) website?</td>
<td>63</td>
<td>1.0</td>
<td>1.0</td>
<td>2.0</td>
<td>1.3</td>
<td>.5</td>
</tr>
<tr>
<td>Do you use the FEWS NET website?</td>
<td>62</td>
<td>1.0</td>
<td>1.0</td>
<td>2.0</td>
<td>1.2</td>
<td>.4</td>
</tr>
</tbody>
</table>
The descriptive statistics of the main composite variables are illustrated below:

Table 13. Main composite variables descriptive statistics (scale data items)

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Range</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>NC</td>
<td>51</td>
<td>48</td>
<td>34</td>
<td>82</td>
<td>59.0</td>
<td>11.2</td>
<td>126.5</td>
</tr>
<tr>
<td>OC</td>
<td>52</td>
<td>96</td>
<td>16</td>
<td>112</td>
<td>94.4</td>
<td>15.8</td>
<td>250.4</td>
</tr>
<tr>
<td>C</td>
<td>58</td>
<td>60</td>
<td>16</td>
<td>76</td>
<td>47.2</td>
<td>10.7</td>
<td>114.1</td>
</tr>
<tr>
<td>IC</td>
<td>54</td>
<td>98</td>
<td>26</td>
<td>124</td>
<td>99.2</td>
<td>17.9</td>
<td>321.9</td>
</tr>
<tr>
<td>FEWI_P.E</td>
<td>134</td>
<td>17</td>
<td>4</td>
<td>21</td>
<td>15.9</td>
<td>3.8</td>
<td>14.1</td>
</tr>
</tbody>
</table>

**Demographic descriptions of the study’s participants**

*Gender and education levels.* Survey participants were overwhelmingly highly educated, male food security professionals and researchers (61.8% had completed graduate school; 74% male). The study had a total of 172 full participants from 191 total responses. Demographics were performed on un-cleaned data with N=191. (The cleaned data resulted in 172 qualified entries, N=172). Among the 131 completed responses specifically on the gender question, 98 (74%) were male and 35 (26%) were female.

*Organizational affiliations of participants.* The participants’ organizational affiliations are of utmost significance in this study given that we are investigating the organizational networks and collaborations patterns in the study. The organizational networks have been discussed in much detail as is requisite in answering the main premise of this study. About 173 or 90.57% of the participants answered this question. 18 or 9.42 % skipped the question. People
from a total of 143 organizations/professional affiliations, mostly sourced from the original listed 57 organizations, participated in the survey.

About 62 or 43.3% of the participants indicated “other” to mean that they worked for an organization beyond the 57 listed organizations included in the survey’s drop-down menu. However, some of the listed organizations (by participants choosing “other”) were already included in the original list. On the other hand, about 20 out of the 57 listed organizations did not get any respondents (returned 0), and have been omitted (57-20=37 organizations included) in the final listing. In addition, some participants who chose an organization from the drop-down menu also listed another organization that they are affiliated with, adding to the list of “other” organizations [over and above of the 62 “other”]. The specified organizations added 86 more entries as some respondents’ listed more than one organizational affiliation under ‘other’.

Thirteen of the 86 organizations were found to be part of the original list; therefore they were added back into the original 57 listed organizations on the drop-down menu of the survey. Therefore, in all, 76 more entries were added, 11 more than the 62 “matching” respondents who answered “other.” This was expected because of the variable nature of professional networks that may be singly or imbricate.

An important factor about the respondents is that although some were affiliated with the organizations mentioned, they contributed to Kenya’s food security management from outside of Kenya. A substantial number of participants (47.8%) worked from outside Kenya and those located within Kenya among the survey participants encompassed 52.2%.

**Participants’ number of years at the organizations.** Among the respondents, most people had worked for their organization for up to 5 years (about 84 or 47.4%). Additionally, a significant number (38 or 21.7%) had worked for their organization for over 15 years. One
respondent indicated that he/she had worked for their organization for 30 years, while others indicated varying stints working for different but related or even collaborating organizations in famine mitigation. It is unclear if respondents chose the number of years based on a cumulative experience or based on their current organizational contribution. One respondent indicated that he was on internship to strengthen his professional portfolio. Another indicated that he had made a choice to complete survey based on one particular past working experience. About 175 (91.62%) of the participants answered question 2 on the number of years served, and 16 (8.38%) skipped the question all together. Below is a chart of the distribution of the number of years participants had worked for their respective organizations:

Figure 19. Distribution of years worked.

![Survey participants distribution of years served](chart)
Quantitative Analyses of primary Hypotheses

The hypotheses are illustrated in figure 19. An alpha level of 0.05 was used for all statistical tests.

Figure 20. Hypothesized path diagram of multiple regression and correlations:

The relationship between composite variables and proposition paths are shown in this research model illustrated on Figure 20.
Hypothesized Structural Equation Model with composite variables from our factor analyses.

The latent variables (NC, OC, IC, C, and PE) each had between one and three measured variables representing them. Below is the hypothesized model with both latent/conceptual variables and measured variables whose proposition paths and mediation-checking paths are shown in the structural equation model (SEM) in figure 21 (below). The SEM will be used for exploratory and confirmatory purposes for our current FEW research model.

Figure 21. Hypothesized path diagram of the structural equation model (SEM):

Mediation: Secondary paths to check for mediation
- NC leads to PE,
- OC leads to PE,
- C leads to PE
Hypothesis $H_1$ - Network connection (NC) is positively associated with organizational commitment (OC).

Table 15 shows results for Hypothesis $H_1$. The Pearson correlation ($r$) and the significance level ($p$) were computed using SPSS 22. OC had two variables; OrgIden and OrgAfil while NC had two variables; NetConnect and NetCollab. NC and OC were significantly correlated, $r = .429, .366, .316$ ($r > .20$), $p < 0.05$.

The composite variables NC and OC correlated moderately, $r = .435$.

Hypothesis $H_1$ was confirmed.

Table 14. Summary of Correlations of NC and OC variables

<table>
<thead>
<tr>
<th>Composite variables NC, OC Correlations</th>
<th>NC</th>
<th>OC</th>
</tr>
</thead>
<tbody>
<tr>
<td>NC</td>
<td>Pearson Correlation</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>51</td>
</tr>
<tr>
<td>OC</td>
<td>Pearson Correlation</td>
<td>.435**</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.005</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>40</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (2-tailed).*. Correlation is significant at the 0.05 level (2-tailed).
Hypothesis $H_2$ - Organizational commitment (OC) is positively associated with collaboration (C). Table 15 shows results for Hypothesis $H_2$. The Pearson correlation ($r$) and the Significance level ($p$) were computed using SPSS 22. OC had two variables (OrgIdent and OrgAfil) while C had two variables (CollabIssues and CollabAct). OC and C had a weak positive correlation relationship, $r = .252, .210, .202$ ($r > .20$) and CollabAct had a very weak correlation of .185 with OrgIdent; the significance level $p > 0.05$.

The composite variables NC and C reported a weak correlation, $r = .313$. Therefore, Hypothesis $H_2$ reported a weak correlation which was confirmed.

Table 15. Summary of Correlations of OC and C variables

<table>
<thead>
<tr>
<th>Correlations Composite variables OC and C</th>
<th>OC</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Correlation</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Pearson Correlation</td>
<td>.313*</td>
<td>.313*</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.034</td>
<td>.034</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Correlations of OC/C variables</th>
<th>OrgIdent</th>
<th>OrgAfil</th>
<th>CollabIssues</th>
<th>CollabAct</th>
</tr>
</thead>
<tbody>
<tr>
<td>OrgIdent</td>
<td>Pearson Correlation</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OrgAfil</td>
<td>Pearson Correlation</td>
<td>.613**</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CollabIssues</td>
<td>Pearson Correlation</td>
<td>.252</td>
<td>.210</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.078</td>
<td>.132</td>
<td></td>
</tr>
<tr>
<td>CollabAct</td>
<td>Pearson Correlation</td>
<td>.185</td>
<td>.202</td>
<td>.334*</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.173</td>
<td>.118</td>
<td>.010</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).
Hypothesis $H_3a, H_3b, H_3c$ - Network connectedness (NC), organizational commitment (OC) and collaboration (C), lead to information commitment (IC).

A linear regression analyses was performed. According to the results, regression statements were computed in order to establish if the independent variables predicted the dependent variable. Further, in order to further ascertain the elusive notion of causation, the structural equation modeling (SEM) was computed for exploratory and confirmatory purposes so as to establish if the model fit according to theory.

Hypothesis $H_3a$ - Network Connectedness (NC) lead to Information Commitment (IC). Multiple regression analyses were used to test if the network connectedness (NC) characteristics significantly predicted respondents’ ratings of information commitment (IC).

It was found that the characteristics of network connectedness (NC) significantly predicted some characteristics of information commitment (IC) [InfoEllab]. However, some characteristics of NC [NetCollab] did not significantly predict Information Commitment (IC) tendencies [InfoAutho and InfoMulti]. Three regression analyses for each dependent variable which are the scale items that constitute Information Commitment (IC), InfoElab/InfoAuth/InfoMulti were predicted by the independent variables of NC’s NetConnect/NetCollab.

Overall, the composite variable NC yielded a significant prediction for the composite variable IC. Hypothesis $H_3a$ was confirmed, as illustrated below (Table 16):
Table 16. Network Connectedness (NC) - Information Commitment (IC) Regression Summary

<table>
<thead>
<tr>
<th></th>
<th>R</th>
<th>R²</th>
<th>B</th>
<th>β (beta)</th>
<th>F-Ratio</th>
<th>T-value</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>NC and IC composite variables</td>
<td>.586</td>
<td>.343</td>
<td>.956</td>
<td>.586</td>
<td>24.003</td>
<td>4.899</td>
<td>.001</td>
</tr>
<tr>
<td>Individual measured variables</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Hypothesis H3b - Organizational commitment (OC) will lead to information commitment (IC).

Multiple regression analyses tested to see if the organizational commitment (OC) characteristics significantly predicted respondents’ ratings of information commitment (IC). The variables of OC were OrgIdent, OrgAfil IC and those of IC were InfoElab, InfoAuth and InfoMulti. It was found that some characteristics of organizational commitment (OC) [OrgIdent] significantly predicted all three characteristics of information commitment (IC). However, some characteristics of OC [OrgAfill] did not significantly predict all information commitment (IC) tendencies. Three regression analyses for each dependent variable which constitutes the scale
items for information commitment (IC), InfoElab/InfoAuth/InfoMulti, ran with independent variables of OC’s OrgIdent and OrgAfil ran.

Overall, the composite variable OC yielded a significant prediction for the composite variable IC. Hypothesis H3b was confirmed.

Table 17. Organizational Commitment (OC) - Information Commitment (IC) Regression Model Summary

<table>
<thead>
<tr>
<th></th>
<th>R</th>
<th>R²</th>
<th>B</th>
<th>β (beta)</th>
<th>F-Ratio</th>
<th>T-value</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Composite variable OC and IC</td>
<td>.633</td>
<td>.400</td>
<td>.603</td>
<td>.633</td>
<td>26.719</td>
<td>5.169</td>
<td>.000</td>
</tr>
<tr>
<td>Individual measured variables ↓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OrgIdent OrgAfil – Ivs InfoElab - Dv</td>
<td>.589</td>
<td>.347</td>
<td>.468</td>
<td>.558</td>
<td>10.885</td>
<td>3.468</td>
<td>.001</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Hypothesis H3c - Collaboration (C) lead to information commitment (IC).

Multiple regression analyses tested whether the Collaboration (C) characteristics significantly predicted respondents’ ratings of information commitment (IC). Variables: C (CollabIssues, CollabAct), IC (InfoElab, InfoAuth, InfoMulti). It was found that some characteristics of collaboration (C) [CollabIssues] significantly predicted some characteristics of
Information Commitment (IC) [InfoEllab] and [InfoMulti]. However, some characteristics of C [CollabAct] did not significantly predict any of the information commitment (IC) tendencies. Still, [CollabIssues] characteristics of collaboration did not predict the [InfoAutho] characteristics of information commitment (IC). Three regression analyses for each dependent variable which constitute the scale items for information commitment (IC), InfoElab/InfoAuth/InfoMulti ran with independent variables of C’s CollabIssues, CollabAct ran. Some IC variables, such as InfoAuth, were not predicted by C.

Overall, the composite variable C yielded a significant prediction for the composite variable IC. (B = .63, \( p < .05 \)). Hypothesis H3c was confirmed.

Table 18. Collaboration (C) - information commitment (IC) regression model summary

<table>
<thead>
<tr>
<th></th>
<th>R</th>
<th>R²</th>
<th>B</th>
<th>( \beta ) (beta)</th>
<th>F-Ratio</th>
<th>T-value</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Composite variable C &amp; IC</td>
<td>.44</td>
<td>.12</td>
<td>.63</td>
<td>.44</td>
<td>11.12</td>
<td>3.33</td>
<td>.002</td>
</tr>
<tr>
<td>Individual measured variables ↓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CollabIssues, CollabAct – Ivs InfoElab - Dv</td>
<td>.42</td>
<td>.17</td>
<td>.54</td>
<td>.38</td>
<td>4.89</td>
<td>2.72</td>
<td>.01</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>.13</td>
<td>.08</td>
<td></td>
<td>.55</td>
<td>.59</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(Not significant)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>.15</td>
<td>.20</td>
<td></td>
<td>1.42</td>
<td>.16</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(Not significant)</td>
</tr>
<tr>
<td>CollabIssues, CollabAct – Ivs InfoMulti – Dv</td>
<td>.35</td>
<td>.12</td>
<td>.13</td>
<td>.30</td>
<td>3.66</td>
<td>2.17</td>
<td>.04</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>.05</td>
<td>.10</td>
<td></td>
<td>.73</td>
<td>.47</td>
</tr>
</tbody>
</table>
Hypothesis $H_4$ - Information commitment (IC) lead to greater perceived effectiveness (PE) of the impact of FEWI information in the network.

Multiple regression analyses tested to see if the participants’ ratings of information commitment (IC) significantly predicted respondents’ judgment of perceived effectiveness (PE) of the FEWI network. The IC variables (InfoElab, InfoAuth, InfoMulti) were tested to determine if they predicted the perceived effectiveness (PE) characteristics. The results recorded that some (1/3) characteristics of information commitment (IC), [InfoAuth], significantly predicted PE tendencies. Conversely, two other characteristics of information commitment (IC), [InfoElab and InfoMulti] did not significantly predict perceived effectiveness (PE). Overall, the negative coefficients for information commitment (IC) [InfoElab], implied that the dependent variable PE decreases with more of the IC characteristics. The model is moderate since the $R^2$ of .159 means that 15.9% of the variation of our variables can be explained in a linear relationship with the predictor. Overall, the composite variable, information commitment (IC) yielded a significant prediction for the composite variable, perceived effectiveness (PE). ($p = .017 < .05$). Therefore, hypothesis $H_4$ was partially confirmed. (Note that SEM confirmatory results did not confirm $H_4$).

Table 19. Information Commitment (IC) – perceived effectiveness (PE) regression summary

<table>
<thead>
<tr>
<th></th>
<th>R</th>
<th>$R^2$</th>
<th>B</th>
<th>$\beta$ (beta)</th>
<th>F-Ratio</th>
<th>T-value</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Composite variable IC and PE</td>
<td>.322</td>
<td>.104</td>
<td>.072</td>
<td>.322</td>
<td>6.034</td>
<td>2.456</td>
<td>.017</td>
</tr>
<tr>
<td>InfoElab, InfoAuth, InfoMulti – Ivs FEWI_PE – dvs</td>
<td>.399</td>
<td>.159</td>
<td>-.025</td>
<td>-.070</td>
<td>3.149</td>
<td>-.304</td>
<td>.102</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>.302</td>
<td>.385</td>
<td></td>
<td>.763</td>
<td>.102</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>.102</td>
<td>.087</td>
<td></td>
<td>.704</td>
<td>(2/3 not significant)</td>
</tr>
</tbody>
</table>

(See also the confirmatory structural equation modeling of the hypothesized relations)
Quantitative analyses of research questions and secondary hypotheses

The factor analyses and research model which lead to the structural equation modeling (SEM) emanated from the theoretical framework created out of the study’s research questions. However, it’s prudent to seek to answer each research question which is largely answered through the hypothesized research model. The findings from all the research questions (primary and secondary hypothesis) contribute to the FEWI SEM discussions, results and implications thereof for the entire description of the FEWI networks community and its perceived effectiveness that we seek to unpack in this study.

Research questions results

RQ₁ – What is the effectiveness of FEWI since 2007 as perceived by members of the network?

The perceived effectiveness (PE) of the famine early warning information network (comprising of FEWS NET, KFSSG and collaborating organizations) was measured using questions 16, 18 and 19. Out of these, 3 Likert scale items out of 5 items in question 19 loaded on one factor in our factor analyses. These three survey items were used to construct the measurement scale for perceived effectiveness (PE) on the regression tests and SEM modeling presented earlier in this chapter. The notion of perceived effectiveness was explored using qualitative data from field narratives discussed in detail on the qualitative analyses in Chapter 5. According to the descriptive statistics of the loading Likert scale items, the members of the network that we studied perceived that FEWI was effective or strongly effective as indicated in Table 20 below.
Table 20. Descriptive statistics for question 19 loading factors on perceived effectiveness (PE)

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Range</th>
<th>Min</th>
<th>Max</th>
<th>Sum</th>
<th>Mean</th>
<th>SE</th>
<th>SD</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q19n2</td>
<td>135</td>
<td>6</td>
<td>1</td>
<td>7</td>
<td>739</td>
<td>5.47</td>
<td>.114</td>
<td>1.326</td>
<td>1.759</td>
</tr>
<tr>
<td>Q19n3</td>
<td>135</td>
<td>6</td>
<td>1</td>
<td>7</td>
<td>733</td>
<td>5.43</td>
<td>.117</td>
<td>1.358</td>
<td>1.844</td>
</tr>
<tr>
<td>Q19n5</td>
<td>136</td>
<td>5</td>
<td>2</td>
<td>7</td>
<td>683</td>
<td>5.02</td>
<td>.133</td>
<td>1.556</td>
<td>2.422</td>
</tr>
</tbody>
</table>

RQ2 - What are the attributes of the connectivity (network connectedness – NC) among stakeholders of FEWI from 2007-2013? (Strength of ties)

This was part of the secondary or derivative research questions that served to provide context to the main question in this concurrent research. Part of the question is answered by quantitative statistics and part is answered by the qualitative narratives and the social network analyses (SNA) of the network connectivity. Specifically the strength of ties is addressed by SNA.

For the quantitative statistics, the attributes of connectivity were represented by the network connectedness (NC) conceptual variable which was measured by two variables labeled NetConnect (had seven 7 survey items loading) and NetCollab (had 5 survey items loading): Combined, they had 12 items that loaded strongly on our factor analyses. The descriptive statistics of the survey items that comprised network connected-ness (NC) are represented in Table 21.
Table 21. Network Connectedness descriptives

<table>
<thead>
<tr>
<th>Scale Item</th>
<th>Cronbach's alpha</th>
<th>N of qs.</th>
<th>Mean</th>
<th>Variance</th>
<th>SD</th>
<th>Model item measuring</th>
</tr>
</thead>
<tbody>
<tr>
<td>NetConnect [Qs16n2, 16n3, 16n4, 18n1, 18n2, 18n3, 18n4]</td>
<td>0.93</td>
<td>7</td>
<td>33.93</td>
<td>65.0</td>
<td>8.1</td>
<td>NC (Network connectedness)</td>
</tr>
<tr>
<td>NetCollab [Qs11n2, 14n2, 14n6, 14n7, 19n4]</td>
<td>0.66</td>
<td>5</td>
<td>24.98</td>
<td>21.4</td>
<td>4.6</td>
<td>NC</td>
</tr>
</tbody>
</table>

RQ3 – What is the level of stakeholders’ information commitments (IC) to the “six sustainable food frames” (Gorp & Goot, 2012) in FEWI since 2007?

Part of this question is answered by quantitative statistics and part is answered by the qualitative narratives. For the quantitative statistics, the level of stakeholders’ information commitments (IC) characteristic was measured by three scale items labeled InfoEllab (10 factors), InfoAuth (5 factors) and InfoMulti (3 scale factors). All combined there were 18 factors that loaded on our factor analyses. Table 22 includes descriptive statistics for IC

Table 22. Information Commitment (IC) descriptives

<table>
<thead>
<tr>
<th>Scale Item</th>
<th>Cronbach's alpha</th>
<th>N of qs.</th>
<th>Mean</th>
<th>Variance</th>
<th>SD</th>
<th>Skewness Statistic</th>
<th>SkewnessStd. Error</th>
<th>Kurtosis Statistic</th>
<th>Kurtosis Std. Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>InfoEllab [Qs4n1,4n2,4n3,4n4,4n5,5n1,5n2,5n3,5n4,9n2]</td>
<td>0.90</td>
<td>10</td>
<td>55.1</td>
<td>126.3</td>
<td>11.3</td>
<td>-1.345</td>
<td>.319</td>
<td>2.450</td>
<td>.628</td>
</tr>
<tr>
<td>InfoAuth [Qs8n2,8n3,8n4,9n4,9n1]</td>
<td>0.70</td>
<td>5</td>
<td>28.6</td>
<td>25.1</td>
<td>5.0</td>
<td>-1.360</td>
<td>.309</td>
<td>2.638</td>
<td>.608</td>
</tr>
<tr>
<td>InfoMulti [Qs9n1,10ns,11n1]</td>
<td>0.70</td>
<td>3</td>
<td>16.0</td>
<td>11.1</td>
<td>3.3</td>
<td>-0.870</td>
<td>.295</td>
<td>1.290</td>
<td>.582</td>
</tr>
</tbody>
</table>
RQ₄ - What is the relationship between the level of organizational commitment (OC) and the level of collaboration (C) of individuals/nodes/actors at the FEWI community since 2007?

The quantitative statistics indicating the relationship between organizational commitment (OC) and level of collaboration (C) were computed and the correlation between the items found to be significant. The qualitative SNA analyses on collaboration will present further insight into each of the variables and on the relationship between the two variables.

RQ₅ - What is the relationship between (a) the level of a stakeholder’s network connectedness (NC) with (b) their level of organizational commitment (OC) and (c) collaboration (C) with their level of information commitment (IC) to sustainable food frames in FEWI since 2007?

The quantitative statistics indicating the relationship between network connectedness (NC) organization commitment (OC) and level of collaboration (C) to information commitment (IC) were computed and the regression between the items found to be significant with certain characteristics and not significant in certain characteristics. (See table 14, 15 and 16). The FN narratives and SNA analyses will present further insight into each of the variables and the relationship between the variables.

RQ₆ - What is the relationship between the use of either FEWS NET or KFSSG websites with perceived effectiveness (PE) of the FEWI network?

A Chi-square function was employed to test the interdependence between the categorical variables on the use of FEWS NET website and the use of the KFSSG website as illustrated on Table 23.

According to the cross-tabulation there was no significant difference between the characteristics of the participants who use the FEWS NET website and those that used the KFSSG website as their information source.
Further, an Anova procedure to measure the differences between the two groups on the perceived effectiveness (PE) variable was not significant for either the KFSSG users or FEWS NET website users. This implies that there was no significant difference between the users of either website in their view of perceived effectiveness of the FEWI network. We cannot therefore claim that exposure to one of the two organization’s websites influences attitudes towards the FEWI network’s effectiveness. (See table 24)

Table 23. Cross-tabulation – Use of FEWNET and KFSSG websites.

<table>
<thead>
<tr>
<th>Do you use the FEWS NET website? * Do you use the KFSSG - (Kenya Food Security Steering Group) website?</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you use the FEWS NET website?</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Expected Count</td>
</tr>
<tr>
<td></td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Expected Count</td>
</tr>
<tr>
<td>Total</td>
<td>Count</td>
</tr>
<tr>
<td></td>
<td>Expected Count</td>
</tr>
</tbody>
</table>

Chi-Square Tests

<table>
<thead>
<tr>
<th>Value</th>
<th>df</th>
<th>Asymp. Sig. (2-sided)</th>
<th>Exact Sig. (2-sided)</th>
<th>Exact Sig. (1-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>18.076*</td>
<td>1</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>Continuity Correctionb</td>
<td>15.398</td>
<td>1</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>17.482</td>
<td>1</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>Fisher's Exact Test</td>
<td></td>
<td></td>
<td>.000</td>
<td>.000</td>
</tr>
<tr>
<td>Linear-by-Linear Association</td>
<td>17.769</td>
<td>1</td>
<td>.000</td>
<td></td>
</tr>
</tbody>
</table>

N of Valid Cases | 59 | |

a. 1 cells (25.0%) have expected count less than 5. The minimum expected count is 4.51.
b. Computed only for a 2x2 table
**Table 24. ANOVA between users of FEWSNET and KFSSG websites**

<table>
<thead>
<tr>
<th></th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you use the FEWSNET website?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between Groups</td>
<td>3.92</td>
<td>16</td>
<td>.25</td>
<td>1.57</td>
<td>.12</td>
</tr>
<tr>
<td>Within Groups</td>
<td>6.87</td>
<td>44</td>
<td>.16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>10.79</td>
<td>60</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do you use the KFSSG - (Kenya</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Food Security Steering Group)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>website?</td>
<td>5.36</td>
<td>16</td>
<td>.34</td>
<td>1.78</td>
<td>.06</td>
</tr>
<tr>
<td>Between Groups</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within Groups</td>
<td>8.64</td>
<td>46</td>
<td>.19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>14.00</td>
<td>62</td>
<td></td>
<td></td>
<td>(not significant)</td>
</tr>
</tbody>
</table>

**Structural Equation Modeling (SEM) of perceived effectiveness of FEWI network.**

It’s prudent to conclude our quantitative results analyses by utilizing a structural equation modeling (SEM) procedure. The SEM statistical technique allows tests and estimates on causal relations between one or more independent variables (IVs) (Tabachnick & Fidell 2007, p. 676), so as to examine in one instance how the model fits. In this study, the Kenya famine early warning information network/community causal relations in the SEM model are useful for both confirmatory and exploratory examination. The confirmatory factor analyses tests for validity of the causal structure in the SEM. Testing for validity is important before making any attempt to evaluate the structural model. Once it’s known that the measurement model is operating adequately, further assessments of the hypothesized structural model are made (Bryne, 2010, p. 164).

According to Rick Hoyle (2012), the confirmatory approach logic of SEM takes on a hypothesis-testing approach to the analyses of structural theory, so that if the goodness-of-fit is
adequate, the model argues for the plausibility of postulated relations among variables and vice versa. Therefore, SEM is an inference method that takes multiple inputs and produces one or more outputs. The inputs on quantitative causal assumptions, query causal and counterfactual relationships among variables of interest and assesses data interaction governed by joint probability distribution generated by a process content. The outputs include statements that are logical implications of relations separate from data-based claims concerning magnitudes or likelihoods of the target queries and testable statistical tests of the degree to which the data fits the predictions of the theoretical model (Hoyle, 2012, p. 71).

On the other hand, the exploratory structural equation modeling (ESEM) integrates features of SEM and ESEM. ESEM allows that some parts of the model are unrestricted instead of restricted so that indicators are allowed to load on every factor. It is suitable when we have a weaker hypothesis about multiple-indicator measurement of some structures in the model (Kline, 2011:121). Moreover, the ESEM is useful where links between the observed and latent variables are uncertain. The analyses proceed in an exploratory mode to determine how and to what extent the observed variables are linked to their underlying factors (underlying factors account for co-variation among observed variables) (Bryne, 2010).

*SEM Assumptions*

According to Hoyle (2012), five conditions (SEM assumptions) need to be met before one can reasonably infer a causal relation between variable in an SEM model: (a) the presumed cause (X) must occur before the presumed effect (Y), temporal precedence, (b) there is association, or an observed co-variation between X and Y, (c) there is isolation, which means that there are no other plausible explanations for effects on the dependent variable, (d) the form of the distribution of the data is known, so that the observed distributions match those assumed
by the method used to estimate associations and (e) the direction of the causal relation is
correctly specified so that X indeed causes Y instead of the reverse, or X and Y cause each other
in a reciprocal manner (Hoyle, 2012, p. 111).

**SEM Benefits**

The benefits of using SEM are clear. According to Iacobucci, Saldanha & Deng (2007), SEM results work to the researcher’s benefit to enrich the results of regression analyses as they are more likely to detect existing patterns or cumulative multiple interacting variables, including *mediation*. Therefore, results are truer to reflecting the known population structural characteristics. SEM results are also statistically more defensible given the elegance of the simultaneous estimation. Moreover, the standard errors of the coefficients are larger for the regression approach. Thus the smaller standard errors for SEM indicate greater precision in the estimation and hence are preferred (Iacobucci, Saldanha & Deng, 2007, p. 145).

This model was assessed using IBM SPSS AMOS 22 goodness-of-fit statistics for the multi-group model whose key values are those of the $X^2$ statistic with degrees of freedom, $p$-value, the CFI and the RMSEA (Bryne, 2010:212-213). The CFI (comparative fit index), values larger than .95 are taken as a good indication of a good fit, however the CFI = 1.000 is not a perfect fit but just an indicator of model fitness (Blunch, 2013). The other fit index is the RMSEA (root mean square error of approximation). The RMSEA value around 0.05 is considered a good sign of a good fit and models with values larger than 0.10 should not be accepted (Blunch, 2013:120). The CMIN/DF (CMIN=Chi²: discrepancy between Sigma (theta) and the unrestricted S, df: degrees of freedom), good fit: ~ 1, acceptable fit: [1-2] or [1-3] or [1-5] a large value indicates a poor fit. The PCLOSE ($p$-values) for testing the null hypothesis that RMSEA is less than 0.05. RMSEA is said to be a “badness of fit” index as it declines with
improving fit and is bounded by a lower value of zero (Hoyle, 2012: 217). The complete
goodness-of-fit reporting syntax includes: [Chi square, degrees of freedom, p-value, CMIN/DF,
CFI, RMSEA, LO 90, HI 90, PCLOSE.] (Blunch, 2013, p. 174).

**AMOS standardized parameter estimates for latent variables:** In order to estimate the
model on IBM SPSS, two conditions must be satisfied: (a) we must create scales for the latent
variables and (b) the model must be identified. In order to meet the first condition, we fix one of
the $\lambda$ (lambda) for each factor to 1.00. This will transfer the scale indicator in question to its
latent variable. In this way, AMOS standardizes the factors by fixing their variances to 1.00.
(Blunch, 2013:134). In analyses of structural equation models, it is common to present results in
terms of standardized parameter estimates because the scale of latent variables can be set
arbitrarily by different identification constraints (fixing either factor variances or one loading per
factor to 1.0) (Hoyle, 2012: 446).

**SEM Results Narrative**

An SEM modelling or confirmatory factor analyses was performed using the Analyses of
Moment Structures (AMOS 22). Figures 21-24 show the completed SEM models at various
configurations. The circles represent latent variables and rectangles represent measured
variables. Absence of a line connecting variables implies the lack of a hypothesized direct effect.
The hypothesized model examined the predictors of perceived effectiveness (PE) of famine early
warning information with a possible mediation by information commitment (IC) for the three
identified factors: network connectedness (NC), organizational commitment (OC) and
collaboration (C).

An initial model from the hypothesized relations with all ten variables was inadequate as AMOS termed it as *inadmissible* due to negative covariance matrix of the OC-NC-C matrix.
Therefore, modification statistics were applied to improve the model. Two measures were employed in order to improve the model. First, the weaker (in reliability) “InfoMulti” measured variable path of the IC conceptual variable was deleted. Then the correlation property between NC and C was deleted. Second, a Bayesian solution (BSEM) admissibility test was conducted. The admissibility test sets the prior density to 0 for parameter values that result in a model where any covariance matrix fails to be positive. The admissibility test analyses took about 99,244 observations to meet the convergence criterion for all estimates. Minimum values for all estimated variances were now positive. The significant potential benefits in BSEM yielded a more realistic model specification (MacCallum, Edwards & Cai, 2012). For this model, the Bayesian posterior predictive details were: \( p = .50, \) DC 3265.72, effective number of parameters 32.45. (See Table 25 below and figures 21-24 thereafter. [See the output detail in Appendix F]).

Table 25. Comparison of different SEM models’ fit indices configurations and their output

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Chi-square</th>
<th>df</th>
<th>( p ) - value</th>
<th>CMIN/DF</th>
<th>CFI</th>
<th>RMSEA</th>
<th>LO 90</th>
<th>HI 90</th>
<th>PCLOSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Fig. 21</td>
<td>128.04</td>
<td>49</td>
<td>.000</td>
<td>2.613</td>
<td>.817</td>
<td>.097</td>
<td>.077</td>
<td>.118</td>
<td>.000</td>
</tr>
<tr>
<td>2. (no fig.)</td>
<td>104.79</td>
<td>40</td>
<td>.000</td>
<td>2.620</td>
<td>.828</td>
<td>.097</td>
<td>.075</td>
<td>.120</td>
<td>.001</td>
</tr>
<tr>
<td>3. Fig. 22</td>
<td>53.37</td>
<td>23</td>
<td>.000</td>
<td>2.320</td>
<td>.913</td>
<td>.088</td>
<td>.057</td>
<td>.119</td>
<td>.024</td>
</tr>
<tr>
<td>4. Fig. 23</td>
<td>28.87</td>
<td>30</td>
<td>.525</td>
<td>.962</td>
<td>1.000</td>
<td>.000</td>
<td>.000</td>
<td>.055</td>
<td>.921</td>
</tr>
<tr>
<td>5. Fig. 24 (-ve Covariance)</td>
<td>61.61</td>
<td>35</td>
<td>.004</td>
<td>.929</td>
<td>.929</td>
<td>.067</td>
<td>.038</td>
<td>.094</td>
<td>.153</td>
</tr>
</tbody>
</table>

-Model 1 represents the output of the complete hypothesized model for this study. (See figure 21)

-Model 2 represents the output of the adjusted FEWI model with the [infomulti] path removed.
(Model 2 is not reproduced in this document as it was also not adequate)

- Model 3 represents the output of the FEWI model with the C (Collaboration) path with its two measured variables (CollabIssues, CollactAct) removed. (See Figure 22)

- Model 4 represents the output of the FEWI model with the NC (Network connectedness) path (with its two measured variables NetConnect, NetCollab) removed. (See figure 23)

- Model 5 represents the output of the model new direct links to PE (perceived effectiveness) from OC and C to demonstrate mediation. (See figure 24)

Figure 22. Model 1. Complete hypothesized FEWI Network Structural Equation Model

Number of distinct sample moments: 90, Number of distinct parameters to be estimated: 41

Degrees of freedom (90 - 41): 49. Minimum was achieved; Chi-square = 128.041, Degrees of freedom = 49, Probability level = .000, CMIN/DF = 2.613, CFI = .817, RMSEA = .097, LO 90 =
.077, HI 90 .118, PCLOSE = .000. Probability level of .000, CFI > .95 and an RMSEA > .05, suggests that model does not fit or was found to be inadequate.

Model 2. Adjusted FEWI Network SEM ([infomulti] path for IC, 1 constraint removed)
Number of distinct sample moments: 77, Number of distinct parameters to be estimated: 37
Degrees of freedom (77 - 37): 40. Result (Default model): Minimum was achieved; Chi-square = 104.785, Degrees of freedom = 40, Probability level = .000, CMIN/DF = 2.620, CFI = .828, RMSEA = .097, LO 90 = .075, HI 90 = .120, PCLOSE = .001. Probability level of .000, an RMSEA > .05, suggests that model does not fit/is inadequate.

Figure 23. Model 3. Adjusted FEWI Network SEM (without Collaboration variable paths)

Number of distinct sample moments: 54, Number of distinct parameters to be estimated: 31
Degrees of freedom (54 - 31): 23. Result (Default model): Minimum was achieved; Chi-square = 53.370, Degrees of freedom = 23, Probability level = .000, CMIN/DF = 2.320, CFI = .913,
RMSEA = .088, LO 90 = .057, HI 90 = .119, PCLOSE = .024. Probability level of .000, CFI > .95 and an RMSEA > .05, indicates that goodness-of-fit indices were not significant.

Figure 24. Model 4. Adjusted FEWI Network SEM (without Network connectedness conceptual variable and paths). *(We adopted this model as it was significant / adequate.)*

The model is recursive. Sample size = 172, Number of distinct sample moments: 65

Number of distinct parameters to be estimated: 35, Degrees of freedom (65 - 35): 30

**Model fit summary:** Minimum was achieved: Chi-square = 28.866, Degrees of freedom = 30, Probability level = .525, CMIN/DF = .962, CFI = 1.000, RMSEA = .000, LO 90 = .000, HI 90 = .055, PCLOSE .921. Probability of .525, < .05 Goodness- of -fit indices were significant).
**Mediation effect**

The FEWI model hypothesized a mediation effect by the information commitment (IC) characteristics in the causal relationship between the independent variables; NC, OC and C each, predicting the dependent variable, perceived effectiveness (PE). The mediating variable is said to intervene in the relations between the independent and dependent variables. A mediator is differentiated from just a third variable in that it is an intermediate variable in the causal sequence from the independent to the dependent variable and may confound or suppress. Researchers rely on theory for making the decision on the type of effect (Hoyle, 2012:418). Our model demonstrated that IC had a suppression effect whose nature had both inconsistent and consistent on different paths. An inconsistent mediation may be indicated when the direct and mediated effects of one variable on another have opposite signs; a consistent mediation occurs when the signs are the same, both of which are apparent in this analysis.

Figure 25. Mediation effect of IC on the OC- PE path (magnified to show path negative estimate)
Table 26. Mediation effect of IC on the OC-PE path SEM estimates

<table>
<thead>
<tr>
<th>Variable 1</th>
<th>Variable 2</th>
<th>Estimate</th>
<th>t-value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information_Commitment</td>
<td>Organizational_Commitment</td>
<td>.332</td>
<td>2.323</td>
<td>.020</td>
</tr>
<tr>
<td>Information_Commitment</td>
<td>Collaboration</td>
<td>.510</td>
<td>1.428</td>
<td>.153</td>
</tr>
<tr>
<td>Information_Commitment</td>
<td>Network_Connection</td>
<td>.376</td>
<td>1.187</td>
<td>.235</td>
</tr>
<tr>
<td>Perceived_Effectiveness</td>
<td>Information_Commitment</td>
<td>-.056</td>
<td>-2.323</td>
<td>.020</td>
</tr>
<tr>
<td>Perceived_Effectiveness</td>
<td>Organizational_Commitment</td>
<td>.015</td>
<td>2.323</td>
<td>.020</td>
</tr>
</tbody>
</table>

An extract of the regression weights from the output of the original model (with all variables) describes the path between the two variables OC and PE, whose direct path has a regression weight of .01 (see highlighted weight). However, the same path through a third variable, IC, becomes negative. (see highlighted weight on table and on magnified path on Figure 29). This pattern is referred to as inconsistent mediation, which is apparent in this analysis where the original path and the subsequent path have different signs (a positive sign becomes a negative indicator/ sign). (Kline 2011:166). Below is the final CFA Model used to demonstrate incidence of consistent mediation where the indicated mediation (confounder or suppression) and therefore comparison between direct and mediated effects have the same sign (Kline 2011:166).

Table 27. A consistent mediation effect by IC on the OC-PE path

<table>
<thead>
<tr>
<th>Variable 1</th>
<th>Variable 2</th>
<th>Estimate</th>
<th>t-value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information_Commitment</td>
<td>Organizational_Commitment</td>
<td>.474</td>
<td>2.754</td>
<td>.006</td>
</tr>
<tr>
<td>Information_Commitment</td>
<td>Collaboration</td>
<td>.604</td>
<td>1.406</td>
<td>.160</td>
</tr>
<tr>
<td>Perceived_Effectiveness</td>
<td>Information_Commitment</td>
<td>-.001</td>
<td>-0.15</td>
<td>.988</td>
</tr>
<tr>
<td>Perceived_Effectiveness</td>
<td>Collaboration</td>
<td>.089</td>
<td>1.208</td>
<td>.227</td>
</tr>
<tr>
<td>Perceived_Effectiveness</td>
<td>Organizational_Commitment</td>
<td>.014</td>
<td>.619</td>
<td>.536</td>
</tr>
</tbody>
</table>
The OC to PE direct path regression weight = .01. The OC, through IC to PE path regression weight = .47, .00. The C to PE direct path regression weight = .09, The C through IC to PE path regression weight = .60, .00.

Please note that the model indicates/estimates .00 for IC to PE path but the detailed regression weights charts indicate a negative sign. We may therefore conclude that the mediation is that of different signs with the direct paths (OC to PE and C to PE being positive but encountering a “suppressing” mediation in IC to either a lower causal relation (.00) or a negative causal relation which is an inconsistent mediatory effect.
Chapter 4 Summary

In this chapter, I present some of the quantitative results that helped to establish relationships between the five main conceptual variables in this study, including perceived effectiveness of famine early warning (PE), network connectedness (NC), organizational commitment (OC), collaboration (C) and information commitment (IC). In the next chapter, the social network data and qualitative results from field narratives that helped to provide context to the quantitative findings will be presented.
CHAPTER 5
SOCIAL NETWORK ANALYSIS AND QUALITATIVE TEXT ANALYSIS RESULTS

Overview of Results (II) chapter

This section constitutes the social network analysis and qualitative text-analysis results of the study to complement the structural equation modeling (SEM) and quantitative results discussed in Chapter 4. Since communication is contextual, social network analysis and qualitative research allow for a more pragmatic depiction of the communicative context of the FEWSNET- KFSSG food-security management and drought mitigation professional community in Kenya and of the famine early warning information networks (FEWI). This qualitative underpinning edges us closer towards a more cultural and holistic approach to understanding and describing the FEWI communication network. As James Carey, a legendary cultural communication scholar, maintains, the cultural approach recognizes that a total experience is shaped by representations of experience or communication beyond the transmissional view to a holistic view of the communicative phenomenon that he refers to as the chaos of modern culture. He writes:

To study communication is to examine the actual social process wherein significant symbolic forms are created, apprehended, and used. …If one tries to examine society as a form of communication, one sees it as a process whereby reality is created, shared, modified and preserved….. it includes the sharing of aesthetic, religious ideas, personal values and sentiments and intellectual notions – a ritual order.

(Carey, 2009, p. 24, 26, 27)

This chapter will address the research questions in two ways, through social network analysis (SNA) and field narratives (FN). SNA maps interaction and collaboration links between
professionals, their organizations, the issues they discuss, frequency, and nature of mutual-interactions. The FN allowed for the researcher to capture the participants’ stories from the field that shaped their experience, and hopefully their views, as food security professionals or researchers will put into context their perceptions of the effectiveness of the FEWI network. The SNA and FN were both useful in making qualitative proximate linkages and visible traces of micro and macro characteristics of the organizational structures (Erik Olin in Duneier, 2001, p. 342). These characteristics involve more organizations working with and alongside FEWSNET and KFSSG. That is why we included the views of not only the professionals in the primary networks of FEWSNET- KFSSG, but also members of the entire famine mitigation organizations as well as independent researchers, so as to snowball and reach the wider breath of the food security professionals terrain in Kenya. This began from the prospect that FEWSNET’s target audiences were not the general public but the food security practitioners (from the interview with Gary Eilerts in Jan, 2012), and thus the focus of this study.

The SNA and FNs results revealed a pattern between government programs and UN agencies and centrality in the networks and corresponding views on perceived effectiveness of the network in mitigating famine. The Kenyan Ministry of Agriculture (MoA) and the food and agriculture organization of the United Nations (FAO) ranked highest in centrality indicators as well as in frequency of contacts, stability, multiplexity in collaboration, strength, direction for perceived effectiveness and reciprocity with other organizations in the famine mitigation network/community. On the other hand, livelihoods and prices, nutrition and food production were the most discussed issues by the majority of organizations.
Research questions applicable to social network analysis data and qualitative analysis data.

Question 1, (RQ₁) was the main research question whose various dimensions have been unpacked through the supporting questions. Questions 2 (RQ₂) and 7 (RQ₇) are answered by SNA and FN respectively.

RQ₁ – What is the effectiveness of FEWI since 2007 as perceived by members of the network? (Has FEWI information, managed by FEWS NET-KFSSG at specific levels in guiding decision-makers’ actions, helped solve the famine mitigation problem?)

RQ₂ - What are the attributes of the connectivity (network connectedness – NC) among stakeholders of FEWI from 2007-2013? (Strength of ties)

RQ₇ - What are some of the field narrative examples that may demonstrate the usefulness or otherwise of famine early warning information (FEWI) systems, managed by FEWS NET-KFSSG networks in Kenya at specific levels, in driving famine mitigation and management of food security in general since 2007?

1. Social Network Analysis (SNA)

Social network analysis (SNA) has been termed as a quantitative (Schweinberger, 2012; Edwards, 2010) or a semi-quantitative (de Nooy, Mrvar & Batagelj, 2005), qualitative (Hanneman & Riddle, 2005) or a mixed (Edwards, 2010) methodology. The international network for social network analysis (INSNA) described SNA as systematic analysis of empirical data and is based on the intuitive notion that patterns of people’s (nodes) social interaction are features of the lives of the individuals who display them. Those linkages to nodes are functional.

The linkages or relations or ties in social network analysis (SNA) can be measured in seven ways as Monge & Contractor (2003) outline, including: (a) frequency (how often a link occurs), (b) stability (existence of a link over time), (c) multiplexity (the extent to which actors
are linked by more than one relationship), (d) strength (amount of time, emotion, intensity, intimacy a reciprocal relation consists of), (e) direction (extent of a link from one actor to another), and (f) symmetry/reciprocity (extent to which relationship is bidirectional), or as indirect links (a path between two actors intercepted by another).

In this study, social network analysis (SNA) focuses on two areas: strength of ties and centrality. The strength of ties examines how the network is connected in terms of contacts and interactions among participants from their respective organizations over time. The scope of this study could not be longitudinal thus it was not possible to study strength of ties over time but could only capture strength of ties based on “mentions” by the participants and existence of reciprocal relation between nodes. The existence of the ties is further accentuated by frequency of contacts, stability, direction and participation. On the other hand, centrality, or the tendency of one node receiving many mentions (in-directional contacts as opposed to out-directional mentions), covers the concepts of multiplexity and node location and the significance of a node within the network.

**Strength of ties**

Network analysis is a means of investigating behavior at a more macro level than the psychological microanalysis of individual-level variables (Rogers & Kincaid, 1981:328). This way, it helps bring social structure into communication research as we have attempted here in unpacking network connection as well as pertinent characteristics in the structure of the network. The professional network being studied has the basic organization around the Famine Early Warning Systems Network (FEWNET) and the Kenya Food Security Steering Group (KFSSG). Each participant in the survey represented a specific organization. Each organization that a participant mentioned as having contact with represented an interaction between the participant’s
organization and the mentioned organization. This was an assumption that we worked with since participants were briefed before participation that their mention of an organization would be taken to help study organizational networks. Four of the total five pillar organizations that form FEWS NET participated, as shown in Table 28.

Table 28. FEWNET Participants in the study

<table>
<thead>
<tr>
<th>Organization</th>
<th>No. of participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>USDA</td>
<td>2</td>
</tr>
<tr>
<td>USGS</td>
<td>2</td>
</tr>
<tr>
<td>NASA</td>
<td>1</td>
</tr>
<tr>
<td>NOAA</td>
<td>0</td>
</tr>
<tr>
<td>USAID/ Headquarters</td>
<td>3</td>
</tr>
<tr>
<td>FEWS NET</td>
<td>1</td>
</tr>
</tbody>
</table>

(Chemonics (nested in USAID through a professional agreement as explained in Chapter 1.)

There was considerable participation by organizations affiliated to FEWS NET and KFSSG. From the total 57 organizations which were included in the survey’s drop-down menu, about 37 organizations had participants in the survey. In addition, out of the 20 organizations that are listed as committee-members of KFSSG, 16 participated in the survey. These were the other directly-collaborating organizations who participated in the survey and who formed the bulk of the participants contributing to the food security and famine mitigation efforts in Kenya.

The final list of participants’ organizations was 95. Table 29 (next page) shows a final list of organizational affiliation of participants and their distribution. (The full list of organizations is in Appendix D). The top contributor organizations in the survey include the Ministry of Agriculture (18 or 10.4 %), the Food and Agriculture Organization (FAO) (9 or 5.2%), and the Kenya Agricultural Research Institute (KARI) (7 or 4.05%). The National Drought Management Authority (NDMA), World Vision International (WVI), Jomo Kenyatta University of Agriculture and Technology and Kenyatta University all tied at each having five participants (or
2.9%). Other key participants included the Kenya Meteorological department (KMD), Egerton University, UNICEF, UNEP, Action Against Hunger (ACF-USA) and Nairobi University. (See Table 29). About 17 or 9.8% indicate that they are individual researchers.

Table 29. KFSSG Participants in the study.

<table>
<thead>
<tr>
<th>Organization</th>
<th>No. Sitting in KFSSG Committee</th>
<th>No. Participated</th>
<th>Participants VS No. sitting in committee</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACF – USA</td>
<td>2</td>
<td>3</td>
<td>+1</td>
</tr>
<tr>
<td>ACSCU</td>
<td>1</td>
<td>0</td>
<td>-1</td>
</tr>
<tr>
<td>FAO</td>
<td>4</td>
<td>9</td>
<td>+5</td>
</tr>
<tr>
<td>FEWS NET</td>
<td>1</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Kenya Meteorology Dept</td>
<td>3</td>
<td>3</td>
<td>-</td>
</tr>
<tr>
<td>KRDP-ASAL DM</td>
<td>2</td>
<td>0</td>
<td>-2</td>
</tr>
<tr>
<td>Ministry of Agriculture</td>
<td>4</td>
<td>18</td>
<td>+ 14</td>
</tr>
<tr>
<td>Ministry of Education</td>
<td>3</td>
<td>3</td>
<td>-</td>
</tr>
<tr>
<td>Ministry of Livestock Development MoLD (Markets, Production, Veterinary)</td>
<td>4</td>
<td>2</td>
<td>-2</td>
</tr>
<tr>
<td>Ministry of Special Programmes (MoSP)</td>
<td>2</td>
<td>1</td>
<td>-2</td>
</tr>
<tr>
<td>Ministry of Water</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MoMS</td>
<td>1</td>
<td>0</td>
<td>-1</td>
</tr>
<tr>
<td>MoPHS</td>
<td>1</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>NDMA</td>
<td>5</td>
<td>5</td>
<td>-</td>
</tr>
<tr>
<td>UNDP</td>
<td>1</td>
<td>2</td>
<td>+1</td>
</tr>
<tr>
<td>UNICEF</td>
<td>3</td>
<td>5</td>
<td>+3</td>
</tr>
<tr>
<td>UNOCHA</td>
<td>1</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>WFP/ WFP_VAM</td>
<td>2</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>World Vision</td>
<td>1</td>
<td>5</td>
<td>+5</td>
</tr>
</tbody>
</table>

(The KFSSG network had representatives from FEWNET and other large organizations)
Figure 27. Number of participants (N=173) per their Organizational (n=95) affiliation
**Sociograms**

Social network analysis is geared towards an investigation of the relational aspects of these structures. The use of these methods, therefore, depends on the availability of relational rather than attribute data (Scott, 1992). The sociograms were generated for three relational areas to describe the organizational structures, including: (a) collaborating organization in the network, (b) frequency of contact and (c) the type of issues discussed. Sociograms were generated using the networks visualizer of IBM SPSS Modeler 16.0.

(a) **Collaborating organizational networks**

Collaborating organizations in the network sociograms were drawn using SPSS Modeler stream from the excel file linked to and using the web-graph feature which displays co-occurrence frequency graph between categorical variables, from questions 1 and 12 of the survey: “Sending organizations/network” - Qs: Which organization do you serve? (Qs1), Receiving organizations/network- Qs: Check the ones that your organization interacts with (share info with, coordinate with, etc.) (Qs 12).

The strongest collaboration link was between FAO (Food and Agriculture Organization) and the Ministry of Agriculture Kenya (MoA) with 35 interactions (mutual mentions). This was followed closely by the link between the Ministry of Agriculture (MoA) and the World Food Program Vulnerability and Mapping unit (WFP-VAM) with 31 interactions/mutual mentions. Third was the link between the Agriculture Sector Coordination Unit ASCU and the National Drought Management Authority NDMA with 27 interactions/mutual mentions. Fourth was the link between the Kenya Agricultural Research Institute (KARI) and Ministry of Livestock Development MoLD, with 25 interactions.

(See figures 28 and 29 (a, b, c) collaboration mappings)
Figure 28. Sociogram of the FAO / MoA network collaboration links.

The diagram shows the strongest collaboration links were between the Food and Agriculture organization of the United Nations (FAO) the Ministry of Agriculture Kenya (MoA), with 35 interactions/mutual mentions.
Figure 29 A, B, and C are sociograms of network collaboration links that show the second, third and fourth strongest collaboration links.

Fig 29 (a) Sociogram of the MoA / WFP-VAM, 31 network collaboration interactions

The diagram above maps the Ministry of Agriculture (MoA) and the World Food Program Vulnerability and Mapping unit (WFP-VAM) with 31 interactions/mutual mentions.

Fig 29 (b) Sociogram of ASCU/ NDMA, 27 network collaboration interactions

The Agriculture Sector Coordination Unit ASCU and the National Drought Management Authority NDMA indicated 27 interactions/mutual mentions.
The Kenya Agricultural Research Institute (KARI) and Ministry of livestock development MoLD recorded 25 interactions.

(b) Frequency and intensity of contact / level of interaction

Sociograms on collaboration in terms of frequency of contact and strength/intensity of contact, from merely sharing information to capacity building, are considered a more intense form of interaction. Sociograms were drawn from the question: “For the organizations that your organization interacts with the most please indicate how often you engage in the following activities?” (Question 13 of FEWI survey)

According to the data, more organizations interacted at least annually along any of the various levels of interaction from information sharing to capacity building. More organizations shared information than engaged in sharing resources and capacity building of each other. (See graphs in Figure 30 a, b, c, and d on frequency and intensity of the collaboration and interactions.)
According to the Table 30 (a), more organizations interacted at the first level, that of exchanging information. Most of those who exchanged information did so monthly or annually.

Figure 30 (b) Level two “to change practices” intensity with frequency of interaction

Table 30 (b) indicates that fewer organizations collaborated at the second level of interaction, that of interacting to change existing practices. Those who did interact to change existing.
practices acted overwhelmingly annually. A substantial number of others collaborated quarterly or monthly.

Figure 30 (c) Level three “share resources” intensity with frequency of interaction

According to the Table 30 (c), more organizations collaborated to share resources annually.

Figure 30 (d) Level 4 “mutual capacity building” intensity with frequency of interaction
According to Table 30 (d), the fewest number of organizations collaborated at the fourth and strongest level of interaction “to increase each others’ capacities” (capacity-building) so as to achieve shared goals. Those who did so collaborated annually, quarterly or monthly.

(c) Patterns of collaboration on Issues in food security management

Sociograms on collaboration in terms of issues in food security management demonstrated the participants’ views and collaboration on 10 of the pertinent food security issues, including food production, climate change adaptation, biotechnology and genetically modified crops, biodiversity, storage/waste reduction/recycling, livelihood/prices, nutrition, energy efficiency, forests for food and gender and economic equality.

Livelihood/prices and nutrition were ranked highest in very frequently discussed food-security-issue among collaborating organizations. On the other hand, food production was frequently discussed and the food-production node had the most interactions with the discussions on the following areas in descending order, including: (a) climate change adaptation (strongest / most interactions) – (17 interactions, strong, thicker link), (b) livelihoods / prices – 16 interactions, (c) storage and recycling – 14 interactions, and (d) gender /economic equality – 13 interactions. The least discussed issues were climate change adaptation and biotechnology and genetically modified crops, forests for food and biodiversity.

Sociograms were drawn using SPSS modeler 16 web graphing for the data collected from question 14 of the FEWI study: “For the organizations that your organization interacts with the most, please indicate how often you discuss the following issues?” (see Figures 35 a- h).
“Livelihood/Prices” and “Nutrition” and were ranked highest in “Very Frequently” food-security-issue discussed among collaborating organizations (see sociograms). Figure 31 (a) captured these interactions.
Figure 31 (b) Sociogram showing that few organizations discussed livelihoods.

Although Livelihoods/Prices were “very frequently” discussed by the organizations that mentioned this particular issue, there were fewer organizations that discussed the issue, as in figure 31 (c).
Figure 31 (c) Sociogram ranking nutrition as “very frequently” discussed

Nutrition was both “very frequently” discussed by the organizations and also mentioned among more participants/organization.
Figure 31 (d) Sociogram raking food production and nutrition interactions

The Figure 31 (d) sociogram indicates that more organizations that collaborated about “Food production” also collaborated on “Nutrition” (see above and below: stronger link meaning more interactions among more participants or more organizations about the two issues).
Figure 31 (e) Sociogram ranking food production discussed by fewer organizations.

The sociogram, Figure 31 (e), shows that “food production” was “frequently” discussed (slightly less than livelihood/ prices) among collaborating organizations.
Figure 31 (f) Sociogram ranking “biotechnology and GMO”, “Forests for food” and “Biodiversity” as rarely discussed issues

The sociogram, Figure 31 (f), illustrates that “Biotechnology and GMO,” “Forests for food” and “Biodiversity” were the food security issues that received a frequency of discussion rating among participating organizations of “rarely.”
For Figure 31 (g), “Climate change adoption” was “occasionally” discussed. Both “Climate change adoption” and “Biotechnology & Genetically modified food” had the second highest, (after “nutrition”) number of mentions by participants on behalf of their organizations. Both were not as frequently discussed but were mentioned by more participants.
Figure 31 (h) Sociogram ranking “food production” as “frequently” discussed.

Food production was discussed “frequently.” More organizations that discussed food production also discussed “climate change adaptation” (most interactions towards food production node).
2. Field Narratives

Data were collected from the FEWI survey and from brief interviews. Out of 133 respondents (53 participants skipped the question), 15 responses were non answers, such as that they were not involved or left just a blank page with only a greeting. In all, 118 narratives from the food security members were used in the qualitative analysis discussed here.

The research questions that were considered with the field narratives are RQ\textsubscript{1} and RQ\textsubscript{7}, which examined the effectiveness of FEWI since 2007 as perceived by members of the network and the field narrative examples that may demonstrate the usefulness of famine early warning information (FEWI) systems in driving famine mitigation and management of food security in Kenya. The discussion in question 22 investigated participants’/stakeholders’ experiences in the business of famine mitigation and their “perceived effectiveness” of the entire process. It read: “Experiences shape our perspectives in our work. Please share with me a brief narrative or story of your most memorable or interesting experience in your work related somehow to supporting food security management. Please use the space provided below.”

(a) Text Analysis

A total of 133 participants responded to this question. The text analyzer identified important words and phrases that the resultant text-analysis mapping generated (figure 32) and highlighted respondents’ role of farmers in food security and the process of management, projects, reports, decision makers, technology and water as resources as central themes in famine mitigation experience. In all, 28 words and phrases ranked highest in usage. The highest ranked phrase from the discussions was food security with 38 occurrences or 28.6%. Table 12 shows the top 12 word and phrases ranked highest in usage.
Figure 32. Text analysis field narratives’ visualization

Table 30. Food security main themes from text analysis

<table>
<thead>
<tr>
<th>Phrase/word Rank</th>
<th>Phrase/word</th>
<th>No. of occurrences</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>Food Security</td>
<td>38</td>
<td>28.6%</td>
</tr>
<tr>
<td>#2</td>
<td>Farmers</td>
<td>21</td>
<td>15.8%</td>
</tr>
<tr>
<td>#3</td>
<td>Project</td>
<td>19</td>
<td>14.3%</td>
</tr>
<tr>
<td>#4</td>
<td>Management</td>
<td>19</td>
<td>14.3%</td>
</tr>
<tr>
<td>#5</td>
<td>Drought</td>
<td>17</td>
<td>12.8%</td>
</tr>
<tr>
<td>#6</td>
<td>Famine</td>
<td>15</td>
<td>11.3%</td>
</tr>
<tr>
<td>#7</td>
<td>Water</td>
<td>13</td>
<td>9.8%</td>
</tr>
<tr>
<td>#8</td>
<td>Experience</td>
<td>11</td>
<td>8.3%</td>
</tr>
<tr>
<td>#9</td>
<td>Technology</td>
<td>6</td>
<td>4.5%</td>
</tr>
<tr>
<td>#10</td>
<td>District</td>
<td>5</td>
<td>3.8%</td>
</tr>
<tr>
<td>#11</td>
<td>Policy</td>
<td>4</td>
<td>3.0%</td>
</tr>
<tr>
<td>#12</td>
<td>Report</td>
<td>3</td>
<td>2.3%</td>
</tr>
</tbody>
</table>

A rather interesting observation was that the term “network” was ranked number 23 (1.5%), indicating a minimal interest in referring to the collaboration work as an integrated network. Moreover, “responding,” which is the essence of mitigation, ranked 27th (1.5%) followed by “strategic,” ranked 28th (1.5%).
(b) Thematic Mapping of categories in field narratives by stakeholders

All of the 118 completed narratives responses were analyzed in terms of thematic notions. About 27 categories emerged from the participants’ narratives description. Examples of selected narratives follow.

Table: 31. Thematic mapping of participants’ field narratives

<table>
<thead>
<tr>
<th>Thematic focus of discussion</th>
<th>Percentage of theme item coverage to all discussions</th>
<th>Number of mentions in participants’ narrative description of experience as a food security practitioner</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adoption</td>
<td>13.5%</td>
<td>18 Mentions</td>
</tr>
<tr>
<td>Cash-for-work</td>
<td>1.5%</td>
<td>2</td>
</tr>
<tr>
<td>Climate,</td>
<td>5.3%</td>
<td>7</td>
</tr>
<tr>
<td>Collaboration</td>
<td>15.0%</td>
<td>20</td>
</tr>
<tr>
<td>Conservation</td>
<td>10.5%</td>
<td>14</td>
</tr>
<tr>
<td>Development &amp; Infrastructure</td>
<td>2.3%</td>
<td>3</td>
</tr>
<tr>
<td>Disease</td>
<td>1.5%</td>
<td>2</td>
</tr>
<tr>
<td>Food prices</td>
<td>12.8%</td>
<td>7</td>
</tr>
<tr>
<td>Funding,</td>
<td>9.8%</td>
<td>13</td>
</tr>
<tr>
<td>GIS</td>
<td>6.8%</td>
<td>9</td>
</tr>
<tr>
<td>Household/ Livelihoods</td>
<td>12.8%</td>
<td>17</td>
</tr>
<tr>
<td>Information</td>
<td>40.6%</td>
<td>54</td>
</tr>
<tr>
<td>Link to intervention/action</td>
<td>19.6%</td>
<td>26</td>
</tr>
<tr>
<td>Livestock/ fisheries</td>
<td>6.0%</td>
<td>8</td>
</tr>
<tr>
<td>Media</td>
<td>5.3%</td>
<td>7</td>
</tr>
<tr>
<td>Nutrition / Holistic,</td>
<td>8.3%</td>
<td>11</td>
</tr>
<tr>
<td>Policy</td>
<td>14.3%</td>
<td>19</td>
</tr>
<tr>
<td>Reforestation</td>
<td>1.5%</td>
<td>2</td>
</tr>
<tr>
<td>Relief</td>
<td>9.0%</td>
<td>12</td>
</tr>
<tr>
<td>Research</td>
<td>2.3%</td>
<td>3</td>
</tr>
<tr>
<td>School-feeding</td>
<td>2.3%</td>
<td>3</td>
</tr>
<tr>
<td>Small-holder farmers</td>
<td>9.0%</td>
<td>12</td>
</tr>
<tr>
<td>Soil enhancement</td>
<td>1.5%</td>
<td>3</td>
</tr>
<tr>
<td>Storage</td>
<td>3.8%</td>
<td>5</td>
</tr>
<tr>
<td>Training</td>
<td>16.5%</td>
<td>22</td>
</tr>
<tr>
<td>Urban farming,</td>
<td>2.3%</td>
<td>3</td>
</tr>
<tr>
<td>Water and Irrigation</td>
<td>12.0%</td>
<td>16</td>
</tr>
<tr>
<td>Uncategorized</td>
<td>11.3%</td>
<td>15 (Non–answers / wan)</td>
</tr>
</tbody>
</table>
Finally, some 15 examples of some of the narratives by the survey respondents were strategically chosen from the narratives submitted, and which reflected the general views of the food security professionals serving in Kenya. These 15 examples are representative of the qualitative results (some spelling errors have been corrected):

1. Participant discussed his/her role in enhancing food production, nutrition and training.
   “I’m currently working on an agri-nutrition project. Kenya has moments of food in plenty with very low prices and there are times normally a few months from harvest when the same food is just unaffordable to most households. Embracing preservative methods some of which are quite traditional, can go a long way in ensuring food availability throughout the year. My joy has been talking to community members to embrace food production which can be a great hobby or business with wonderful results for the nutrition status of individuals and community at large.”

2. Participant discussed his/her role in enhancing households’ livelihoods through an innovative soil management program in an ASAL area.
   “We have introduced water pans and soil fertility enhancing trees in Kibwezi, which are helping extend the cropping season so farmers can harvest crops even in seasons where crops would have otherwise failed. This has reduced the number of vulnerable households in the area.”

3. Participant discussed his/her role in enhancing a livestock and water irrigation project to stop a relief cycle in a drought-prone area in eastern province of Kenya.
   “10 years ago we went to Marimanti, Tharaka where we found WFP distributing food. We thought of a gravity flow irrigation project using the river Kathita. Today, in the area of Marimanti, the very people whose livestock was dying due to the drought can produce
enough food for themselves and even some for sale due to the impact of the gravity flow irrigation project we carried out together with Manyirani Farmers Self Help Group.”

4. Participant discussed his/her role in an innovative drought-resistant cassava development project which targeted women in agriculture. This is a climate-change adaptation innovation in farming that improved household-food security and helped alleviate poverty.

“The Cassava Development project as a food security management strategy was initiated by the UK-Alumni Global food balance professional network and managed in collaboration with the Association of Women in Agriculture (AWA). It is a unique opportunity for women to take the lead in developing the production, transformation, consumption and marketing of cassava and its products to eradicate hunger and poverty from their households. Why cassava? It is very resistant to unpredictable rainfall patterns in the face of climate change and most importantly so many products can be gotten from this crop and its processing can increase the shelf-life by up to a year, thereby meeting the need of ensuring all year round household food supply, and thus, food security.”

5. Participant, a FAO employee (like other supportive organizations such as NASA, USAID among others) wrote that they were not directly involved in food security management but that their work was complementary in logistics for instance among other areas of support that they acknowledged. These participants talked of a bio-diversity project with an interesting, practical experience of introducing foods to real people.

“I am not really involved in management however I am currently involved in A FAO-Bio-diversity project seeking to conserve biodiversity in Busia and improve on food security. My greatest experience is seeing households diversifying their diet to include forgotten foods. I visited a household that was really food insecure. The mother, a
pregnant woman, had stayed a whole day without food. We convinced her that termites were a good source of proteins and since an older child had collected and fried some, we had to eat together to encourage her to do the same.”

6. Participant discussed his/her role in implementing various relief programs in the ASAL regions in Kenya and the prevailing grassroots sentiments about sustainable development that does not await relief efforts/activities.

“Working mostly in the Kenyan ASALs, I experienced an interaction with stressed communities in the devastating drought of 2006. We were supporting them with FFW and CFW for WASH and people were enthusiastic. When I asked them whether it might not be better to just receive relevant food and NFI items for free in such taxing times, they vehemently rejected this, saying, ‘This is our time now. During normal times none cares about us. None gives a thing about whether we live or die. In Nairobi, you hear there is lots of development support. Now, let us tell you, there isn’t. But now we have an emergency, some even say a famine. Now we are getting support. So this is our time now to roll up our sleeves and get development. We are ready to work ourselves out of poverty.’ Flies in the face of pretty much all established development literature and high floating discourse among governments and Western donors, doesn’t it!?”

7. Participant discussed his/her role in relief and sustainable community solutions.

“Implementing Cash for Work and Vouchers for Work program has proved very valuable for beneficiaries, as it provides a long term and sustainable solution for communities. Early warning systems are helpful in forewarning communities about impending droughts, dry spells and floods. Communities are thus able to adjust their agricultural production programmes according to FEWI information.”

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8. Participant discussed his/her role in media of telling the story of vulnerable people which helped get the attention of the government ministry which implemented various sustainable projects for famine monitoring and climate change adaptation (drought-resistant crops), enhancing the food security of the community this participant had written about.

“It was 2008 when severe famine hit Taita Taveta County where I was working as a correspondent that led to families surviving on cactus leaves and fruits. After the touching story I wrote on the plight of the family of five orphaned children, the government through Ministry of Arid Lands Resource Management came out strongly with identification of early warning systems in collaboration with the Meteorological department to educate farmers on the crops to plant during certain seasons depending on the rain fall pattern predictions. Rain gauges were placed in strategic places in Mwatate and Wundanyi to provide information on the amount of rains experienced in the areas. The Ministry of Agric also introduced drought-tolerant crops in the area and the total dependence on maize as the main food crops grown in the area has largely gone down. An alternative crop like sorghum is now adopted to provide an alternative for maize that does not perform well.”

9. Participant discussed his/her role in agricultural research, climate change adaptation and capacity-building initiatives to encourage communities to be food-secure by utilizing a range of research-supported strategies. This is probably the longest serving among the study’s participants.

“I have worked for close to 34 years, all of which have been in agricultural research. From 1983, I developed an interest in feeding livestock in rangelands. This began with an MSc thesis research looking at effects of bush infestation and herbal availability on
dietary selection and quality as well as animal performance. This was followed by an understanding of human and environmental factors bearing on rangeland degradation.

More significantly, I sought to look for ways and means of ensuring that degraded natural pastures are improved and sustained. I zeroed in on reseeding as a possibility that had generally been put off as impossible/impracticable; I focused on seed availability as a major limiting factor. I was able to come up with simple techniques to harvest range grass seeds, and process and store them at farmer level for future use. Further, I came up with a package of ensuring successful establishment and utilization of stands. Together with my team we now have modules that can and are being used to train trainers and other practitioners. We have conducted on-demand capacity-building workshops and set up demonstrations throughout the ASAL (Mandera, Marsabit, Moyale, Narok, Kajiado, Taita-Taveta, Makueni, Machakos, Tana River, Garissa, to name but a few). And we are still available to up-scale this. Last, but not the least, we are now screening range grass to select germplasm that would assist in developing varieties that could be formally release and commercialized. To cap it all and through influencing policy, the relevant ministry has for the last couple of years allocated funds to selected districts with up-scaling this initiative - meaning I have for sure contributed in my own small way to this country's food security management.”

10. Participant discussed his/her role in training and supporting communities to embrace sustainable urban farming, and encouraging farming among pastoralists in the ASAL.

“Most memorable occasion is when disseminating useful information in International show at Nairobi, disseminating multiple vegetable technology and other urban agriculture technologies for the slum dwellers that are challenged in getting enough food. Another
occasion is applying farmer field school as an approach of participatory extension in empowering farmers groups. The memorable moment is when working with agro pastoral communities in Kerio valley of Kenya under Community Agriculture development project in Semi Arid lands (CADSAL) from 2006 to 2010. Empowered people in terms of promoting New Rice for Africa (NERICA) rice as an alternative crop.”

11. Participant discussed his/her role in relief and the role of media in driving faster relief when needed.

“It is very interesting to piece together information on food security and nutrition and finally determine the number and proportion of people. It feels nice when people use the information as witnessed in Kenya in 2011 during the drought period. However, the media is very important because the government and decision-makers respond faster to stories done by the media.”

12. Participant discussed his/her role in training farmers on how to choose and use appropriate food security technologies that enhance their needs.

“Involving farmers in choosing food security technologies in a participatory manner that are suitable for them. In most cases we get technologies from research, and disseminate them to farmers without getting to understand what really the farmers want. In the end the technologies are developed but the farmers do not utilize them.”

13. Participant discussed his/her role in enhancing water management and sustainable growth so as to turn available information to long-term efforts for food security in the region.

“Amb working on water resources management with emphasis on equitable allocation, exploitation, management and conservation of water for improved livelihoods, economic growth and ecological sustainability. These informed my reservation while responding to
some of your questions (for instance, whether Famine early warning information (FEWI) is synonymous to sustainable food security in Kenya and the region) My take is that time is nigh for us to stop talking and engage in concerted efforts to plant the beautiful ideas so they can translate in legitimate long-term actions that can stand the test of time.”

14. Participant discussed his/her role in securing funding for relief and reconstruction of the food sector after the 2007 conflict in Kenya that affected food security.

“During the post election violence aftermath in Kenya, I was working for Save the Children Kenya program as a consultant to assess the needs of the displaced population. I focused in identifying the major livelihood and wealth groups, their farming system, compiled a report and contributed to the proposal development using the facts and findings from the assessment report. After a couple of months the government announced Rudi Nyamabani, which matches with securing of funds for a livelihood program. The need assessment findings helped to roll out agriculture recovery program before the rainy season was out. The people were able to recover due to a good integration and self complimentary nature of different projects components, the cash-voucher based and market recovery approach applied good rains and good skills of the people in crop and vegetable production.”

15. Participant discussed his/her opinion on early warning information as being elitist and therefore fails to reach grassroots audiences who matter. Cites simplicity and improved communication as possible solutions.

“Some of the anecdotal information that I have heard about the effectiveness of FEWI (FEWSNET) is that most of the information fails to map onto the realities on the ground. There is a huge disconnect in their information output and what households experience.
Even when the information is correct it is poorly disseminated and fails to reach the target audience in good time to make a difference. Some see it more as a geopolitical tool, serving external interests and not necessarily targeting hunger mitigation. Overall though, there is great potential especially with the satellite images which are useful in forecasting weather scenarios when this information is simplified and placed in the hands of farmers at the right time.”

Chapter 5 Summary

This chapter displayed the SNA and FN results of the study so as to enhance the quantitative data analysis. The SNA discussed the strength of ties and the FN discussed participants’ experiences in the field.

In Chapter 6, these results and their practical implications will be discussed in relationship to theory and information that exists in the existing literature on information systems, early warning information system, frames, networks, famine mitigation and food security management in Kenya. In addition, a summary, discussion of findings, conclusions and recommendations for further research will be discussed.
CHAPTER 6
DISCUSSIONS:
SUMMARY, IMPLICATIONS, CONCLUSIONS RECOMMENDATIONS

Summary of discussions chapter

The results confirm that there is a vibrant network of food security organizations, workers and researchers in Kenya, who collaborate, engage in discussions, study and use information on famine early warning information on sustainable food frames in their work. The network members also believe that the network is not adequate in membership, scope, focus, mechanism and ability to turn famine early warning information into effective early action. Therefore, the FEWSNET-KFSSG famine early warning information (FEWI) network has a healthy network-forming and growth direction on relations but is still deficient in meeting its goals and needs work in order to become what it should be in helping to effectively mitigate famine and to plan for sustainable food security management from the grassroots in Kenya and the Horn of Africa region. The results were based on both qualitative and quantitative analyses in Chapters 4 and 5, sourced from the “FEWI networks survey” whose design and sampling distribution is described in Chapter 3.

Further, the literature review in Chapter 2 revealed six gaps in literature that this discussion chapter attempts to contribute to, based on the results, including: (a) Insufficient research on disparity in the amount of famine early warning information generated and extent of corresponding information (organizational and government policy, media coverage) and early action for famine mitigation (Bailey, 2013; Tadesse, et al, 2008; Juma 2011; Kim & Guha-Sapir, 2012); (b) lack of precise literature linking food entitlement perspectives, agricultural and economic development and priority issues to the practice of collaborative/participatory food
security management (Sen, 1980 & 1997; Tilley, 1983; De Waal, 1990; Devereux, 2001; Huesca in Valdivia, 2005; Juma, 2011; Van Gorp & Van der Goot, 2012); (c) little published research on emergence of communication and organizational networks motivated by network theories (Monge & Contractor, 2003:xi); (d) eclectic and superficial framing studies in communication meaning in networks and public discourse (Gamson & Modigiani in Scheufele, 1999); (e) gap in research on information commitment as a context in information systems (Hirashima et al., 2011; Van Dijk, 2006, p. 20); and (f) gaps in African and historical philosophic contributions to social change and issues including the food conversation (Asante, 1980 & 2012; Naugle, 2002; Garnsey, 1989; Juma 2011).

The background of the study sets the stage for the discussions on the main findings and their relation to theory and their contributions to gaps in literature on network frames in famine early warning information systems in Kenya. These observations lead to recommendations for a more efficient food security network. Finally, the present study’s limitations are discussed, which leads to recommendations for further research and conclusion of the study.

**Background of the study**

Although the occurrence of drought has been an almost 4-16 year intervallc-phase phenomenon in Kenya, a growing drought mitigation information systems network of government programs working alongside non-profits has helped to prevent the possibility of escalation to a full-blown famine from time to time (Nyamwange, 1995). The Global Hunger Index (GHI), prepared by the International Food Policy Research Institute (IFPRI) and which indicates the challenge of hidden hunger in nations, ranked Kenya as a high risk country for hidden hunger but that the country has indicated an improvement of its GHI index between 1990 and 2014. For instance, Kenya moved from position 51 to 47 in 2013/2014.

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The review of literature revealed a disparity in the amount of famine early warning information generated and the extent of corresponding early action for famine mitigation by decision-makers in their various capacities (Bailey, 2013; Tadesse et al, 2008; Kim & Guha-Sapir, 2012). This information, policy and action gap thwarted sustainable mitigation efforts. The Prevention Web lists drought in Kenya as a disaster affecting about 4.8 million people regularly. According to Ibrahim Hussein, NDMA Chairman, between 2008 and 2011, Kenya lost an estimated 970 billion Kenya Shillings due to the failure to manage drought. The Regional Learning and Advocacy Program (REGLAP) notes:

But why does a regular and predictable event like drought always lead to disaster? It’s because too often the response and the media coverage comes too late – after disaster has already struck, when people are hungry and cattle are dying —…Exacerbated by a changing climate, drought is currently inevitable in Kenya. However it is not inevitable that people starve and thousands of animals die as a result. (Prevention-web, REGLAP)
Reminiscent of these facts, the 1984 drought, which became a severe famine in the greater Horn of Africa region, was a heavily covered news-event across the globe, with response criticized as initially too slow or too late for the victims, however. Response trickled in, starting with the Kenyan government drought response interventions starting around June 1984, through the newly formed National Famine Relief Fund. Later, response increased with the October 23rd, 1984 report by Michael Buerk of the British Broadcasting Corporation reaching its publicity climax with the March 7, 1985 release of the “We are the World” charity-raising song by the USA group for Africa. This garnered everyone’s attention and started an outpouring of relief and policy activities that finally ended the famine by the end of 1985, with a strong resolve to prevent future occurrences.

The allure of information and people collaborating together in a task to drive action hit the socio-cultural scene of a newly post-modernistic world of 1984. The developing consensus in the crisis, inclined to what post-modernist philosopher Michel Foucault termed as the systems of language imbricate with the social practice seeking homogeneity (Best & Kellner, 1991, p. 38). This made for a true turning-point on the business of famine mitigation information from relief-seeking information to universal capacity-building information for sustainable alleviation nested in continuous collaboration reminiscent of Foucault’s “homogeneity” notion. Therefore, the aim was to put institutions in place that support self-regulating, self-governed sustainable mitigation efforts beyond the relief efforts which advanced differentiated capacities. Notable was the 1985 launch of FEWS NET by USAID after the 1984 famine crisis, meant to facilitate continuous collaboration of organizations, resources and expertise to support country programs for sustainable drought management globally.
It is an assumption of this research that the country programs like the drought management board by the Kenyan government and several donor agencies found themselves working together towards the famine mitigation goal in their various capacities. The evolving networks nature of their task has been strategically well utilized by the Kenya food security steering group (KFSSG). The study seeks to unpack the networks’ technology-supported commitment to information by both agency and co-agency groups in realizing the food security forward-planning vision of FEWI.

According to KFSSG’s leader, who is also the chief executive officer of NDMA (the National Drought Management Authority of Kenya), Mr. James Oduor, organizations including FEWS NET participate based only on capacity to benefit KFSSG in specific technical knowledge. As such, the purpose of this research is to contribute to a better understanding of the perceived effectiveness of Kenya’s famine early warning information (FEWI) network since 2007 from the perspective of members of the network. The FEWI Networks survey was conducted as part of a communications study of the organizational and information commitment patterns of the food security and famine mitigation professional networks in Kenya.

Discussion and Findings

This study’s discussion is nested in the study’s functional framework that guided the choice of theory and methods in studying perceived effectiveness of the network, which applies the multi-theoretical, multi-level, multi-analytical (MTML) model (Monge & Contractor, 2003). This study uses the MTML model to propose the notion of network framing in famine early warning information systems (FEWIS) so as to examine the perceived effectiveness (by members) of early drought information in driving corresponding early action. The purpose of theory is to explain the meaning, nature, and challenges of a phenomenon that is often
experienced but unexplained in the world in which we live, so that we may use that knowledge and understanding to act in more informed and effective ways (Asher, Weisberg & Shively, 1984). This study sought to explain the experience of inter-organizational collaboration and the perceived effectiveness of the network that works towards famine mitigation and food security management in Kenya. The focus of this study is the dual perspective of the strategy-capacity-building network, which is the famine early warning information systems network (USAID’s FEWS NET), and the coordinating-implementer network, which is the Kenya food security steering group (KFSSG).

(i) Network connection’s relation to organizational commitment. The findings confirm that the participants’ network of contacts and associations’ trait, labeled network connection (NC), is associated with the participants’ indicators of involvement and identification with their own organizations, labeled organizational commitment (OC). Correlation analysis to establish possible but non-causal relations were conducted as hypothesized on hypothesis H₁ and H₂. The two measured variables that comprised the NC composite variable were “netconnect” and “netcollab” and measured the number of contacts a participant mentioned as well as the participant’s involvement in using in-network tools. On the other hand, the OC composite variable comprised of two measured variables: “orgident” and “orgafill,” which measured identification commitment levels as well as the affiliation commitment levels of participants (Balfour & Wechsler, 1996). This implies that a participant’s in-network contact and collaboration activities (NC) increased as the participant’s affiliation and identification with their respective organizations (OC) increased.

Further, the structural equation modeling (SEM) confirmed a moderate association between the NC and OC traits; but the final SEM model’s goodness-of-fit indices were
significant after the NC path was deleted. The final SEM model’s expunging of the NC path indicates that another path in the model, mainly the collaboration and information paths, served comparable functions in the model/network to the functions served by the NC path. Another inference would be that the NC trait was insufficiently supported by a mere mention of contacts within the network, therefore suggesting a more vigorous study of the network connect through a preferably longitudinal study that would capture network connection over time and more extensive characteristics of the network connectedness trait of what Monge & Contractor (2003:40) call the global network.

The NC/OC association was also examined using qualitative field narratives text analysis which revealed an interesting observation about “network” connection. The text analysis findings found that “network” ranked 23rd (at 1.50%) out of the 28 words and phrases mapped that ranked highest in usage by the text visualizer. This indicates a less than keen interest in referring to the collaboration work as an integrated network. Instead, according to the field narratives, actors were connected to others outside of their organizations for the utilitarian information-sharing purposes and did not demonstrate a shared identity as a network.

Finally, I also executed social network analysis (SNA) so as to map the nature of the FEWI network relations from the mentioned contacts. SNA analysis compared the contacts that each participant mentioned as their own organizational affiliation (initiating network) and the mentions made by participants about the contacts that they collaborated with (receiving network). The SNA revealed centrality of the Kenya governmental agencies and departments affiliated to KFSSG. This is because they received more contact mentions or ranked higher in “in-degree” contacts and were therefore termed as more popular nodes (Monge & Contractor, 2003, p. 38) or actors in the FEWI communication network. FEWSNET had very few, 5.20%, of
the participants in the survey, reflecting a very small representation of FEWSNET in the country, as it is part of their policy to build capacity in order for country programs to take the lead role in famine mitigation. For instance, the National Oceanic and Atmospheric Administration (NOAA) did not have any respondents but their contributions in terms of weather forecasting had a lead role through utilization by the Kenya Meteorological Department (KMD). About 16 out of the 20 key organizations on the KFSSG committee, based on their technical contributions, had participants in the survey. In all, a significant number (35.26%) of KFSSG committee members participated in the survey.

The UN agencies, including FAO and WFP, along with FEWSNET came a close second in the number of mentions indicating a property of “expansiveness,” which demonstrates a fairly well distributed communication network. Lastly, one agency affiliated to FEWSNET, the independent researchers and environmental journalists or writers received few or no mentions and were therefore “isolates” because of their lack of “in-degree” ties in the network. This implies the need for a more deliberate identity as network so as to tap the contributions of the researchers and communicators who ought to be at the front line of the conversation on mitigation. Further, the organizational commitment (OC) traits of affiliation and identification with the organization ranked lower in the thematic grouping of the field discussions. Affiliation was ranked behind information, link to intervention/action and training.

The findings point to the tendency that the more contacts an actor or a node or a participant had within the network, the more likely they were to also be committed to their own organization affiliated in the FEWI network, and the more popular they were in the network (in-degree contacts), even if they did not consider themselves part of a wider network beyond their organizations where they concentrated on information, training and policy activities. That the
participants’ sample was drawn from FEWSNET, KFSSG, other NGO’s, UN organizations, journalists and independent researchers serving in the food security and famine mitigation efforts indicates a growing, vibrant network of food security workers and practitioners within Kenya. The tendency that organizational commitment is associated with network connection explains that a participant’s commitment to their organization’s vision of food security management supports their growing links of contacts in the FEWI communication network, needs a forum for a more deliberate identification and coordination as a cohesive network so as to strengthen the quality and quantity of collaboration towards sustainable food security management and drought mitigation efforts by all the partners.

This NC/OC association finding described the nature of the FEWI network which matches the notion espoused by the social network theory (SNT) which suggests that members in a community interact in a network and are joined by connections which constitute ties, which are diffusion paths for adoptive behavior. These ties center on social capital, coordination, contagion, adaptation, and convergent evolution among others (Scott & Carrington, 2011). The people are enmeshed in networks of relationships that include occupational colleagues, organizational members, kinships or friendships and comprise clustered networks with various ties, different liaison rules, and different degrees of interconnectedness, which provide diffusion paths, psychological paths and different transactions that have a bearing on adoptive behavior (Craig & Muller, 2007). There are different ties, rules and degrees of interconnectedness in describing the participant’s connection within the FEWI network (NC), and their connection to the goals of their own organizations (OC) as they engage in the task of formulating, collaboration, decision support and commitment to action in famine mitigation.
This finding contributes to knowledge on emergence of communication and organizational networks. According to communication networks theorists Peter Monge & Noshir Contractor, there is little published research on the emergence of communication and organizational networks motivated by network theories (Monge & Contractor, 2003:xii). They argue that communication networks are patterns of contact created by flow of messages in time and space and may take on many forms, including personal contacts. The finding suggests that the personal contacts by people from different organizations with similar interests increase as they identify more and serve the interests of their own organization. The nature of the contacts may be informational, collaboration on an issue or mutual capacity building. Therefore, interest in the work of their organization is a catalyst rather than a hindrance to seeking contacts outside their organization so as to serve the greater needs of a similar interest (in this case, famine mitigation and food security management obligation).

Another point on the NC/OC association findings contribution to knowledge is that the SNA findings of the centrality of government institutions suggests that capacity-building for country programs to take on the famine mitigation challenge has matured in Kenya, so that workers serving in these institutions are committed to the agencies’ vision and actively seek out contacts from the other professional organizations in the network to enhance their work. What remains is a threshold to accentuate these contacts’ mutual benefits towards the shared interests.

(ii) Organizational commitment’s relationship with collaboration. The findings confirm that the participants’ indicators of involvement and identification with their own organizations, labeled organizational commitment (OC), is associated with the participants’ indicators of involvement in shared activities and in discussing sustainable food issues trait, labeled collaboration (C). Further, the structural equation modeling (SEM) confirmed the OC/C
association. The OC/C association confirmed hypothesis two (H2) of the study. The two measured variables that comprised the OC composite variable were “orgident” and “orgafill,” which measured identification commitment levels as well as the affiliation commitment levels of participants. Further, the two measured variables comprising of the collaboration trait, C, were “collabissues” and “collabact.” Correlation analyses between all the main variables were all positive and the coefficients were moderately or strongly significant. The SEM both confirmed the link between OC and C, but also eliminated the NC path because of NC’s strong association with C. This implies that the participants’ network of contacts and associations’ trait (NC) was almost entirely included in the trait on participants’ indicators of involvement in shared activities and in discussing sustainable food issues trait, labeled collaboration (C). Participants described shared activities and topical discussions of sustainable food and also covered contacts and type and extent of associations’ trait that comprised NC; therefore, rendering the NC path redundant in the SEM model. This OC/C association finding implies that increased organizational commitment is occasioned by increased involvement in collaboration, including involvement in collaborative activities across the organization and increased involvement in discussing the sustainable food issues, and vice versa.

Further qualitative findings on thematic rankings from the field narratives ranked collaboration fourth, after information, linking to intervention/action and training. Collaboration takes a close fourth, ahead of policy and adoption. These qualitative findings indicate that collaboration was closely tied to the practice of involvement in respective organizations and also benefits from its precedents of information, planning and training, all of which are organizational functions. Collaboration on information, planning and training are crucial aspects for the implementation and action functions of policy and adoption.
The social network analysis (SNA) contributed to describing the nature of the network through describing the network in terms of social ties (previously discussed under NC’s SNA mapping), collaboration, frequency and level of cooperation/collaboration. Collaboration was determined by the amalgamation of the “sending organization/network” which the participant identified as their organization, and the “receiving organization/network.” The strongest collaboration link was between the Food and Agriculture Organization (FAO) and Ministry of Agriculture Kenya (MoA), which had 35 interactions or mutual mentions. This was followed closely by the MoK and the WFP-VAM, with 31 interactions. The collaboration between government programs and UN agencies was natural and a crucial part of their daily work of their own organizations. This finding supports the OC/C association linking efficiency within the organization and also the occurrence of collaboration outside the organization. These collaboration indicators reveal that the country programs, led by the Ministry of Agriculture, were involved or can be said to have a firm grip on involvement in the task of famine mitigation and food security management efforts in the country. On the other hand, the network analysis reveals that the involvement of UN agencies in local mitigation efforts goes across the board with the main players along the MoA being FAO and WFP-VAM programs.

The frequency and level of cooperation helped to establish the type strength of the collaboration. The sociograms were based on the four levels of intensity of cooperation: (a) to exchange information for mutual benefit, (b) to change existing practices or to create new ones for mutual benefit, (c) to share resources to meet common needs and (d) to increase each other’s capacities to achieve shared goals. SNA findings indicate that more organizations interacted at least annually to exchange information for mutual benefit. Mutual capacity-building, a more
deliberate and rigorous collaborative effort was the rarer form of collaboration that participants and organizations reported involvement in at fewer occasions.

This OC/C positive association finding and SNA mapping is supported by both the ideas of the Social Exchange Theory (SET) and the Organizational Knowledge Creation Theories (OKCT). The SET proposes that social life is an intricate exchange-network where members try to minimize cost and maximize rewards based on perceived outcomes. Actors, who are committed to their organization’s famine mitigation mandate, will seek out collaboration more if they perceive that collaboration carries further benefits of enriching their knowledge and capacity for more efficiency in fulfilling their mandate. Further, as the OCKT proposes the notion of a “phenomenal” space, a shared space for emerging creation of knowledge through continuous dialogue. The more efficient utilization of the phenomenal space occasioned by commitment to an organizational mandate (OC) will facilitate more collaboration or ”dialogue” among various actors from different organizations within the network to grow ideas for famine mitigation and food security management in the country.

This OC/C association finding serves to add to literature linking perspectives of sustainable food frames to practice in food security management. Previous studies indicated a lack of precise findings linking food entitlement perspectives, agricultural and economic development and priority issues to the practice of collaborative/participatory food security management (Sen, 1980 & 1997; Tilley, 1983; De Waal, 1990; Devereux, 2001; Huesca in Valdivia, 2005; Juma, 2011; Van Gorp & Van der Goot, 2012). The OC/C association finding contributes to the knowledge in that food security professionals’ involvement and identification with their organizations’ goals for food security management (OC) increased with the participants’ involvement in shared activities with others outside their organizational deemed to
contribute to professional development, and in discussing sustainable food issues trait, labeled collaboration (C). This knowledge contributes to studies linking food entitlement perspectives on agricultural and economic development and priority issues to the practice of collaborative food security management. This is because OC/C positive association finding links both the working practice in the organizations and the professionals’ involvement outside the organizations both to acquire knowledge and influence public opinion on food security management and food entitlement issues as being moderately positively associated. This implies that more directed debate on food entitlement and sustainable food perspectives in breadth and depth actually increases as organizational commitment increases. The OC and C here are therefore seen to possess a symbiotic relationship where organizations will become more relevant, more effective and will expand in relevant scope and emphasis when its members are enriched by the involvement in informational to capacity building activities outside the organization, including learning and grassroots efforts. The more involvement in debate on sustainable food security outside of the confines of their organizational definition of the phenomenon, the more open they will be to new and constructive ideas and the more they will be committed to the goals of their own organization.

(iii) Participants’ information commitment’s trait. The findings confirm that the participants’ indicator of information commitment trait (IC) was influenced by the OC, NC and C traits of the participants. The information commitment (IC) trait was a composite variable comprised of: (a) the indicators of engaged information searching style (infoellab), (b) their information authority preference style for in-network information (InfoAutho) and (c) the use of multiple in-network information use (infomulti). These IC categories were adopted from the information commitments survey (Tsai, 2004; Wu & Tsai, 2007). Therefore, based on these three
categories that loaded on the factor analysis and which I used in the measurement scale to
describe the IC trait in the study, I can describe the information commitment (IC) trait of the
study as engaged information-seeking of information deemed authoritative from multiple in-
network sources which comprised the network frames of information in the FEWI network.

The findings that the three independent variables, NC, OC and C, each had an impact on
IC, implies that a change in the level of each trait respectively influenced the IC trait. The
confirmatory Structural Equation Model (SEM) confirmed the impact(s) but also confirmed that
each influence was moderate. This implied that the participants’ network of contacts and
associations (NC) influenced how the participant was engaged in information-seeking behavior
of information deemed authoritative from multiple in-network sources (IC). This means that the
respondents’ associations affect their information-seeking behaviors and choice of information
they seek as they engage in their food security management work. For instance, if one had
associations with contacts from a government-affiliated agency, the type of information one
would use for decisions and work would be those sourced from the government formal position
on the state of food security management in the country. If they have contacts across the board
including outside, they would make decisions based on the comparisons of the varied forms of
information for food security management against current debate on the issues. This was evident
in the qualitative analysis where it was determined that respondents who mentioned more
contacts tended to also use more communication products offered by in-network sources.

NC path purging. The final SEM model goodness-of-fit indices were not adequate using
all the paths or without some of the paths, and only became adequate after purging the contacts
and associations (NC) path. This can be explained in two ways. First, the AMOS program
indicated that two independent variables, NC and C, were associated. Secondly, the model
yielded adequate goodness-of-fit indices by purging one of the two variables, the NC path. The SEM model points to the possibility that “contacts and associations” is an implied factor in the path measuring collaboration, C. This therefore rendered the NC path redundant, thus the purge.

Similarly, the participants’ indicators of involvement and identification with their own organizations (OC) influenced their tendency to be engaged in information-seeking of data deemed authoritative from multiple in-network sources (IC). This implies that respondents who identified with their organization and who were more involved in the task and mission of their respective organizations influenced their information commitment positively. In addition, participants who did not mention an in-network affiliation or affiliation to a traditional food security management organization, such as independent researchers and journalists, reported fewer uses of specific in-network communication products (from FEWSNET and KFSSG) to guide their work.

Finally, the participants’ indicators of involvement in shared activities and in discussing sustainable food issues practice (C), influenced how they were engaged in information-seeking of information deemed authoritative from multiple in-network sources (IC). The SEM model indicated a moderate influence of C on IC and the link was stronger in the final model that had purged the NC path in favor of the C path, as it was said to be redundant (compare C→IC paths on Fig. 26 and Fig. 28). Collaboration (C) had three properties that guided the information-seeking behavior of the respondents, including contacts, number of issue topics of interest (there were a total of 10) and the frequency of activities with contacts. This influence implies that a respondent who has more contacts in the network and who engages in discussing more of the 10 major sustainable food issue topics more often influenced their information commitment positively.
The C → IC relationship was the most productive view in terms of SNA analysis results as well as the qualitative analysis results. The greatest number of participants in this study was from the Ministry of Agriculture (MoA) and the Food and Agriculture Organization (FAO). The social network analysis (SNA) revealed that the strongest collaboration links were between FAO and MoA, which had 35 mutual mentions (see fig. 31.). The MoA also had strong collaborative ties with WFP-VAM, and NDMA. The MoA, the main Kenya government agency on food security management, demonstrates contacts and mutual mentions with UN organizations as well as with country programs supported by the government. The most discussed food security issues were livelihood and nutrition (Fig. 34), both which were reported to be discussed very frequently. These were followed closely by the issue of food production (Fig. 34, d). The least discussed issues were climate change adaptation and biotechnology and GMO (Fig. 34, g). More participants reported exchanging information for mutual benefit monthly than any other category of frequency and nature of contact (Fig. 33). These collaboration patterns mapped by the SNA reveal many factors, among them that the more the contacts were connected with the government agency, the more they tended to discuss more issues and the highest in their agenda was livelihood, nutrition and food production; and that they collaborated to exchange information fairly less frequently (monthly).

This can be explained by the socio-political environment where the issue of food availability is in a majority arid and semi-arid geographical reality of Kenya. Professionals linking up with government representatives in the same pursuit of food security will discuss affordability of food in their discussions on livelihood, the quality (nutrition) and the food production. It’s no surprise why the qualitative field narratives (see Table 12) text analysis revealed that the top seven issues mentioned in the field narratives, in order of mention were
food security, farmers, project, management, drought, famine and water. Other issues that especially concern the private sector, such as technology, were ranked lower, indicating differences in information-seeking behaviors of the respondents in their work. Finally, it is encouraging to note that most respondents reported that they had used the KFSSG and the FEWSNET website in their work. From the results, I concluded that the availability of information through these (FEWSNET & KFSSG websites) as authenticated sources have been the basis of journalists writing about food security and famine mitigation as well as academics.

These patterns of collaboration and organizational commitment affecting information commitment variable can be explained using the Organizational Knowledge Creation Theory (OKCT). The OCKT suggests the notion of a phenomenal space, a shared space for emerging creation of knowledge through continuous dialogue. The creation of knowledge of how to better manage food security in the country is ongoing, as different collaborating professionals and organizations collaborate in famine mitigation. Most respondents indicated that they shared information of mutual benefit to help their respective organizations to become effective in their task of food security. However, fewer reported engaging in the phenomenal space. The potential for knowledge creation both formally and informally drive efficiency at a higher level of engagement, including: (a) changing existing practices or create new ones, (b) sharing resources and (c) mutual capacity-building. This suggests that the notion of a phenomenal space is more incidental than planned or deliberate. There is need to create a forum where the other three levels of knowledge creation are pursued, such as a professional organization that connects stakeholders from across the board.

The main contribution to knowledge from this finding that NC, OC and C influences information commitment (IC) is that the types of affiliations, types of discussions and the level
of involvement or commitment to the organization influences information-seeking behaviors, which in turn help to determine the frames of information in a network. Thus the results show that there are specific frames to information shared within a certain network help to shape the perspectives and approach to such resultant activities as policy-making and action, among others.

This finding contributes to knowledge on a comprehensive and cohesive representation of framing of food security discourses in the public space and answers the gap in literature; there seemed to be eclectic and superficial framing studies in communication meaning in networks and public discourse (Scheufele, 1999). The findings on information commitment satisfy Scheufele’s condition about framing, that it is both a macrolevel and a microlevel construct (Scheufele, 1999) and includes both the mode of presentation that relates to underlying schemas.

Further, this NC, OC and C influence on IC finding also fills the stated gap in research on information commitment as a context in information systems (Hirashima et al., 2011; Van Dijk, 2006, p. 20). This study used a model and also used SNA to map out the FEWI information system in terms of number and frequency of collaborations, issues discussed and organizational affiliation. The study explored the FEWI information systems and defined and placed information commitment at the center of the model. The study essentially links network connection, organizational commitment and collaboration characteristics to information commitment that determines the overall perceived effectiveness of the network itself. Information commitment therefore is the context of describing the FEWI information system and the specific network frames prevalent in the network.

(iv) Perceived effectiveness of the FEWI network. The findings confirm that the participants’ perceived effectiveness of the FEWI network was inversely affected by the information commitment (IC) trait of the participants. Regression analysis yielded a weak
prediction by the composite variable IC for the composite variable PE. The structural equation model (SEM) revealed that the regression weight for information commitment in the prediction of perceived effectiveness of 0.59 was not significantly different from zero at the 0.05 probability level (two-tailed). The SEM model also had a negative estimate of -0.06 which the AMOS program revealed as a negative prediction and influence when information commitment goes up by 1, perceived effectiveness goes down by 0.06, which also was not statistically significant.

Mediation. An important SEM finding on perceived effectiveness compared the influence on perceived effectiveness (PE) to other variables in the model so as to investigate if the IC variable had confounding or confirming effects on the direct paths of the other variables to predict perceived effectiveness (PE). The final model had the OC and C paths. The OC →PE and C →IC paths yielded positive estimates of .014 and .089 respectively. However, these two paths changed to a negative term when they used the IC path to get to PE. This demonstrates an inconsistent mediation (Kline, 2011, p. 166).

These results imply that participants’ information commitment (IC) quality or their engaged information-seeking of information deemed authoritative from multiple in-network sources practice influenced their view of perceived effectiveness of the FEWI network inversely. Although not statistically significant, this predisposition can be explained as dissatisfaction based on an informed view of what an effective network ought to be and how much the FEWI network fell short of the ideal. The more the participants who were involved in their organizations and in discussing the 10 main issues in sustainable food security and their awareness and conformity to the six sustainable food frames in their work, the more they were dissatisfied with the effectiveness of the FEWI network.
The field narratives revealed this dialectic quality of the network where they hailed the abundant resources and knowledge creation present in the individual organizations, in the training of the personnel, and the strong information availability supported by years of research and collaboration both at the local and internal level, while decrying a disconnect with the grassroots reality. They maintained that the early action that should be spurred by early warning information failed to occur because of enduring flaws in information and organizational structures. This view was shared by a 2013 report on the failure of early warning to spur early action, which blamed traditional structures of control both at the relief organizations’ level and the government level in refusing to engage and carry out early action (Bailey, 2013).

Another flaw in the early warning system is the composition of the network that left out key players in the food security management practice at the grassroots level. The study’s demographics of the participants revealed a great disconnect between those involved in food security holistic conversation and those involved in food production. For instance, the FEWI survey participants were 73.7% male, 26.3% female and 62% had completed graduate school. Yet 50% of the agricultural activity in sub-Saharan Africa is performed by women (Gawaya, R., 2008). According to the *FAO Natural Resources Management and Environment Department*, less than 10% of women have tertiary education in developing countries yet they play a decisive role in household and national food security but they lack the leverage necessary to gain access to resources, training and finance. Busani Bafana (Oct, 2012) writes: “Only one in four agricultural researchers in Africa is female, according to AWARD’s 2008 benchmark study. But it gets worse: just one in seven holds a leadership position in African agricultural research institutions” (Oct 19 2012, *IPS*).
Previous studies indicate that women receive no more than 5 percent of extension resources. The involvement of women in the climate change debate, despite its apparent urgency, has been left to the food security professionals who are very different demographic groups. Therefore, the food security professionals and all those involved in the food security question are not the ones involved in grassroots’ experiences of agriculture, thereby indicating some disconnect with involvement in the issues at the grassroots.

This perceived effectiveness PE/IC relationship can be explained using the general systems theory (GST). The GST proposes the existence of a system of laws that impose wholeness, centralization and hierarchy among other aspects of a system. Through the insight of GST, PE is deemed insufficient because increased IC relationship imposes higher ideals of wholeness, centralization and hierarchy in the FEWI system that exposes flaws in the legitimacy of PE in the system. Information literacy will be an important first step towards training a critical public that will help to crowd-source local solutions of a local problem of food security in this study’s context.

This OC/PE finding addresses the literature gap on research on disparity in the amount of famine early warning information generated and extent of corresponding information (organizational and government policy, media coverage) and early action for famine mitigation (Bailey, 2013; Tadesse, et al, 2008; Juma 2011; Kim & Guha-Sapir, 2012). The present study suggests that the apparent disconnect between early warning information and early action is first felt by the food security management practitioners in the field. This suggests that future action to address early action will have to be focused on people and information rather than more information that is sourced elsewhere through international think tanks. The local practitioners
and further grassroots involvement will help forge a local African response to the semi-perennial problem of food security in Kenya.

A recent study on the 2010/2011 Horn of Africa food crisis, the investigators Kim & Guha-Sapir (2012), questioned the role of the food security professionals in enacting early action that matches early warning. They recommended the need to institutionalize change in the health response during humanitarian emergencies. Kim & Guha-Sapir (2012) reported:

In the recent crisis in the Horn of Africa, alarming levels of acute malnutrition were documented from March 2010, and by August 2010, an impending food crisis was forecast. Despite these measures, the situation remained unrecognized and further deteriorated causing malnutrition levels to grow in severity and scope. By the time the United Nations officially declared famine on 20 July 2011, and the humanitarian community sluggishly went into response mode, levels of malnutrition and mortality exceeded catastrophic levels. At this time, an estimated 11 million people were in desperate and immediate need for food. (Kim & Guha-Sapir (2012, p. 2)

Further, Rob Bailey (April 2013) points out the problem of inaction by professionals as being what he calls institutionalized *dragging* of sorts because of the politics of early warning and relief where professionals know what is required to do but they point at other functions that can do it because of funding means and an undefined network to respond to similar or closely related phenomenon. This implies that the more professionals know about the problem and the available resources, the more their tendency to be critical of the effectiveness of the FEWI network in spearheading early action.

Lastly, the literature review highlighted gaps in African and historical philosophic contributions to social change and issues including the food conversation (Asante, 1980 & 2012;
This study investigated a modern African community of professionals who are involved in food security management and famine mitigation. Although it may be argued that this not a spontaneous community, this is a genuine community of African leaders in their own area of specialty coming together around the complex phenomenon of food security management. One important African philosophical value is the role of the community in rallying help for solving both individual and shared problems and the appeal to authority.

The issue of community in Africa strives to capture the notion of collective responsibility in society. This study captures this notion. Through linking collaboration and organizational commitment to information commitment in assessing the perceived effectiveness, this study places community at the center of problem-solving, a core African philosophical value. This integrated community view is also inclined to the *entitlement perspective* (Sen, 1982), which implies that how one deals with his fellow men in community through technology, political perspective, capability and knowledge has an impact on perspectives of food distribution and access.

Table 32 captures the main implications and recommendations of the study as explained in the discussion section so far.
Table 32. Summary of main Implications of results and Recommendations

<table>
<thead>
<tr>
<th>Implications of results</th>
<th>Recommendations</th>
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<tbody>
<tr>
<td>1. The FEWI information network in Kenya is a growing, forming network with imbricate network connections of both the attributes and to its collaborating members.</td>
<td>1. This means that it is important to retrace the ties and take an inventory of both the similar contributions as well as unique contributions of each entity so as to maximize the use of available resources while minimizing redundancy.</td>
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<td>2. All OC-C associations were positive but too weak and statistically insignificant. Therefore I can say that hypothesis two reported a non-significant association and was not supported. This implies that a participant’s organizational commitment was not closely associated with the possibility that they will engage in collaboration with the other organizations. The nature of participation especially at the KFSSG committee was through representation that was also dependent on invitation based on organizational expertise’s contribution to KFSSG.</td>
<td>2. There is a need to tie duties to the collaboration effort in order to foster a culture of mutual capacity building that may in turn encourage research innovation for increased efficiency in the famine mitigation and food security management task of the FEWI network.</td>
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<td>3. The local government country program (KFSSG, MoA) lead the FEWI efforts and worked closely with supportive multinational programs (FEWSNET, FAO, WFP); indicates a weaning process tending towards taking firm ownership of food security management, famine mitigation and relief work.</td>
<td>4. Need to continue trend by seeking local resources in terms of human resources, climate information monitoring capacities, more local research, involvement of grassroots units like the smallholder farmers, among other localization efforts, in order to take a firm grip on mitigation sustainably.</td>
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<td>4. The final SEM model deleted the NC path suggesting that C covered the items measured by NC, including number or frequency of contact and use of in-network communication products. This describes the nature of FEWI networks as characterized by organizations working alongside similar organizations.</td>
<td>4. Need for more intentional connections to strengthen collaboration. Organizations should connect along all four suggested ways more frequently, including exchanging information for mutual benefit, collaborating to change existing practices or to create new ones for mutual benefit, sharing resources to meet common needs and working to increase each other’s capacities to achieve shared goals.</td>
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<td>5. The types of information commitments detected among the participants of the FEWI survey placed value on integrating information from several sources as presented by sources they considered authoritative. This may explain why they made use of the in-network communications tools offered by FEWSNET-KFSSG.</td>
<td>6. There is need to both encourage in-network use of communication tools as well as participation in innovation beyond what the tools have to offer. There is an even larger need to source information from the grassroots in areas of jurisdiction in order to enrich these in-network communication outlets as well as to increase relevance.</td>
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<td>6. The participants’ information commitments (ICs) were however not impacted significantly by such aspects as matching, contact and technical issues. This suggests that the participants were more inclined to usability of information for their task as food security practitioners in their various capacities, rather than the tendency to focus on the information itself for critical appraisal of the information as being a match to their local realities (for example, relevant or accurate or the accessibility of the information).</td>
<td>6. There is need to point out the general inclination by practitioners towards being information consumers or user-perspective rather than a prosumer perspective that seeks to be involved in the process of food security management and famine mitigation information accumulation as well as dissemination and use to fulfill the early warning to early action vision in sustainable mitigation. Need to improve technical capabilities to support this, including use of collaborative wikis and other user platforms so as to allow everyone into the conversation.</td>
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<tr>
<td><strong>Implications of results</strong></td>
<td><strong>Recommendations</strong></td>
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<td>7. Statements drawn from the problem definitions of Gorp &amp; Goot (2012) sustainable food frames scored “Agree” to “Strongly Agree” indicating practitioners’ commitment to the sustainable food frames.</td>
<td>7. Need to tap into participants’ views corresponding to the six sustainable food frames [Responsibility value frame, Undermining-of-foundations frame, Frankenstei frame, Natural Goodness frame, Progress frame and Good mother (archetype) frame (Gorp &amp; Goot, 2012: 134-138).] to drive future information drives to invite more participation by more people on the question of food security and sustainability. Include information in education curriculum to start early best practices by all.</td>
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<td>8. The final more parsimonious SEM model (with four latent variables OC, C, IC and PE; excluding NC) yielded a satisfactory goodness-of-fit indices [Chi= 28.866, DF = 30, CMIN/DF = .962, CFI = 1.000, RMSEA = .000, LO 90 = .000, HI 90 = .055, PCLOSE .921, and Probability of .525. ], indicating that how an actor was connected in the network was through how the actors’ participated in the network through collaboration (C) activities [CollabAct] and collaboration on food security issues [CollabIssues] and not merely association, therefore, NC was rendered redundant by the model.</td>
<td>8. This indication means that there is need for a strong professional organization that gives more meaning to association in the network beyond just participation in similar, parallel or joint activities in their different capacities.</td>
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<td>9. A suppressive inconsistent (different signs) mediatory effect implies that the more a participant’s information commitment, the less he/she perceived the FEWI network as effective, probably because their understanding of the ideal and therefore expectations increased, in effect reducing their perceived effectiveness of the information network. Field narratives indicated dissatisfaction with putting action to information available and the need for policy to support implementation</td>
<td>9. There is need to focus on accessing effectiveness and planning for effectiveness that matches information available. The field narratives lamented the disconnect between information and action and the SEM model also supports the fact that effectiveness of matching action to information ideals is crucial to achieve effectiveness generally and therefore to increase perceived effectiveness of the network by the members. Perceived effectiveness will start a cycle of efficient culture in OC, C and even NC in forming a true culture of sustainable food security in the country.</td>
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<td>10. The patterns of collaboration on ten top issues in food security management indicated that “Livelihoods/prices” was “very frequently” discussed by the organizations. “Nutrition” was mentioned by more organizations but was not as frequently discussed as Livelihoods. More organizations collaborated about “Food production.” Organizations that discussed “Food production” were more likely to discuss the following issues in order: climate change adaptation, livelihoods/prices, storage, recycling and gender/economic quality. Indicating consumer-perspectives. “Forests for food,” “Biotechnology and GMO” and “Biodiversity” received the lowest discussion rating among participating organizations and were discussed “rarely,” indicating a less focus on policy and future planning.</td>
<td>10. Refocus current consumer-perspective towards a sustainability paradigm that focuses on policy and future planning. Need to bring to the limelight less discussed issues at the implementation circles. All issues are supportive of the others and boosting one area in turn positively affects the other. Generally, it’s a call for more involvement in the conversation with local perspectives and corresponding action to boost the effectiveness of the FEWI network towards sustainable food security and effective drought mitigation. There is need for strategies to link information to early action, appropriate training, collaboration and policy.</td>
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Contribution to Communication Research

Despite the limitations, this FEWI network frames study contributes to knowledge on information systems networks research, organizational networks research, communications networks research, climate change communication, agricultural communication and framing in communication. Specifically, this study on network frames in drought early warning information networks systems contributes to understanding on organizational networks in drought mitigation professional communities. The study assessed how professional networks were connected and how organizational commitment, information commitment to sustainable food frames, and the perceived effectiveness of the drought information systems contributed to driving early action for effective famine mitigation.

Framing research has been criticized as being redundant and has abandoned the informational equivalent labels for the state of framing research. A call for new directions on equivalent frames urges scholars to discuss frames as selection and salience. This way, they would redirect away from emphasis frames towards equivalence frames by expanding the sample of potential frames to include non-verbal, visual cues (Scheufele, 2011). This FEWI study attempted to implement Scheufele’s recommended study of framing towards equivalence making framing observations for a wholesome view of the food security and famine mitigation phenomenon.

Case for an independent Drought Mitigation and Climate Change information network

The findings on the main relations of the path/ SEM model including NC, OC, IC, C, touch on the need for a more deliberate network identity so as to tap the contributions of the researchers and communicators who ought to be at the front line of the conversation on drought
mitigation and food security management in order to birth and grow local solutions to upcoming challenges.

Climate change is upon us. According to a recent World Bank report (WB, 2010), Africa has warmed about half a degree in the last century. With a projected global warming of up to $2^\circ$C by 2050, Africa is expected to lose almost 20% of its arable land by 2080 against an exploding population expected to increase to 1.8 billion. Therefore, even more planning for food security management and famine mitigation is needed. A central organizing principle of African socio-political planning ought to focus on cultural reorganization of entire populations to focus on mitigation. African countries should focus on investing in research and advisory services to develop and disseminate adaptation options, and scaling-up investments that build resiliency as a priority (Sasson, A., 2012).

Kenya has had active food security and drought mitigation programs through the Ministry of Agriculture (MoA), the research body the Kenya Agricultural Research Institute (KARI) and the drought mitigation body, the National Drought Management Authority (NDMA). These institutions have had an impact on sound policy in many spheres of food security and have created an enabling framework research and implementation of such programs as the KFSSG. However, the vast resources and training has stayed with the institutions and need to disseminate to the population, which will lead to localized innovation.

There are vibrant current innovations towards climate change action in Kenya. For instance, the Kenya Climate Innovation Center (KCIC) linked to the East Africa Climate Innovation Network (EACIN) housed in Egerton University focuses on bio-energy and was preceded by the African Centre for Technology Studies (ACTS) which began in 1988. Among the recent projects of KCIC is that they launched a program to promote crowd-funding
campaigns for Kenyan entrepreneurs. ACTS is the first African independent think-tank on the application of science and technology to development. The research activities of the centre rotate around the core issues of biodiversity and environmental governance, energy and water security, agriculture and food security and science and technology literacy. The ACTS executive officer, Dr. Ochieng (2002), suggests the embeddedness approach to solving the mitigation problem. He suggests that the interdisciplinary concept links the social with the natural sciences, sociological with economic, political with cultural analyses. For instance, the biophysical environment which is normally the preserve of natural science research is affected by, and in turn affects, the socio-cultural as well as the politico-economic environment, typically the domain of most social science research.

However, these current initiatives will require an informational campaign incentive through a project on climate change communication so as to address the disconnect between availability of information and the dissemination of that information into the cultural fabric of society that drives a society’s support of what is an urgent problem but not perceived as such by the vast majority of people in the society. Therefore, an independent climate change information network is important to establish so as to produce localized information and let farmers and others own the information sourcing and climate change action. The climate change information network will strive to include both men and women and anyone previously left out of the food security conversation and forward planning on climate change adaptation strategies.

The general tendency from the field narratives is that the food security conversation has been relegated to NGO’s mainstay where ideas are discussed and stay with the professionals working in international organizations and it never gets to the mainstream grassroots productive population. For instance, a 2013 launch ceremony for color-coded flags to reach local
communities in arid regions in Kenya with drought early warning information by the NDMA was conducted in English. There is a need to integrate the views and participation of local community members, including those whose language may be limited to the local language or Swahili. There is therefore a need to create a fully interactive and climate change information system with local perspectives and language, to be embedded in the local running of the government and the private sector and education system.

**Limitations of the study**

The study has offered an evaluative perspective on an important food security management and effective famine mitigation development policy program, and was conducted at the organizational level through snowball sampling among professional practitioners and researchers. As a direct consequence of this methodology, the study encountered a number of limitations, which need to be considered.

First, the study targeted and studied the nature of famine early warning information through FEWSNET and KFSSG, which is aimed for decision-makers from the onset. As such, the study was limited to only professional food security networks of that constitute the decision-makers in the early warning information edifice and not to grassroots farmers. This took away the opportunity to study the views of the grassroots networks, including the small scale farmers, and commercial farmers, among other practitioners.

Secondly, the study was limited by time constraint due to the nature of doctoral dissertation research. As such, the study constituted collecting data in a snapshot of time instead of a long period as in a longitudinal study, which would yield much more information on the nature of the networks and determine if the tendencies apparent were static or fluid. A longitudinal study would likely capture network connection over time and more characteristics of
the network connectivity characteristics such as density of the global network would unpack the completeness of the relations in the network (Monge & Contractor, 2003 p. 44). These two main limitations drive the recommendations for further study suggested herein.

Areas of future research

The debate on the effects of famine early warning to spur early action for famine mitigation is extensive and multifaceted at all three levels of assessment including, the intrinsic, contextual and adjacent networks levels. To generate achievable policy strategies with regards to diversification, there is need for more case studies at the local level to allow further assessment of grassroots dimensions of the subject. Exploring the following as future research strategies can facilitate the attainment of this goal

First, there is the need to study the networks dimensions in a deeper and more heuristic including conducting long-term longitudinal studies and comparing behavior of networks. Thus it is important to understand the dynamics of the networks over time and if they wane during normal periods and build up around crisis times and what it takes to keep the networks in place so as to build a further case on the strength of ties beyond what this study has explored.

Moreover, comparing between different levels of the networks such as studying to understand how the emergent food security information systems professional networks are mapped and if they match local food production networks of workers, farmers and local leaders helps to answer the question of local penetration and networks’ impact on the cultural fabric.

Further, there is a need to study audiences and conduct an audience segmentation analysis on their views on climate change and global warming for the people living in a tropical climatic region. Since drought information is fast emerging as a human-cultural issue due to its impact on livelihoods and food, an Afro-centric conversation on climate change communication is
imperative. Audience views on climate change may flag fundamental insights to inform FEWI strategies for spurring early action.

Finally, a major finding of this research was that FEWI is characterized by a an energized network with active governmental and, UN and relief agencies’ participation and collaboration but who saw themselves as ineffective in spurring early action. A rather contradictory trend was the almost unanimous echo to Bailey (2013)’s charge that famine early warning failed to spur early action because of a culture of inaction. Going by the field narratives, some professionals expressed that there is a need to translate the abundant information into action by being simple. This begs the question on the reality of food security professionals’ daily experience in famine mitigation and food security management and how to propose culture-altering measures that will spur effective early action further. Therefore the need for a diagnostic ethnographic study (Erik Olin in Duneier, 2001, p. 342) or an extended place methodology to reinvestigate network frames more deeply, patiently and efficiently, so as to get a closer, participant observation grasp of the experiences of food security professionals.

Conclusions

This study evaluated the role of human capital, organizational networks and communications – driven famine mitigation and sustainable food security management practices in famine early warning information (FEWI) systems networks in Kenya. In spite of what is often reported about the benefits of more information to support the famine early warning information systems towards eradicating possibilities of famine in Kenya, the theoretical and policy debates have only offered some solution to the prevailing and persistent household vulnerability triggered by predictable drought cycles and other vulnerability factors.
The FEWI network members, who are the food security practitioners, researchers and writers who responded to our survey, believe that the network is not adequate in membership, scope, focus, mechanism and ability to turn famine early warning information into effective early action. The networks have been useful as government programs, and UN and aid agencies have helped to prevent the possibility of droughts escalation to a full-blown famine from time to time but have failed to equate increased early warning information to corresponding increased early action as a culture of inaction persists (Bailey 2013). The study’s demographics of the participants also revealed a disconnect between those involved in food security holistic conversation (74% male, 62% completed graduate education) and those involved in food production as 50% of agricultural activity is performed by women who are less literate.

This study made observations through the perspectives of the FEWS NET and KFSSG, both which were inspired by response to the 1984 famine crisis in the Horn of Africa. In response to the crisis, a March 7, 1985 release of the “We are the World” charity-raising song by the USA group for Africa garnered the world’s attention and spurred an outpouring of relief and policy activities that finally ended the famine by the end of 1985, with a strong resolve to prevent future such occurrences. This entertainment-education communications event not only drove world-wide aid towards ending the 1984 famine, but also helped spur a turning-point on the business of famine mitigation information from relief-seeking information to universal capacity-building information for sustainable alleviation nested in continuous collaboration reminiscent of Foucault’s “homogeneity” notion. The 1984 crisis is related to the inception of USAID sponsored FEWS NET in 1985 to support already existing government efforts towards famine mitigation efforts in Kenya. FEWS NET serves in several other developing countries to support drought prediction and response capacities to food security management. KFSSG started as a
result of FEWS NET research and support in 1999 with a unique setup of both governmental, UN and aid agencies being represented in the committee to discuss and collaborate towards famine mitigation and effective food security management in the country.

Perspectives from a rhetorical analysis of the historical famine early warning biblical story of Joseph demonstrates a historical triumph in mitigating famine sustainably through famine early warning information, link to early action, human capacity, food storage and management, the centrality of cereal and livestock management in food security, food distribution, food prices and livelihoods, land tenure policy, the role of the divine in culture and food entitlement (Gen 41:47:13-26). However, criticism of the Joseph famine mitigation story as a model for FEWI includes over-stretched centralized storage, food distribution, tax policy and ownership. The Joseph story demonstrated the role of civic leadership and clergy in supporting a long term government solution to revenue and sustainable food security management, but which also yielded undue taxation for the citizenry.

The results revealed a vibrant network of collaboration towards drought mitigation marked by centrality of the Kenya governmental agencies and departments affiliated to KFSSG in the FEWI network. The network is functional at all three levels, intrinsic, contextual and adjacent networks levels. This is because they received more contact mentions and ranked higher in in-degree contacts and were therefore termed as more popular actors in the FEWI communication network. FEWSNET had very few, 5.20%, of the participants in the survey, reflecting a very small representation of FEWSNET in the country. This indicates a met goal of capacity–building by FEWS NET, in order for country programs to take the lead role in famine mitigation in their own countries. About 16 out of the 20 key organizations on the KFSSG committee, based on their technical contributions, had participants in the survey. In all, a
A significant number (35.26%) of KFSSG committee members participated in the survey. The UN agencies, including FAO and WFP, along with FEWSNET came a close second in the number of mentions indicating a property of expansiveness which demonstrates a fairly well distributed communication network. The independent researchers and environmental journalists or writers received few or no mentions and were therefore isolates because of their lack of in-degree ties in the network. This implies the need for a more deliberate identity as network so as to tap the contributions of the researchers and communicators who are at the front line in framing the famine mitigation conversation.

Further analysis reveal that NC, OC and C influences information commitment (IC), which implies that the types of affiliations, types of discussions and the level of involvement or commitment to the organization influences information-seeking behaviors, which in turn help to determine the frames of information in a network. Thus the results show that there are specific frames to information shared within a certain network and which shapes perspectives and approach to such resultant activities as policy-making and action, among others which I refer to as network frames. Results revealed that the most discussed food security issues were livelihood and nutrition both of which were reported to be discussed very frequently. These were followed closely by the issue of food production. The least discussed issues were climate change adaptation and biotechnology and GMO, biodiversity and forests for food. This indicates a consumer-perspective in the conversations as opposed to the focus on policy and sustainable food security in the less discussed themes. This can be explained by the socio-political environment where the issue of food availability in a majority arid and semi-arid geographical reality of Kenya. Professionals linking up with government representatives in the same pursuit of food security will discuss affordability of food in their discussions on livelihood, the quality
(nutrition) and the food production. It’s no surprise why the qualitative field narratives text analysis revealed that the top seven issues mentioned in the field narratives, in order of mention were food security, farmers, project, management, drought, famine and water. Other issues that especially concern the private sector, such as technology, were ranked lower.

Finally, the study made 10 recommendations ranging from more involvement in the information by grassroots participants, including small-scale farmers and local networks and the education system focus on food security perspectives, to forming a professional network to legitimize connections for more local research and innovation focus. These recommendations form a basis for a case for an independent climate change information network that will be a threshold for research, innovation and a localized climate change information communication campaigns that would specifically strive to spur an inclusive, culture–altering conversation that takes the country ahead in mitigating climate change effects while meeting the food security and drought mitigation goals. Recommendations for future research suggest longitudinal studies on food security networks and invite further contributions to an ongoing conversation on sustainable food security and effective famine mitigation in Kenya and in the Horn of Africa region.
LIST OF REFERENCES


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APPENDICES

A. Visual Model for the concurrent embedded mixed methods study

B. Literature Review Map

C. Consent to participate in Research

D. INSTRUMENT -Survey Monkey-hosted –Networks and Commitment FEWI Survey (1-23qs.) PRINT-SCREENS;

E. Full list of participating organizations and survey participants per organization

F. Factor Analysis loadings full table

G. Structural Equation Model and its output estimates

H. EARLY WARNING PRODUCTS BRIEFING SAMPLE

Early Warning Products and Briefings covering Somalia in the 11 months leading up to the June 20, 2011 famine declaration (C. Schaeffer, personal communication, January 9, 2012).
Note: products are in addition to regular monthly reporting by FEWS NET and FSNAU.

FEWS NET did a total of 25 briefings (addressed developing crisis to donors, UN agencies, and other partners by FEWS NET and FSNAU between August 2010 and the July 20th 2011, famine declaration.)

I. FEWS NET AFRICA DATA PORTALS PRODUCTS SAMPLE

(FEWS NET’s Monthly Food Security updates – Sample March 2013 (2 pages)
Appendix A

Visual Model for the concurrent embedded mixed methods study

<table>
<thead>
<tr>
<th>Phase</th>
<th>Procedure</th>
<th>Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.</td>
<td>- Qualitative pre-interviews</td>
<td>- Establish Early warning agenda</td>
</tr>
<tr>
<td>II.</td>
<td>- Data</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Quantitative/quasi-qualitative</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Survey responses/data and field</td>
<td></td>
</tr>
<tr>
<td></td>
<td>narratives</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(concurrent)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Web-based survey N=191</td>
<td>Numeric data</td>
</tr>
<tr>
<td></td>
<td>Qual</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Web-based survey narrative</td>
<td></td>
</tr>
<tr>
<td></td>
<td>QUAN</td>
<td></td>
</tr>
</tbody>
</table>

III.   - Analysis of findings

<table>
<thead>
<tr>
<th>Data Analysis I (Quantitative data &amp; Qualitative II data analysis)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data screening</td>
</tr>
<tr>
<td>(Descriptive statistics, missing data, linearity and homoscedasticity)</td>
</tr>
<tr>
<td>Data analysis</td>
</tr>
<tr>
<td>(SPSS quantitative software V. 22)</td>
</tr>
</tbody>
</table>

IV.     Interpretation of entire analysis
Appendix B: Literature Review Map

Network Frames in Early Famine Warning Information Systems and their effects on Commitment: Evidence from the FEWSNET-KFSSG Anti-famine campaign

**Literature Review Map**

### Networks & Network Analysis studies
- Contractor, N.S. (1999)
- Nooy, W., Mrvaj, A. & Batagelj, V. (2005)
- Scott, J.P. & Carrington, P. (2011)

### Communication Networks studies:
- Monge, P.R., Cozzens, M.D. & Contractor, N.S. (1992)
- Monge, P.R., Cozzens, M.D. & Contractor, N.S. (1992)

### Communication Networks campaigns studies:
- Beninger, J. (1986)
- Burt, R.S. (1982)
- Postmes, T. & Wit (2001)

### Communication etymology and Visual Arts
- Boje, David M. (2002)
- Harris, J. (2011)

### Framing Communication studies:
- Alexander, R.J. (2009)
- Dardis, F.E. (2007)

### Media and Framing
- Burt, R.S. (1982)
- Garud, R. (1994)

### Interpreting Frame
- Fishman, A. (1982)

### Six sustainable food
- Gorp, B.V. & Goot, M.J. (2012)

*Six sustainable food Interpretative Frame Packages: (this study’s coding)*

### Networks & Commitment causal:
- Multi-theoretical, Multi-level, multi-analytical model (MTML) to describe collaborative EWS Community

### Macro level
- Inter-Organizational networks + stakeholders
- FEWSNET-KFSSG
- Social Network theory,
- General Systems Theory

### MTML counterpart
- Contagion theories, Homophily
- Theories, Theories of Network evolution and co-evolution

### Meso-level
- FEWS NET 5 Implementing partners
- Social Network theory (Ditto)
- Organizational Knowledge Creation Theory

### Current African Perspectives:
- Juma, C. (2011)
- Ververs, Mijat (2011)
- Famine studies:
  - Tannahill, R. (1973)
  - OECD (1998)
  - Ververs, Mijat (2011)

### FEWS NET – KFSSG Networks
- Funk & Verdin (2010)
- National Science Foundation (2009)
- FEWSNET-KFSSG Anti-famine campaign

### Early Warning Information Systems (FEWIS)
- Ellis F. (2000)
- Shapouri, S. et al. (2011)
- Noran, O. (2009)
- Funk & Verdin (2010)

### Medieval Biblical Models of Famine Early Warning
- Genesis 41: and 47: 13-26
- Frost, S.E., Jr (1989)
- Swindoll, Charles (1998)
Appendix C:

REGENT UNIVERSITY

CONSENT TO PARTICIPATE IN RESEARCH

Invitation to Participate
Lucy Wanjiku Gichaga, a graduate student researcher at Regent University, is conducting a study on the effectiveness of Kenya’s famine early warning information (FEWI) network from 2007 to 2013. You are invited to participate in this study because of your direct or indirect connection to the food security professionals’ community in Kenya.

Purpose
The objectives of the current study are to:
1) assess the strength of collaborative networks
2) unpack the types of information commitments to sustainable food frames
3) evaluate the organizational commitment
4) and appraise perceived impact of FEWI towards early action by stakeholders at FEWSNET, KFSSG, and all their affiliate organizations since 2007.

Description of Procedures
You will be asked to complete an anonymous survey on Survey-Monkey.

The survey will take approximately 12 – 25 minutes, maximum. Since a networks study requires attention to details, you will need to find a quiet and convenient time and place to participate effectively. Ideally, you may complete this survey with consultation with colleagues in the office or in the field so as to recall as many organizational networks that you have had contact with as is true in the course of your work.

Please add/type in names of organizations that we may have left out and which may have been useful contacts in regards to food security in Kenya in any way. Please email us with any extra information you may have in regards to the survey at lucygic@mail.regent.edu.
You may complete the survey on your computer or mobile device.

Risks and Inconveniences
There are minimal/no risks attached to this study.

Safeguards
The nature of the survey safeguards the confidentiality of all my respondents in the current survey.
Confidentiality
Your survey responses will be kept confidential, available only to the research team for analysis purposes.

Interview responses will not be linked to your name or email address, and there will be no follow-up sessions. We do this to ensure your responses remain confidential and that you feel free to respond as freely as possible.

Voluntary Participation
Participation is voluntary. You do not have to participate in this study if you do not want to. If you agree to be in this study, but later change your mind, you may withdraw at any time. If the length of the survey is inconvenient for you, you may stop the survey at any time without any consequence to you. There is no (penalty) of any kind if you decide you do not want to participate.

Benefits
Although there may be no direct benefit to you, the possible benefit of your participation is to enrich the existing knowledge of inter-organizational dynamics in famine early warning information (FEWI) systems communication networks and the possible contribution to an inoculate commitment to early action that prevents famine and enhances effective food security management.

Questions
If you have any questions about this study I will be happy to answer them now. You may contact me on lucygic@mail.regent.edu. If you have any questions in the future, please contact the researcher’s advisor/professor, Dr. William Brown, Phone: 757-352-4216. Email: willbro@regent.edu

If you have any questions about your rights as a research participant, you may contact our Institutional Review Board at Regent University at 757.352.4447.
☐ I agree to participate in this research study.
☐ I agree to be videotaped

_________________________________________                     ____________________
Participants Name                                      Date

(The participant may sign here only if the language level is appropriate for the child. Otherwise, a separate child assent must be used.
Participants Signature

________________________________________
Researcher’s Signature

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Appendix D:

FEWI SURVEY (hosted on the Survey Monkey website)

Networks and Commitment FEWI Survey (1-23qs.) PRINT-SCREENS:

1. What organization/sector do you primarily work for?

(Choose your organization/sector from the drop-down menu, below, or write in the space provided if not included.)

Choose Organization from the drop-down menu here

Other organization(s):

[Green Screen]

- 344 -
2. How many years have you been working for this organization?

- 1-2 years
- 3-5 years
- 6-8 years
- 9-10 years
- Over 10 years
- Other (please specify):

3. Which of the following is true about you?

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Somewhat disagree</th>
<th>Neutral</th>
<th>Somewhat agree</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>(6) Agree</td>
<td>(5) Agree</td>
<td>(4) Agree</td>
<td>(3) Agree</td>
<td>(2) Agree</td>
<td>(1) Agree</td>
<td>(0) Agree</td>
</tr>
</tbody>
</table>

- Agree to work together for the common good
- Agree to use my personal life to help with the organization's goals
- Agree to work together for the common good
- Agree to work together for the common good
- Agree to work together for the common good
- Agree to work together for the common good
- Agree to work together for the common good
- Agree to work together for the common good

Networks and Commitment FEWi survey

6. Are you involved directly with food security and/or famine management in Kenya? (Meaning that you work in the food security sector, govt. NGO, aid agency and you are LOCATED in Kenya).

Yes
No

7. Please tick EVERY Communication product (by FEWNET or IFSSG) on Famine Early Warning Information (FEW) that you have used in your work.

- Food Assistance Outlook
- Livelihood_profiles
- Software
- FEWNET food security updates
- Market Summary
- WRF Reports
- Cross Border Traffic Reports
- Reports and Analysis
- Other

Please indicate your own other communication products you mentioned in a comment (MAX 5 words)

Comments: 

- Social reports
- FEWS food security impact assessments
- Rapid Analysis
- WRF Food security outlook
- IFSSG data
- IFSSG long and short term reports
- IFSSG regional food security 

-347-
### Networks and Commitment FEW survey

#### 8. Which of the following statements is true about sustainable food security?

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Somewhat disagree</th>
<th>Neutral</th>
<th>Somewhat agree</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>It is important to improve supply security to stop irresponsible use of GMO's in food security management practice.</td>
<td>✔️</td>
<td>❌</td>
<td>❌</td>
<td>✔️</td>
<td>❌</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Farming and food production should be important solutions to food productivity and sustainability and should be strongly supported.</td>
<td>✔️</td>
<td>✔️</td>
<td>✗</td>
<td>✔️</td>
<td>✔️</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>The sharing of the natural resources and habitats to support agricultural activities is interfering with the natural balance of the connections between humans, animals, and the environment.</td>
<td>❌</td>
<td>✔️</td>
<td>✔️</td>
<td>✗</td>
<td>✔️</td>
<td>✔️</td>
<td>✗</td>
</tr>
<tr>
<td>When considering the use of GM technology and pesticides, the goal of producing the safest and most nutritious foods for future generations is more important than economic production.</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✗</td>
<td>✔️</td>
<td>✔️</td>
<td>✗</td>
</tr>
<tr>
<td>Organic/natural products stand for health, quality, authenticity and a good taste and should be exclusive.</td>
<td>❌</td>
<td>✔️</td>
<td>✗</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✗</td>
</tr>
<tr>
<td>The agricultural and food industry guarantees the continuous supply of consumers in a broad range of product, taste and colors and therefore of mixed and should continue to do so.</td>
<td>❌</td>
<td>✔️</td>
<td>✗</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✗</td>
</tr>
</tbody>
</table>

---

### FEW Survey:

#### FEW survey:

5. Please answer the following questions about how you use FEW information in your work.

<table>
<thead>
<tr>
<th>Question</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Somewhat disagree</th>
<th>Neutral</th>
<th>Somewhat agree</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. To familiarize with FEW issues.</td>
<td>❌</td>
<td>✔️</td>
<td>✗</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✗</td>
</tr>
<tr>
<td>b. To understand the status and appropriate action</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>❌</td>
<td>✔️</td>
<td>✔️</td>
<td>✗</td>
</tr>
<tr>
<td>c. To get idea in how to carry out appropriate actions</td>
<td>✗</td>
<td>✔️</td>
<td>✔️</td>
<td>❌</td>
<td>✔️</td>
<td>✔️</td>
<td>✗</td>
</tr>
<tr>
<td>d. To understand the need to take action and actions to take.</td>
<td>❌</td>
<td>✔️</td>
<td>✗</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✗</td>
</tr>
</tbody>
</table>

(Responses continued...)
FEW Survey:
Famine early warning information (FEW) networks, organizational and information commitment questionnaire

Networks and Commitment FEW survey

10. When I search for information on FEW, I try to:

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Somewhat disagree</th>
<th>Neutral</th>
<th>Somewhat agree</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Summarize the information I find</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Use as many websites as possible if they all contain the information I need</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Interpret the information from multiple websites</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. I search for information on multiple websites</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e. Compare information from multiple websites</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

11. When I search for information on FEW, I am:

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Somewhat disagree</th>
<th>Neutral</th>
<th>Somewhat agree</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Primarily seeking to find the most appropriate websites that fit my needs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. I try to find several websites and get as much information as possible, even if it means going to multiple websites</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. I try to find as much information as possible, even if it means going to multiple websites</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>d. I try to get all the information I can and use all websites that I find</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e. I try to get all the information I can and use all websites that I find</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- 349 -
13. For the organizations that your organization interacts with the most, please indicate how often you engage in the following activities:

<table>
<thead>
<tr>
<th>Activity</th>
<th>Never</th>
<th>Annualy</th>
<th>Occasionally</th>
<th>Quarterly</th>
<th>Monthly</th>
<th>Weekly</th>
<th>Almost daily</th>
<th>Continuously</th>
<th>Monitor and assess</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. To exchange information/mutual benefit</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. To develop new partnerships to create new value for mutual benefit</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. To share resources to meet common needs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. To collaborate and coordinate to achieve shared goals</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Other please specify:

14. For the organizations that your organization interacts with the most, please discuss the following issues:

<table>
<thead>
<tr>
<th>Issue</th>
<th>Never</th>
<th>Very Rare</th>
<th>Rare</th>
<th>Infrequent</th>
<th>Frequent</th>
<th>Very Frequent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food Production</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Irrigation &amp; Water distribution</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indirect &amp; Genetic Modified Crops</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Biotechnology</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Herbicides</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Residues reduction/recycling</td>
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<tr>
<td>Landscapes</td>
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</tr>
<tr>
<td>Nutrition</td>
<td></td>
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</tr>
<tr>
<td>Energy efficiency</td>
<td></td>
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<tr>
<td>Poverty</td>
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</tr>
<tr>
<td>Gender-specific efforts</td>
<td></td>
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</tr>
</tbody>
</table>

Other please specify:

- 351 -
FEWS Survey: Famine early warning information (FEWS) networks, organizational and information commitment questionnaire

### Networks and Commitment FEWS survey

**16. Do you use the FEWS NET website?**
- Yes
- No

**17. Which of the following statements is true about the FEWS NET website to the best of your knowledge and experience using it?**

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Somewhat disagree</th>
<th>Neutral</th>
<th>Somewhat agree</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>The FEWS NET website is easy to navigate and they try to explain technical terms</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>The FEWS NET website has a role for me in my daily work</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I appreciate the FEWS NET website because I get information that i need easily</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I believe that the FEWS NET website has played a large role in helping to prevent famine through its famine early warning information</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

### Networks and Commitment FEWS survey

**18. Do you use the KFS SG - (Kenya Food Security Steering Group) website?**
- Yes
- No

**19. Which of the following statements is true about the Kenya Food Security Steering group (KFS SG) website to the best of your knowledge and experience using it?**

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Somewhat disagree</th>
<th>Neutral</th>
<th>Somewhat agree</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>The KFS SG website is easy to navigate and they try to explain technical terms</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The KFS SG website has a role for me in my daily work</td>
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<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>I appreciate the KFS SG website because I get information that i need easily</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>I believe that the KFS SG website has played a large role in helping to prevent famine through its famine early warning information</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>
FEW survey:
Famine early warning information (FEW) networks, organizational and information commitment questionnaire

Networks and Commitment FEW survey

19. Famine early warning information (FEW)

<table>
<thead>
<tr>
<th>Agree</th>
<th>Disagree</th>
<th>Somewhat Agree</th>
<th>Neutral</th>
<th>Somewhat Disagree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

FEW is a useful means of reducing the harmful consequences of famine.

FEW is effective in reducing migration in times of hunger.

Famine early warning information (FEW) has played a major role in reducing famine.

There is need for the continuation of famine early warning information (FEW) since there would be no regular occurrence of famine in Kenya and the region.

Famine early warning information (FEW) is synonymous to sustainable food security in Kenya and the region.

20. What is your gender?

- Male
- Female

21. What is the highest level of education you have completed?

[Input field for education level]

22. Final question:
Experiences shape our perspectives in our work.

Please share with me a brief narrative or story of your most memorable or interesting experience in your work related somehow to supporting food security management. Please use the space provided below. Thanks for sharing.

[Input field for narrative]

- 353 -
Thank you for your time and participation!

Please return to the email link where you started this survey and forward the survey to a colleague in food security management. Your help is appreciated!

If you would like to receive the results of this Networks and Commitment FEW survey, please provide us with your email (optional).

Thank you!

23. What is your email address? (Optional)

[Email field]
Appendix E. Full list of participating organizations and survey participants per organization

<table>
<thead>
<tr>
<th>Organization/Mentor/Project</th>
<th>Number of Survey Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Action against Hunger (ACF – USA)</td>
<td>3</td>
</tr>
<tr>
<td>Adventist Development and Relief Agency (ADRA)</td>
<td>1</td>
</tr>
<tr>
<td>AfricaRice</td>
<td>1</td>
</tr>
<tr>
<td>Agricom consultants ltd</td>
<td>1</td>
</tr>
<tr>
<td>AMREF KENYA</td>
<td>1</td>
</tr>
<tr>
<td>Arid Lands Resource Management Project, Kenya (ALRMP)</td>
<td>1</td>
</tr>
<tr>
<td>Association of women in Agriculture</td>
<td>1</td>
</tr>
<tr>
<td>Catholic Relief Services (CRS)</td>
<td>1</td>
</tr>
<tr>
<td>Centre for Basic Research and Networking Africa (CeBRNA)</td>
<td>1</td>
</tr>
<tr>
<td>Community Action For Nature - Githunguri</td>
<td>1</td>
</tr>
<tr>
<td>Danish Refugee Council</td>
<td>2</td>
</tr>
<tr>
<td>Daystar University</td>
<td>1</td>
</tr>
<tr>
<td>Dedan Kimathi University of Technology</td>
<td>1</td>
</tr>
<tr>
<td>Department for International Development (DFID/EC)</td>
<td>1</td>
</tr>
<tr>
<td>Doctors Without Borders / Médecins Sans Frontières (MSF) - Veterinaires Sans Frontières, Germany</td>
<td>2</td>
</tr>
<tr>
<td>Egerton University</td>
<td>4</td>
</tr>
<tr>
<td>Farm Input Promotions Africa (FIPS-Africa)</td>
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<tr>
<td>FEWSNET Central office in Kenya</td>
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</tr>
<tr>
<td>Food and Agriculture Organization of the United Nations (FAO)</td>
<td>9</td>
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<tr>
<td>Gargaar Relief and Development Organization (GREDO)</td>
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<tr>
<td>Helping Hand for Relief and Development (HHRD)</td>
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<tr>
<td>HopeLink</td>
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<tr>
<td>Howard University, Washington DC, USA</td>
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<tr>
<td>Independent Researcher</td>
<td>17</td>
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<tr>
<td>Intergovernmental Organization</td>
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<tr>
<td>International Aid Services (IAS)</td>
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<tr>
<td>International Federation of the Red Cross, Kenya Red Cross (IFRC)</td>
<td>2</td>
</tr>
<tr>
<td>International Medical Corps (IMC), Kenya</td>
<td>1</td>
</tr>
<tr>
<td>Islamic Relief in Kenya (IRK)</td>
<td>1</td>
</tr>
<tr>
<td>JapakGIS Solutions - GIS Analysis, Mapping and Web Mapping projects Consultancy</td>
<td>3</td>
</tr>
<tr>
<td>Jomo Kenyatta University of Agriculture and Technology</td>
<td>5</td>
</tr>
<tr>
<td>K.I.R.D./ Water resources sector</td>
<td>1</td>
</tr>
<tr>
<td>Kenya Agricultural Productivity and Agribusiness</td>
<td>1</td>
</tr>
<tr>
<td>Project 1</td>
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<tr>
<td>Kenya Agricultural Research Institute (KARI)</td>
<td>7</td>
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<tr>
<td>Kenya Investment Authority (KIA)</td>
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<tr>
<td>Kenya land alliance</td>
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<tr>
<td>Kenya Meteorological Department (KMD)</td>
<td>3</td>
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<tr>
<td>Kenya seed company</td>
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</tr>
<tr>
<td>Kenyatta University</td>
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<tr>
<td>Manufacturing sector</td>
<td>1</td>
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<tr>
<td>Masinde Muliro University</td>
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</tr>
<tr>
<td>Medecins D’ Afrique - Doctors Of Africa</td>
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</tr>
<tr>
<td>Media (Journalist, Nation Media Group)</td>
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</tr>
<tr>
<td>Meru University of science and technology</td>
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</tr>
<tr>
<td>Metropolitan planning / Nairobi city county government</td>
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<tr>
<td>Ministry of Agriculture, Kenya (MoA)</td>
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<tr>
<td>Ministry of Education, Kenya (MoE)</td>
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<tr>
<td>Ministry of Health, Kenya (MoH)</td>
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<tr>
<td>Ministry of Livestock development (MoLD)</td>
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<tr>
<td>Ministry of Mining, Kenya</td>
<td>1</td>
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<tr>
<td>Ministry of Public Health and Sanitation, Kenya (MoPHS)</td>
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<tr>
<td>Ministry of Public Works</td>
<td>1</td>
</tr>
<tr>
<td>Moi University</td>
<td>3</td>
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<tr>
<td>National Aeronautics and Space Administration (NASA)</td>
<td>1</td>
</tr>
<tr>
<td>National Disaster Operation Centre</td>
<td>1</td>
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<tr>
<td>National Drought Management Authority, Kenya (NDMA)</td>
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<tr>
<td>Natural Resource Information and Technology Limited, Kenya</td>
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<tr>
<td>NGO - vestergaard frandsen</td>
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<tr>
<td>Non Governmental Organization / Faith Based Organization</td>
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<tr>
<td>Norwegian People’s Aid - Rural Development Programme, South Sudan Programme</td>
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<tr>
<td>Norwegina Refugee Council, NRC</td>
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<tr>
<td>Othaya Boys High School</td>
<td>1</td>
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<tr>
<td>Oxford Committee for Famine Relief (OXFAM – GB)</td>
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<tr>
<td>Oxford University Press, East Africa</td>
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<tr>
<td>Plan International, Kenya</td>
<td>1</td>
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<tr>
<td>Plant Breeders Association of Kenya</td>
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<tr>
<td>Private - Farmer or farming support/ Private</td>
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<tr>
<td>Consultancy firm/Self employed, EIA/EA</td>
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<tr>
<td>Consultant/freelance environmental information systems consultant/ Entrepreneur</td>
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<tr>
<td>Rice promotion programme under the Rice Promotion Unit in the Crop Management Department</td>
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<tr>
<td>Samaritan’s Purse International Relief (SPIR)</td>
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<tr>
<td>Social Life and Agricultural Development Organization (SADO)</td>
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<tr>
<td>Somali Aid</td>
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<tr>
<td>Solomiland Research Centre Organization</td>
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<tr>
<td>Sun Relief and Development Organization (SURDO)</td>
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<tr>
<td>Sustainable Aid in Africa (SANA) International</td>
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<tr>
<td>Tana Water Services Board</td>
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</tr>
<tr>
<td>The African Development Bank</td>
<td>1</td>
</tr>
<tr>
<td>The Media for Environment, Science, Health and Agriculture (MESHA)</td>
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</tr>
<tr>
<td>The Office of the United Nations High Commissioner for Refugees (UNHCR)</td>
<td>1</td>
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<tr>
<td>The United States Geological Survey (USGS)</td>
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<tr>
<td>UN-Habitat</td>
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</tr>
<tr>
<td>United Nations Children’s Fund – Education (UNICEF)</td>
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<tr>
<td>UNICEF, Planning Monitoring &amp; Evaluation Unit</td>
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<tr>
<td>United Nations Development Programme (UNDP)</td>
<td>2</td>
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<tr>
<td>United Nations Environment Programme (UNEP) - &amp; UNEP Division of Early Warning &amp; Assessment</td>
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<tr>
<td>United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA)</td>
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<tr>
<td>United States Department of Agriculture (USDA)</td>
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</tr>
<tr>
<td>University of California, Santa Barbara</td>
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</tr>
<tr>
<td>University of Nairobi</td>
<td>4</td>
</tr>
<tr>
<td>USAID</td>
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</tr>
<tr>
<td>USAID East Africa Trade Hub</td>
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</tr>
<tr>
<td>USAID/Kenya Pharma project</td>
<td>1</td>
</tr>
<tr>
<td>Vi-Agroforestry programme, Kisumu</td>
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</tr>
<tr>
<td>World Agroforestry Centre (ICRAF)</td>
<td>2</td>
</tr>
<tr>
<td>World Food Programme Vulnerability and Mapping Unit (WFP/VAM)</td>
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<tr>
<td>World Vision International (WVI)</td>
<td>5</td>
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<tr>
<td>Young Africans Development Action (YDA)</td>
<td>1</td>
</tr>
</tbody>
</table>

- 355 -
Appendix F. FACTOR ANALYSIS (Loadings table)
10 out of 12 factors loaded and used on measurement scale. (Print screen of 1 of 4 pages)

<table>
<thead>
<tr>
<th></th>
<th>Factor 1</th>
<th>Factor 2</th>
<th>Factor 3</th>
<th>Factor 4</th>
<th>Factor 5</th>
<th>Factor 6</th>
<th>Factor 7</th>
<th>Factor 8</th>
<th>Factor 9</th>
<th>Factor 10</th>
<th>Factor 11</th>
<th>Factor 12</th>
</tr>
</thead>
<tbody>
<tr>
<td>I am quite proud to be able</td>
<td>0.378</td>
<td>-0.032</td>
<td>-0.225</td>
<td>-0.064</td>
<td>0.653</td>
<td>0.225</td>
<td>-0.014</td>
<td>-0.055</td>
<td>0.023</td>
<td>-0.011</td>
<td>-0.056</td>
<td>-0.250</td>
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<td>to tell people who it is that</td>
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<td></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>I work for an organization</td>
<td>0.105</td>
<td>0.108</td>
<td>-0.053</td>
<td>-0.076</td>
<td>0.972</td>
<td>0.047</td>
<td>-0.165</td>
<td>-0.166</td>
<td>0.106</td>
<td>0.047</td>
<td>0.027</td>
<td>0.082</td>
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<td>that I am proud of</td>
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</tr>
<tr>
<td>I like to wear trademark</td>
<td>-0.036</td>
<td>0.087</td>
<td>-0.114</td>
<td>-0.066</td>
<td>0.881</td>
<td>0.142</td>
<td>0.088</td>
<td>-0.062</td>
<td>0.131</td>
<td>0.143</td>
<td>-0.053</td>
<td>0.147</td>
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<td>items to identify with my</td>
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<tr>
<td>organization such as t-shirts</td>
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<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>The organization's goals</td>
<td>0.168</td>
<td>0.008</td>
<td>-0.108</td>
<td>0.066</td>
<td>0.871</td>
<td>0.005</td>
<td>0.019</td>
<td>0.006</td>
<td>-0.075</td>
<td>0.073</td>
<td>0.346</td>
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<td>are synonymous to my own</td>
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<td>career goals in working to</td>
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<td>support food security</td>
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<td>Working for my organization</td>
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<td>has helped to meet my passion</td>
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<td></td>
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<tr>
<td>for food security work</td>
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<td></td>
<td></td>
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<tr>
<td>I feel a strong sense of</td>
<td>0.892</td>
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<td>-0.182</td>
<td>0.087</td>
<td>0.079</td>
<td>-0.046</td>
<td>-0.117</td>
<td>-0.061</td>
<td>0.023</td>
<td>0.002</td>
<td>-0.061</td>
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<td>belonging to this organization</td>
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<tr>
<td>I feel like part of the</td>
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<td>-0.008</td>
<td>-0.231</td>
<td>0.085</td>
<td>0.006</td>
<td>-0.008</td>
<td>0.031</td>
<td>0.073</td>
<td>-0.047</td>
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<td>0.044</td>
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<td>family at this organization</td>
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<td></td>
<td></td>
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<tr>
<td>The people I work for care</td>
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APPENDIX G
STRUCTURAL EQUATION MODEL FULL ESTIMATES

MODEL 1. The Hypothesized model with all ten variables (Result: Inadmissible because of negative covariances)
(Output NOT represented below but SEM figure and short output version included in-text, Chapter 4)

MODEL 2. The modified model (Bayesian Admissibility test to eliminate negatives)
(See output below; P = .000 – model confirmed. SEM figure and short output version included in-text, Chapter 4)

MODEL 2
(Model without Network connectedness)

The model is recursive. Sample size = 172
Number of distinct sample moments: 65
Number of distinct parameters to be estimated: 35
Degrees of freedom (65 - 35): 30
Result (Default model): Minimum was achieved, Chi-square = 28.866, Degrees of freedom = 30, Probability level = .525

**Variable summary**

Observed, endogenous variables:
OrgIdent, OrgAfill, CollabIssues, CollabAct, InfoElab, InfoAuth, PE [Q19n5, Q19n3, Q19n2], InfoMulti

Unobserved, endogenous variables:
Information_Commitment, Perceived_Effectiveness

Unobserved, exogenous variables:
Organizational_Commitment, e1, e2, Collaboration, e4, e10, e9, e5, e6, e7, e12, e3, e11, e8

**Variable counts (Group number 1)**

Number of variables in your model: 26
Number of observed variables: 10
Number of unobserved variables: 16
Number of exogenous variables: 14
Number of endogenous variables: 12

**Estimates (Group number 1 - Default model): Maximum Likelihood Estimates**

**Regression Weights: (Group number 1 - Default model)**

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**Standardized Regression Weights: (Group number 1 - Default model)**

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Variances: (Group number 1 - Default model)

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**Squared Multiple Correlations: (Group number 1 - Default model)**

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Number of observed variables: 10
Number of unobserved variables: 16
Number of exogenous variables: 14
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Number of distinct parameters to be estimated: 35
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**AIC**

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**HOELTER**

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Minimization: .102
Miscellaneous: .933
Bootstrap: .000
Total: 1.035
Appendix H: SAMPLE EARLY WARNING PRODUCTS BRIEFING

Early Warning Products and Briefings covering Somalia in the 11 months leading up to the June 20, 2011 famine declaration  
Note: products in addition to regular monthly reports

FEWS did 25 briefings which addressed the developing crisis in the eastern Horn, were given to donors, UN agencies, and other partners by FEWS NET and FSNAU between August 2010 and the July 20th 2011, famine declaration.

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<tr>
<th>#</th>
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<tr>
<td>1</td>
<td>EXECUTIVE BRIEF: La Niña and Food Security in East Africa</td>
<td>August 17, 2010</td>
<td>FEWS NET</td>
<td>A La Niña event has been declared … La Niña events are associated with drier-than-normal conditions during the October-December rainy season in the eastern sector of East Africa, … La Niña events can also result in poor March-May rains in the eastern sector of the region. The main areas of concern are those that depend on the short rains for crop and pasture production, including Somalia, the northeast pastoral and southeastern marginal agricultural areas of Kenya, the Somali region of Ethiopia, and northeastern Tanzania.</td>
</tr>
<tr>
<td>2</td>
<td>PRESS RELEASE: Somalia Humanitarian Crisis Eases but 2 million Somalia Still Need Aid</td>
<td>August 23, 2010</td>
<td>FSNAU</td>
<td>But the report, by the Nairobi-based Food Security and Nutrition Analysis Unit (FSNAU) of the UN’s Food and Agricultural Organization (FAO) with FEWS NET, warned that though Somalia received above average rains, boosting food production and livestock farming, these gains could easily be reversed. This is particularly relevant as the outlook for the next rainy season is poor.</td>
</tr>
<tr>
<td>3</td>
<td>SOMALIA Food Security Alert: Humanitarian crisis in Somalia persists, despite good rains</td>
<td>August 23, 2010</td>
<td>FEWS NET</td>
<td>Looking ahead, IRI, ECMWF, and ICPAC seasonal forecasts all indicate an increased probability of below normal 2010 deyr rains (October-December) due to a developing La Niña. For vulnerable pastoralists, poor rains would adversely affect rangeland conditions, with implications for animal body conditions and reproduction. In southern and central agropastoral areas, poor rains would deplete deyr crop production which provides roughly 30 percent of annual food needs in these areas. Thus, if a poor deyr season occurs, it is likely to push more pastoral and agropastoral households into high and extreme levels of food insecurity in central and southern areas,</td>
</tr>
<tr>
<td>4</td>
<td>EXECUTIVE BRIEF: La Niña and Food Security in East Africa - UPDATE</td>
<td>September 28, 2010</td>
<td>FEWS NET</td>
<td>The September 2010 Greater Horn of Africa Climate Outlook Forum (GHACOF) confirmed the presence of a moderate to strong La Niña event … The event is expected to continue at least into early 2011, with significant food security implications through the year….La Niña events are associated with drier-than-normal conditions during the October-December rainy season … Failure of the March to May 2011 rains would have major implications on agricultural and pastoral production throughout the eastern sector of the region.</td>
</tr>
<tr>
<td>5</td>
<td>EAST AFRICA Food Security Alert: Pre-emptive livelihood support could mitigate likely La Niña impacts in the eastern Horn</td>
<td>November 2, 2010</td>
<td>FEWS NET</td>
<td>… rainfall during the October-December period is likely to be below-average in the eastern sector of East Africa (Figure 1). …This poor performance is expected to result in a worse than usual January-March lean season, offsetting the modest recovery in household food security which occurred during 2009/10, following three years of drought. March-May 2011 rains, the major rains for this region, may also be below-average. Four areas of particular concern: agropastoral areas of southern and central Somalia (Area A), southeast marginal cropping areas of Kenya (Area Bù), and pastoral areas of Somalia, northeastern Kenya, and southeastern Ethiopia. In these at-risk areas, household receipt of livelihood support over the coming months could help to prevent deterioration in food security.</td>
</tr>
<tr>
<td>6</td>
<td>PRESS RELEASE: Early impact of poor rains seen in Somalia</td>
<td>November 26, 2010</td>
<td>FSNAU</td>
<td>“We are very concerned that the initial early warning for below normal short rains we gave in August, has now transpired, which will have a negative impact on the gains earlier this year, following the above normal long rains” said Grainne Moloney, FSNAU’s Chief Technical Advisor.</td>
</tr>
<tr>
<td>7</td>
<td>PRESS RELEASE: Somalia faces severe water crisis as drought looms</td>
<td>January 28, 2011</td>
<td>FSNAU</td>
<td>Seasonal analysis by the Food Security and Nutrition Analysis unit (FSNAU), managed by the Food and Agriculture Organization (FAO) in Somalia, in collaboration with FEWS NET, indicates that the failure of short rain season dwindled water sources for both human and livestock in most areas, leading to crop failure and subsequent increase in prices of water and local cereals.</td>
</tr>
<tr>
<td>8</td>
<td>SPECIAL EAST AFRICA Food Security Update: Extreme food insecurity in the eastern Horn of Africa likely to follow failure</td>
<td>January 31, 2011</td>
<td>FEWS NET</td>
<td>The forecasted below normal March-May rains will likely lead to significantly lower than normal crop production in southeastern Kenya and southwestern Somalia. Thus household food security will most likely continue to decline after April due to low labor opportunities and reduced production of the minor short season crops. Poor rains would also affect recovery in pastoral areas. If rains are significantly below normal, a major crisis, similar in severity to 2005/06, but covering a larger area would be likely.</td>
</tr>
<tr>
<td></td>
<td>EAST AFRICA Food Security Alert: Ongoing drought and uncertainty forecast raise food security concerns</td>
<td>February 23, 2011</td>
<td>FEWS NET, FSNAU, WFP, KFFSG, FAO</td>
<td>Substantial assistance programs should be implemented to address current and expected food insecurity. In addition, large-scale contingency planning should begin immediately given that a failure of the March-May rains would result in a major crisis.</td>
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</tr>
<tr>
<td>10</td>
<td>EAST AFRICA Food Security Alert: Below-average March to May rains forecast in the Eastern Horn - current crisis likely to worsen</td>
<td>March 15, 2011</td>
<td>FEWS NET, FSNAU, WFP, KFFSG, FAO, FSNWG</td>
<td>Based on the findings of a multi-agency scenario building process, the likely poor performance of March-May rainfall is expected to result in further deterioration in food security. In marginal cropping areas of Juba and Hiran (southern Somalia), where humanitarian access is constrained, and the median GAM prevalence had already exceeded 25 percent as of December 2010, localized famine conditions, including significantly increased child mortality, are possible if the worst case scenario assumptions are realized.</td>
</tr>
<tr>
<td>11</td>
<td>SOMALIA Food Security Alert: Extreme food insecurity likely due to drought and lack of humanitarian response</td>
<td>March 21, 2011</td>
<td>FEWS NET, FSNAU</td>
<td>In the worst-case scenario, Gu rainfall will be significantly below average, resulting in very poor crop production (&lt;50 percent of average), sustained high prices, and very limited pasture/water replenishment in key grazing areas. Large-scale crisis migration and localized famine conditions, including significant increases in human mortality, are possible…</td>
</tr>
<tr>
<td>12</td>
<td>EAST AFRICA Food Security Alert: Poor performance of April rains brings major food security concerns in the Eastern Horn</td>
<td>May 6, 2011</td>
<td>FEWS NET</td>
<td>In Somalia, food insecurity conditions remain at Crisis and Emergency levels, despite the rains during the last week in April. Activation of response plans is advised to deal with the current and anticipated very high levels of food and non-food assistance needs.</td>
</tr>
<tr>
<td>13</td>
<td>EAST AFRICA Food Security Alert: Food security emergency continues in the eastern Horn - humanitarian response inadequate</td>
<td>June 7, 2011</td>
<td>FEWS NET, FSNAU, WFP, KFFSG, FAO, FSNWG, Save the Children</td>
<td>The eastern Horn of Africa has experienced two consecutive seasons of significantly below-average rainfall, resulting in one of the driest years since 1995. Crops have failed, substantial livestock mortality has occurred, and local cereal prices are very high. More than seven million people in the sub-region need humanitarian assistance, and emergency levels of acute malnutrition are widespread. This is the most severe food security emergency in the world today, and the current humanitarian response is inadequate to prevent further deterioration.</td>
</tr>
<tr>
<td>14</td>
<td>EAST AFRICA SPECIAL REPORT: Past year one of the driest on record in the eastern Horn</td>
<td>June 14, 2011</td>
<td>FEWS NET</td>
<td>This analysis indicates that rainfall was below-average in all analysis areas with 2010/11 being the driest or second driest year since 1950/51 in 11 of the 15 analyzed pastoral zones. Though May 2011 rains have resulted in some improvement to pasture and water availability, these gains are likely to be short-lived.</td>
</tr>
<tr>
<td>15</td>
<td>PRESS RELEASE: Somalia: Food prices swell, crisis expected to deepen</td>
<td>June 20, 2011</td>
<td>FSNAU</td>
<td>The last season failed due to the drought and the next is likely to reach about half of normal, again due to poor rains. This has led to a very low supply of local cereals on the market, pushing the prices out of the reach of many. Coupled with that, the poor rainfall also resulted in a significant number of livestock deaths and reduced value of livestock for the pastoralists, as they have lost body condition.</td>
</tr>
<tr>
<td>16</td>
<td>SOMALIA Food Security Alert: Extremely high cereal prices across southern Somalia exacerbate ongoing emergency</td>
<td>June 27, 2011</td>
<td>FEWS NET, FSNAU</td>
<td>The prices of locally produced cereals have been rising in southern Somalia since October 2010, and increased sharply in May 2011, reaching record highs … Levels of acute malnutrition and child mortality are above Crisis thresholds and immediate emergency response is needed to save lives. …. Food insecurity is expected to remain at Crisis and Emergency levels though September, with localized famine conditions possible in the worst affected areas.</td>
</tr>
<tr>
<td>17</td>
<td>PRESS RELEASE: Famine in Somalia</td>
<td>July 20, 2011</td>
<td>FEWS NET, FSNAU</td>
<td>Evidence of severely reduced food access, acute malnutrition, and crude mortality indicates that a famine is currently ongoing in two areas of southern Somalia: the Bakool agropastoral livelihood zones and all areas of Lower Shabelle. A humanitarian emergency currently exists across all other regions of the south, and current humanitarian response is inadequate to meet emergency needs. As a result, famine is expected to spread across all regions of the south in the coming 1-2 months.</td>
</tr>
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Appendix I: SAMPLE OF FEWS NET AFRICA DATA PORTALS PRODUCTS DOCUMENT
FEWS NET’s Monthly Food Security updates – Sample March 2013 (2 pages)

KENYA Food Security Outlook Update
March 2013

KEY MESSAGES

- The food insecure population declined to 1.1 million in February 2013 from 2.1 million in August 2012 according to the Kenya Food Security Steering Group (KFSSG) 2013 short rains assessment. This was attributed to near average short rains crop production and improved grazing conditions compared to the 2012 August to September lean season.

- However, abnormally high February temperatures have accelerated the deterioration of grazing conditions and led to a decline in milk production in pastoral livelihood zones. Accelerated deterioration of grazing conditions is likely to result in deterioration of the food security through April.

- Household food stocks from the February to March harvest are likely to last through June in the southeastern and coastal livelihood zones. However, poor storage facilities and immediate cash needs may drive early selling and result in earlier than normal depletion of short rains food stocks and therefore, constraining household food access by May.

CURRENT SITUATION

- The short rains harvest has almost been concluded in most parts of the southeastern and coastal marginal agricultural livelihood zones. The harvest was more than 50 percent above average in the northern parts of the southeastern marginal mixed farming livelihood zone including Meru North District, but it was below average in the rest of the southeastern and coastal livelihood zones. Nevertheless, the harvest seasonally improved food availability and access, and it induced a seasonal decline in market dependency in February compared to January. Concurrently, the seasonal increase in maize supply on markets from February to March harvest has continued to place downward pressure on maize prices. Overall, the short rains harvest had near average production.

- In much of the Southeast and the Coast, February grazing conditions were good, but they have deteriorated since late January due to the ongoing dry season, but livestock body conditions have remained fair and stable. February cattle and goats prices remained above their five-year averages, but increases were notable in Mwingi District due to conflicts between pastoralists and agropastoralists, which led to decline in livestock supply in markets. With the exception of Lamu District where the proportion of children ‘at risk’ of malnutrition—those with mid-upper arm circumference (MUAC) less than 135 millimeters (mm)—was above the five-year average, the proportion of children under five years of age ‘at risk’ of malnutrition remained below their respective five-year averages from January to February.

- In February, households consumed food from their own food stocks or from market purchases funded by casual labor from harvesting of short rains crops and early land preparation for the March to May long rains season. These sources

FEWS NET KENYA
kenya@fews.net
www.fews.net/Kenya

FEWS NET is a USAID-funded activity. The content of this report does not necessarily reflect the view of the United States Agency for International Development or the United States Government.
of food and income made it possible for households to meet their minimum food requirements. As a result, the food security situation is Stressed (IPC Phase 2) in the southeastern and coastal marginal agricultural livelihood zones. However, the risk of deterioration is high in the marginal lowlands where performance of the short rains was below normal including parts Kitui, Kwale, Makuenei, Mwingi, and Taita Taveta Districts.

- In much of the pastoral livelihood zones, including northeastern pastoral, northwestern pastoral, and northern pastoral livelihood zones, the February food security situation improved marginally compared to January with the exception of Ijara District where grazing distances were considerably above average, and the quality of pasture and browse was poor. This improvement in food security was driven by the availability of pasture, browse, and water. However, due to the dry season across the pastoral livelihood zones, grazing conditions have started deteriorating. Deterioration of grazing conditions has triggered normal seasonal livestock migration in parts of Ijara, Turkana, Mandera, Tana River, and West Pokot Districts.

- February cattle and goat prices increased compared to January and remained above their five-year average prices, driven by fair body conditions and increased demand for livestock, meat, and milk. However, milk production marginally declined in February compared to January in Garissa, Mandera, Turkana, Lamu, and Tana River Districts resulting to marginal increase in prices making it more difficult to access milk. Despite the constrained milk access, the proportion of children under five years of age ‘at risk’ of malnutrition remained below their five-year averages between January and February in much of the pastoral livelihood zones due to the ongoing interventions and improvements in livestock to cereals terms of trade, driven by increases in livestock prices while maize prices remained relatively stable between January and February. Exceptions are found in parts of Turkana District including Loima, Kainuk, Kakuma, Katisi, and Kerio Divisions where the proportion of children ‘at risk’ remained considerably above their five-year averages. In the pastoral livelihood zones, food security outcomes are Stressed (IPC Phase 2).

UPDATED ASSUMPTIONS

Most assumptions from the Kenya Food Security Outlook for January to June 2013 remain unchanged, and none of the assumptions were modified in the February Food Security Outlook Update. However, changes in the political environment necessitate updating the following assumption:

- In January, it was assumed that intensifying political activities would disrupt markets, livelihoods, and school activities. Luckily, disruptions of these normal activities by political activities and any associated violence have been minimal.

PROJECTED OUTLOOK THROUGH JUNE 2013

Available food stocks may last through June, but sales due to lack of proper storage facilities and immediate cash needs may result in earlier than normal depletion of stocks, leading to an earlier start of market dependency by May, a time when maize prices will be increasing. In addition, due to unusually high temperatures in marginal mixed farming livelihood zones, grazing conditions are deteriorating faster than usual, resulting in reduced milk availability and consumption. The March to May long rains, although not the primary season in southeastern and coastal marginal agricultural livelihood zones, will be average to below average in terms of volume, but they are likely to result in some recovery of grazing conditions and seasonal increase in casual labor which will likely keep up with the possible increase in maize prices from April to June. Food security is expected to remain Stressed (IPC Phase 2) in these areas through June.

Available pasture, browse, and water are likely to last through April in the pastoral livelihood zones. These conditions will likely sustain livestock production and keep livestock prices near their current above-average levels. Through March, grazing conditions are likely to seasonally deteriorate faster than normal in the northeastern pastoral livelihood zone due to the ongoing, warmer-than-usual dry season. Reduced pasture availability is already reducing milk production, and milk production will decrease while malnutrition is likely to increase between now and June. Food security will however, remain Stressed (IPC Phase 2) but with a high risk of deterioration by June if the March to May long rains are below average or poorly distributed.
BIOGRAPHICAL SKETCH

Lucy Wanjiku Gichaga attended Egerton University and graduated with a Bachelors of Education degree. She went on to earn her Masters in Communication at Daystar University where she wrote her thesis on the notion of ethnocentrism and the efficacy of small group communication networks, exposed to certain strategic information, influences and changes to dysfunction ethnocentric attitudes among undergraduate student populations. Her Ph.D. dissertation work at Regent University has included researching how information and technology networks impact livelihoods and the business of relief and harnessing food-security in the information age against the backdrop of significant climate change in Sub-Saharan Africa, specifically Kenya. Upon graduation, Wanjiku hopes to begin her career as a professor in Communications where she will be able to combine her love of teaching, development, information systems networks, organizational and public relations, multi-level network analysis, climate change communication and research to help build knowledge and scholarship to bring/support food security for all in our generation.

Wanjiku was born in Nyeri Kenya, part of the bread basket of Kenyan Highlands. By living in different places, she has noticed that people’s perspectives and their networks have an impact on their views about food entitlement and in turn effect a huge impact on many other activities in the community, including the need to safe-guard the access to provisions. Early warning famine information systems have utilized existing community networks to try to safeguard the food provision. She studied two organizations’ deliberate or spontaneous utilization of the networks so as to increase its effectiveness. She has studied USAID’s Famine Early Warning Systems Network (FEWS NET) work with a core of five implementing partner organizations and co-operative country networks, such as the Kenya Food Security Steering Group (KFSSG), to help build a foundation around understanding early famine warning information systems network and its essential but often elusive linkage to early action. Therefore this research examines FEWS NET’s role towards building solid food security in Sub-Saharan Africa despite the existing local planning and climate change challenges.

Thank you. Sincerely, Wanjiku L. Gichaga, 2014