Investigating Cultures of Food Security: Traditional Ecological Knowledge and Gender in Rural Kongwa, Tanzania

by

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Abstract

This thesis examines two cultural components of food security in rural Tanzania, specifically gendered mobilities and Traditional Ecological Knowledge (TEK) in the District of Kongwa. Drawing on critical and focused ethnographic principles, intra-household data was collected from 27 households in two communities using participant observation, cognitive maps, and multiple rounds of semi-structured intra-household interviews (61 interviews in total). Gendered mobility is analyzed using Cresswell and Uteng's (2008) trifold framework (movement, meaning and potential mobility), which provides the opportunity to study physical and socio-cultural components of movement. Results demonstrate that women in Kongwa have different access to mobility than their male counterparts ultimately limiting their comparative access to food during the hunger season. Men have the ability and expectation to: A) leisurely move around the communities to visit other households to share in their meals, and B) migrate to seasonally food secure regions of Tanzania in order to work or find food during the hunger season. In contrast, narratives of femininity, expected labour roles of women and child rearing activities generally limit the mobility of women to household activities. Moreover, women's relative immobility means that they have more difficulty accessing casual labour and long term food stores than men. However, women have access to short term emergency food stores during the hunger season, which men cannot access. In the second half of the thesis, Berkes' (2008) three layers of knowledge (knowledge, practice, belief) are used to analyze Traditional Ecological Knowledge on food security that exists in Kongwa. Efforts were made to collect conscious knowledge as well as tacit knowledge embedded in practices, social institutions and collective attitudes using participant observation and interviews. Findings indicate that a knowledge paradox exists within Kongwa whereby local peasants possess TEK seen through agricultural practices and coping strategies for hunger and drought, but this knowledge is locally devalued resulting

in a lack of collective efficacy for development. Additionally, outsiders with development interests (government, NGOs, etc.) do not challenge the self-perception of inefficacy in Kongwa, thus exacerbating the local desire for different knowledge for development and enhanced dependence on outsider knowledge. These findings about Traditional Ecological Knowledge combined with those on gendered mobility in Kongwa demonstrate the importance and complexity of addressing cultural components of food security research and development.

Preface

This thesis is an original work by Ryan Mason. The research project, of which this thesis is a part, received research ethics approval from the University of Alberta Research Ethics Board, Project Name "Dairy Goat and Root Crop Production in Tanzania", No. MS3 Pro00025606 (Amendment No. Pro00025606 AME3), June 7th, 2013.

To my Dad

for inspiring intrigue,

the love of learning

and a passion for agriculture.

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Chapter 1: Culture, Hunger, and Food Insecurity

The global population is expected to reach 9.6 billion people by 2050, adding over two billion more people to feed on a the same or potentially less arable land due to climatic change (FAO 2014). Additionally, climate volatility, food price spikes and recent global recessions have added renewed urgency to find solutions to global food insecurity. Africa is increasingly becoming the focus of this urgency as a result of its low crop yields (in comparison with global averages), vulnerability to climate change (Boko et al. 2007), and political revolutions such as the Arab Spring associated, in part, with food instability. To address these challenges researchers and development organizations have mobilized around issues of food security. In general, food security includes three pillars: nutritional adequacy, food availability, and economic access to food (Boko et al. 2007). Olumakaiye and Ajayi (2006) further describe these categories as:

1. "nutritionally adequate and safe food supply at household level,
2. reasonable degree of stability in the supply of food during the year and in all years, and
3. access by each household to sufficient food to meet the needs of all (p.52)."

Beyond these three pillars of food security research, other ways to conceptualize food security have emerged. Definitional differences occur when food security is split based on global, regional and local (household) perspectives. Globally, food security is focused on trade, food production, macro-economics, and multilateral reactions to agricultural threats like climate change (Boko et al. 2007; Tansey and Rajotte 2008). Regionally, food security focuses on research and development, technological innovation, food availability, and rural-urban intersectionality (Tansey and Rajotte 2008). Food security research at the household level is very diverse ranging from access to resources (Boon, Ogato, and Subramani 2009) to child nutrition (Bezner Kerr, Berti, and Shumba 2011). Additionally, researchers also study cultural components of food security including gender impacts on agricultural production (Oyekale 2013) and inter/intra household power distribution. However, these cultural components of food security have largely been overshadowed by the tri fold framework on food security (access, availability and nutritional adequacy).

Accessing food is usually concentrated on household finances, global supply or regional availability rather than cultural constraints to accessing or producing food. In the race to produce more food for Africa and the world, green revolution philosophies have been pushing cultural desires and

local knowledge around nutrition and food production to the periphery (Kerr 2012; Negin et al. 2009). Similarly, the dominant food security paradigm of neoliberalizing global food systems (as seen in the 1994 WTO Uruguay Round Negotiations and articles such as Chikhuri 2013; Swaminathan 2007) has at times caused or exacerbated problems around indigenous rights (Turner et al. 2013), gender (Foster 2011), the environment (Lo and Chen 2011), health (Kerr 2012), and food sovereignty. As a result there is increasing attention of academics and citizens to food sovereignty, resulting in advocacy for indigenous people, local control over food, and household level focused research and development (McMichael 2009; Tansey and Rajotte 2008). Through the study of food sovereignty, local food systems, food justice and inequalities, as well as inter/intra household food security dilemmas, researchers are beginning to call for greater awareness of culture with food security research (Ibnouf 2011; Powell et al. 2014).

The importance of culture, whether it is gender, ritual, knowledge, preferences, or societal institutions is illustrated through numerous disciplines. Culturally rooted studies on food in Africa have illustrated significant local knowledge around nutrition (Bezner Kerr et al. 2011), limitations to accessing food (Gawaya 2008), intergenerational sustainable agricultural systems (Elwert and Sehoueto 1999) and adaptation to climatic or other food production challenges (Oyekale 2013). As a result of the interconnections of culture to increasing food security, researchers are beginning to call for a new definition of food security. One such definition comes from Ibnouf (2011) that calls for food security to reflect "the ability of food providers to secure adequate food at all times to meet the dietary requirements and cultural preferences of their household members" (p.216). Responding to this call for more culturally sensitive research on food security, this study broadly looks at the intersections between culture and food security in rural Kongwa, Tanzania.

1.1 Study Purpose

While there are numerous intersections of culture and food this study focuses on two specific foci: gender (Chapter 2) and Traditional Ecological Knowledge (TEK, Chapter 3). Gender studies on food security has previously looked at division of labour (Doss 2011; Moser 1989), access to resources (Boon et al. 2009; Boserup 1970), adaptation to climate change (Oyekale 2013), and social security policy (Gawaya 2008; Patel and Hochfeld 2011) amongst other research topics. Most of these studies focus on household data, which may be missing important nuances, inequalities and behaviors that exist within a single household. As a result, Quisumbing (2013) argues for more intra-household research on gender

relations in order to better understand gendered differences in access to and control of food, resources and decision-making. This is especially important as "resources controlled by women are more likely to be used to improve household food consumption and welfare, reduce child malnutrition, and increase the overall well-being of the family" in comparison to men (The World Bank et al. 2009:185). Additionally, experiences of hunger and food insecurity, while having a communal component, are generally individualized. In other words, when food insecurity exists in a household, factors such as gender, age, privilege, status, and responsibility affect the distribution of food and individual coping mechanisms. Understanding that gender, both between and within households, influences experiences of hunger this study sets out to investigate: How does gender affect experiences of hunger and food insecurity at the local level in Rural Tanzania? However, during the initial field research stages, it became increasingly clear that the answer to this question would be largely based on how gender shapes mobility. Therefore, Chapter 2 addresses how gendered mobility shapes individual experiences with food insecurity in rural Tanzania.

The second intersection of culture and food within this study looks at the Traditional Ecological Knowledge within Kongwa, Tanzania. Around the world, knowledge situated in place and culture exists that informs how food is eaten, prepared, produced and distributed. Food security definitions regularly include food security as based on specific indicators such as access, availability, or nutritional adequacy. While these indicators play into many scenarios of food security, this study challenges the universality of food security definitions seeking a local understanding of food security. One such area found to contest broad notions of food security is through the study of culture. If culture is dynamic and contains generational experiences about consuming and producing food, then food security must be influenced by knowledge situated in place, tradition, ritual, norms, practices, social institutions, resource management and belief systems. Many researchers argue that knowledge (food security or otherwise) is shaped by social interactions and often constructed by generations of experience (LaRochelle and Berkes 2003; Parlee and Berkes 2006). However, most published research on food security knowledge does not include these sources of knowledge and instead focus on western scientific thinking. Therefore, Chapter 3 of this study seeks to identify local understandings of food security through an investigation of Traditional Ecological Knowledge in Kongwa.

1.2 The Researcher

Researcher bias occurs no matter the method, methodology, discipline or study. Bias is shaped by the knowledge gained from a researcher's experience, culture, education, disciplinary background and inexperience. Qualitative research is especially scrutinized for bias because of its heavy reliance on interpreting perceptions and the fluidity that sometimes comes along with its iterative demeanor. Constas (1992) states that "questions concerning the credibility and status of qualitative inquiry are related to the privatization of qualitative analysis" (p. 253) and argues that all aspects of qualitative research should be made public for the reader to inspect including the inherent biases of the researcher. Therefore, below are some important points describing my own worldview, experiences and biases.

My past is deeply intertwined with agriculture. Born and raised on an industrial chicken farm, I have been exposed to rural North American cultures of growing food and the consolidation of agriculture. My family is not from the era of homesteading pioneers, but part of a new wave of agriculture focused on commodity farming. Experience on the farm taught me how to use machinery to interact with land, animals and food systems. Technological innovation in agriculture was the norm. Since my entrance into university nine years ago, I have been exposed to numerous alternative methods of agriculture production around the world (Cuba, Mexico, and Canada) that I currently gravitate towards. Many of these alternatives are still technology driven, but put more value on the natural and social systems that were created over millennia. Seeing these 'new', yet periphery, examples of agricultural systems producing quality food in a semi-sustainable manner has inspired me to focus my research passion on food security. More specifically, I want to bring voice to marginal agriculture and knowledge around it in order to make visible what is now hidden in our food system; this includes subsistent peasant agriculture in rural Tanzania.

My sociological background is influenced by many streams of thought. First is that of critical development theory that sees the world as embedded in covert and often pre-informed power relationships that shape our behaviors and society. Some of these theories are seen in publications of Rist (2008), Swidler and Watkins (2009), Guijt and Kaul Shah (1998), Cooke and Kothari (2001), and Hickey and Mohan (2004). While society is often veiled in power dynamics associated with pre-determined mentalities shaped by social structures, I believe that there is still existence of personal agency. Another important literary influence is the works of social justice and the emancipatory works of Freire (1970) and Falsborda (1991) that argue that the emancipation of the poor and marginal will

come from self-reflective learning and the grassroots creation and control of knowledge. However, in an attempt to better reflect on the power constructs embedded in knowledge, I approach research and the 'truths', perceptions, and attitudes expounded by research participants cautiously. This will be explained further in the methodology section of this chapter. The third area of sociology that shaped this project's creation is western gender studies and the layers of feminist thought often associated with this discipline. As a white affluent North American male I have felt most comfortable in actively pursuing a feminist agenda of 'undoing gender' as written about by Deutsch (2007). While this idea of gendered activity followed me into rural Tanzania, so did many African feminist ideas such as Nego-feminism (Nnaemeka 2004). Nego-feminism is an African feminism that believes in negotiated gender equity that includes ideals of compromise, cooperation, and balance rather than challenge, deconstruction or contestation. Therefore, while I entered this research with biases about development, gender and knowledge construction I intentionally challenged myself to read and think about these fields from different perspectives including those developed within Africa.

1.3 Crop and Goat Project (CGP) Tanzania

The research conducted for this thesis is supported by the Crop and Goat Project (CGP) Tanzania, which is jointly funded by the Canadian International development Research Centre (IDRC) and the Canadian Department of Foreign Affairs, Trade and Development. The CGP implemented a development intervention from 2011-2014 and conducted research on its impact as well as intersecting social, physical and livestock sciences. The development intervention consisted of creating a holistic and self-reproducing agricultural subsystem within project households. Through random selection, interested households were given two female goats as well as cassava and sweet potato cuttings to plant. Goats were housed above ground in elevated goat houses in order to reduce disease, provide easy access for milking and avoid overgrazing. The cassava and sweet potatoes were grown for personal consumption (roots) as well as goat fodder (vines and processed cassava leaves). The goats and root crops provide nutritional (roots, milk and meat) and financial (sale of milk, meat and offspring) support to project families. One requirement of the project families was to give the first two kids that they received to another member of the community, chosen by the local crop and goat farmer group, thus creating more sustainable and distributed supports to the community. The CGP provided guidance and training to the project farmers through formal training workshops on animal husbandry, crop science, and gender training (i.e. labour roles associated with goats) as well as informal supports through cooperation with local agricultural extension agents. While this particular study did not directly focus on these project-

based development interventions, it is influenced by the CGP through the knowledge and experiences imparted to project farmers and the community as a whole, especially the knowledge about agriculture and gender behaviours. Additionally, my role as a researcher attached to the CGP created power dynamics and expectations within the villages that affected my research.

The CGP focused on two districts in Tanzania, specifically the Mvomero District of Morogoro and the Kongwa District of Dodoma. Within these districts two communities were selected to implement the development intervention; two additional villages with similar characteristics were chosen as control villages for baseline research, but were not part of the development intervention (ILRI 2013). In order to conduct more in-depth gender and food security research, this study focuses only on the Kongwa District (See Figures 1.1 and 1.2). The Kongwa District was chosen because its food security measures were worse than that of Mvomero including its food consumption score, individual and household dietary diversity score, and months of inadequate household food provisioning (ILRI 2013). While there are many factors affecting food security in these districts, the comparatively low food security indicators in Kongwa are attributed largely to its harsh semi-arid climate. The two communities (one project and one control) with the lowest food consumption scores within Kongwa were chosen for this study, Masinyeti and Mautya. The rationale for this was that a study focused on experiences of hunger should look at the communities with the highest identified levels of food insecurity.

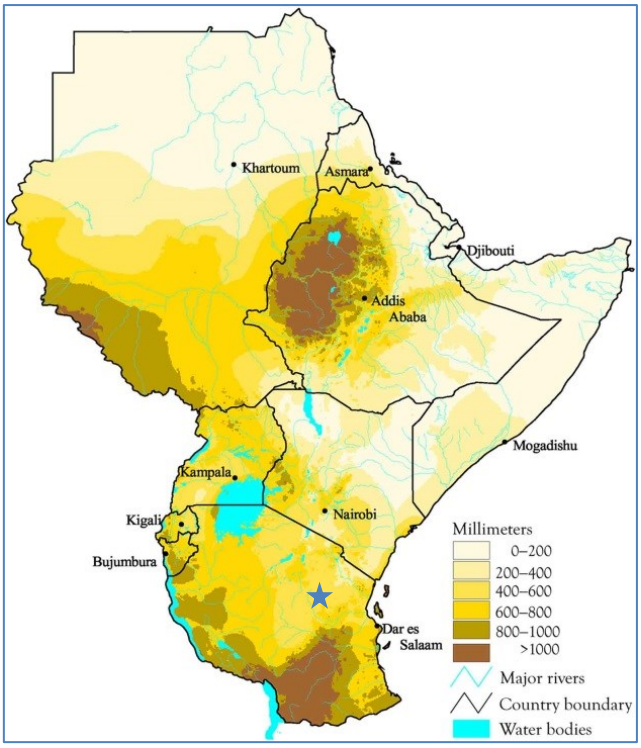

Figure 1.1: East African average yearly rainfall, Kongwa starred, Source: proteus.brown.edu/introtoegypt/6526#heading28

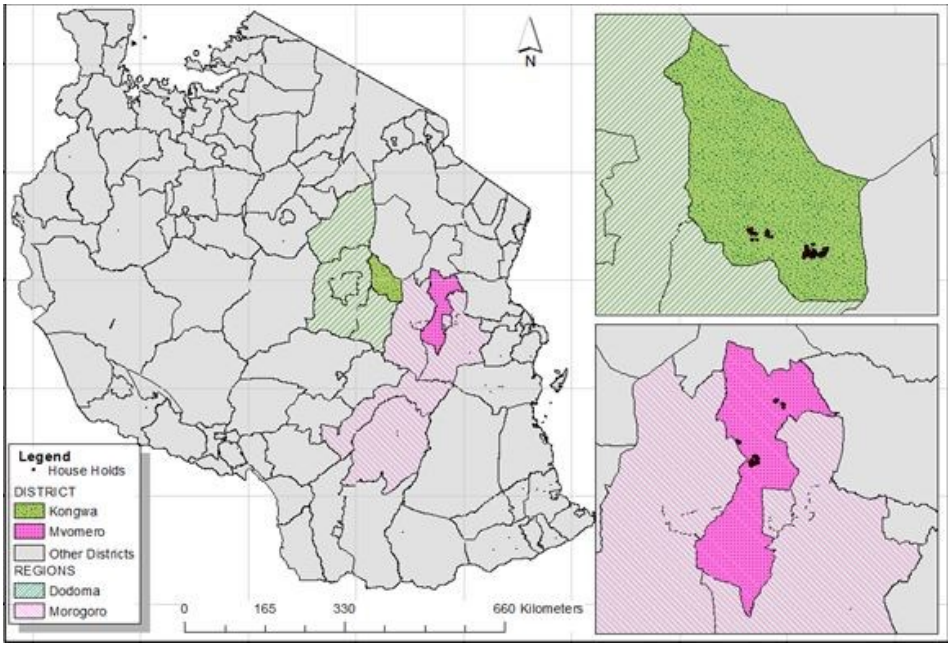

Figure 1.2: Tanzanian Political boundaries by district, Kongwa District is shaded in Green, Source: Crop and Dairy Goat Project

Research attached to the CGP identified important findings related to this study. Previous survey work conducted in the Kongwa District has demonstrated a high level of food insecurity. Out of 520 households surveyed in both the Kongwa District and Mvomero District, over 50% of the participants stated they had not eaten food for at least one day of the year. In both these districts, food consumption scores (FCS) were collected, but in Kongwa the FCS were on average 12 points lower than in Morogoro illustrating the relatively vulnerable nature of the region. The FCSs in Kongwa averaged just above the adequate level implying a large percentage of households were food insecure (ILRI 2013). Similarly, higher levels of stunting, wasting and underweight children under the age of five were found in Kongwa than Mvomero, with Masinyeti demonstrating the highest levels of malnutrition (Meena and Lyimo-Macha 2014). Factors, besides location, influencing malnutrition in this study are the education level of mothers, dietary habits of the family and the age of children. In another study, initial findings on gender empowerment demonstrates gender training has increased the role of women in household decision making as well as expanded women's role in small animal husbandry (Galiè 2013; 2014); the latter finding has potential negative implications due to its contribution to the triple burden of responsibility (World Bank, IFAD, and FAO 2009). These gender empowerment findings have implications on the findings in Chapter 2 relating to gendered division of labour and mobility. Finally, research on the impact of gendered headship and asset ownership in the both project districts demonstrates that women headed households without any males presence are the most likely to be

food insecure. Female headed households with males present have considerable higher food consumption scores (Mason et al. 2014). In addition, this same research demonstrates that female ownership of livestock increases household food security. All of these studies, more specifically the process by which they were conducted, intersect with the discussion of knowledges found in Chapter 3.

1.4 Methodology

Critical ethnographic and focused ethnographic principles provided inspiration for processes of data collection over a period of 3 months (July, August, September) in 2013. Critical ethnography focuses on uncovering difficult to reach realities, which are often associated with an injustice or cultural behavior (i.e. gender) (Cresswell 2013; Thomas 1993). The rationale for this methodology comes largely from Gubrium, Holstein, and Atkinson (2001) when they talk about culture's influence on memory.

> "Memory is a cultural phenomenon, and is therefore a collective one. What is "memorable" is a function of the cultural categories that shape what is thinkable and what is not, what is counted as appropriate, what is valued, what is noteworthy, and so on" (p. 810).

Since cultural values about gender, food, and behavior are known to shape answers based on perceptions, a mixed method approach to research that includes participant observation, cognitive mapping and semi-structured interviews is used. Critical ethnography is often employed in an attempt to uncover difficult to reach realities, which in the case of this study is gender. When asking questions of culture or gender, researchers often have difficulty going beyond superficial answers and cultural rhetoric and into deeper more reflexive representations of reality (Thomas 1993). Within this study, these problems are exacerbated by the focus on gendered household activities such as food preparation and eating. It is not uncommon for static answers from research participants based on A) what is expected (culturally) to be answered, and B) what is comfortable to answer.

To help with problems with interpretation and data gathering, several analytical approaches are employed throughout this study. Firstly, the principle reflexivity or reflective thought is used. Reflexivity helps the researcher to understand what they see as well as what may be inhibiting their interpretive gaze. Researchers recommend writing memos or field notes, pointing out "that getting ideas down when they occur is actually the beginning of analysis. Writing notes to one's self permits researchers to discover things in their heads that they did not know were there (Elbow, 1995; Huff, 1999; Woods, 1999)" (found in Watt, 2007). Within this study, field notes and memos (based off of Maxwell 2008) are used as a reflective exercise to account for and question the interpretation of field data.

Additionally, Ricoeur's (2008) understanding of conflicting hermeneutics is applied. Ricoeur suggests that we approach the world with two vantage points, the hermeneutic of affirmation and the hermeneutic of suspicion. As they imply the affirmation means to take texts, knowledge and life in good faith, while suspicion believes the world to be a farce, manipulated by greater systems at play (i.e. capitalism, power relationships etc.). While these hermeneutics may seem at odds with each other, the intention is to have multiple ways to consider truth and information. Coleman (2009) describes how Ricoeur sees these two hermeneutics intersecting. "Ricoeur's point is not to argue for the value of one of these approaches to the exclusion of the other; rather, he insists that they form a tension, an extreme polarity, which is "the truest expression of our 'modernity'" (p. 32). Approaching interviews, observations, stated perceptions, my own biases and the rest of the data with these two hermeneutic gazes helps provide important reflexivity.

Finally, multiple methods of data collection are utilized as a check to the researcher's bias and interpretive gaze. The mixed methods approach is not used as a triangulation technique, but rather focuses on the idea of Richardson's (2000) theory of crystallization. Methodologically, triangulation assumes:

> "that there is a "fixed point" or "object" that can be triangulated. But in postmodernistic mixed-genre texts, we do not triangulate; we crystallize. We recognize that there are far more than "three sides" from which to approach the world... [With the crystal metaphor] what we see depends upon our angle of repose...Paradoxically, we know more and doubt what we know. Ingeniously, we know there is always more to know". (p. 934)

Crystallization assumes that knowledge is relative to the interpretation or angle from which we, the researchers, arrive at the data. In order to account for the challenge of relativity, multiple methods of data collection are used, which do not necessarily triangulate truths, but force the researcher to interpret several sets of data, providing an extra safeguard to bias and increases the validity of the findings.

Due to time constraints a full ethnography could not be conducted and thus focused ethnographic principles were applied. Focused ethnography differentiates from a conventional ethnography through the use of short-term intensive field visits to collect large amounts of data on a specific aspect of society (Knoblauch 2005). In comparison, conventional ethnography is based on long term immersion that provides a holistic representation of the society being studied. Additionally, audio-visual equipment is often used in order to capture large amounts of data quickly that can later be analyzed. Table 1.1 (adapted from Knoblauch 2005) provides a more expansive comparison of these two

methods. Both forms of ethnography are generally understood as the study of people in their natural social situation (Brewer 2000). One deviation from the focused ethnographic methodology within this study is the intentional placement of the researcher as a 'participant as observer' (Angrosino 2008). Participant as observer is a step down from the complete participant seen in many ethnographies, but provides the ability to interact with farmers, food providers and families on a deeper more natural setting that provides intense observations of behaviours.

Table 1.1: Comparison of Conventional and focused ethnography

Conventional Ethnography	***Focused Ethnography***
Long term field visits	Short term field visits
Experientially intensive	Data/analysis intensity
Writing	Recording data
Open study	Focused study
Participant role	Field-observer role
Insider knowledge	Background knowledge
Subjective understanding	Conversational understanding
Notes	Notes and transcripts
Coding	Coding and sequential analysis

1.5 Methods

Methods for this study include conducting interviews, the development of cognitive maps, and participant observation. Using previous survey work in Kongwa, two communities were chosen based on their high levels of food insecurity. Within these communities 27 households (Masinyeti 15 and Mautya 12) were chosen to include in this study based on household food consumption scores, building off of the concept of theoretic sampling (Charmaz 2001, Mason 2007, and Platt 1988). Theoretic sampling accounts for two theories: 1) hunger is experienced differently by men and women, and 2) socio-economic differences affect levels of food security/consumption. Families will undoubtedly differ in routines, beliefs, amount and experiences with food. The qualitative interviews alone would likely capture this rich diversity in these demographics, but for speed of data collection, validity and accuracy

a stratified sample was planned to better allow for diverse food experiences. Therefore, the sample was stratified based on nutritional adequacy using a previously gathered Food Consumption Score (FCS) adapted from the World Food Program (2008). Households were categorized at one of four levels of consumption (poor, borderline, adequate and highly adequate food consumption) based off of the 2011 CGP baseline survey results. Households were also stratified based on internal FCS differences (women and men have different FCS) and by household composition (single male, single female, or couple). From these categories households were randomly selected to be part of this study (see Table 1.2 and 1.3).

Table 1.2 Mautya sample breakdown based on food consumption scores (FCS)

Sampling strategy (12 households)	**Dual parent household**		**Single male parent**	**Single female parent**
	Same FCS	Different FCS		
Poor FCS 1-21	(1) N: 2	(0) N: 0	(1)	(2)
Borderline FCS 22-35	(3) N: 8	(0) N: 0	N: 0	N: 2
Adequate FCS 36-49	(3) N: 6	(0) N: 0	(0)	(0)
Highly Adequate FCS 50 +	(1) N: 1	(1) N: 1	N: 0	N: 0

N is total pool of households found in the CGP baseline survey; bracketed numbers are households sampled for this study

Table 1.3 Masinyeti sample breakdown based on food consumption scores (FCS)

Sampling strategy (15 households)	**Dual parent household**		**Single male parent**	**Single female parent**
	Same FCS	Different FCS		
Poor FCS 1-21	(1) N: 2	(2) N: 4	(1)	(0)
Borderline FCS 22-35	(2) N: 23	(1) N: 5	N: 1	N: 12
Adequate FCS 36-49	(2) N: 27	(1) N: 1	(1)	(1)
Highly Adequate FCS 50 +	(3) N: 27	(0) N: 0	N: 2	N: 7

N is total pool of households found in the CGP baseline survey; bracketed numbers are households sampled for this study

An emergent body of scholars are calling for more intra-household data collection to better determine the extent of gender inequality, relationships and power dynamics (Quisumbing 2013). They argue that preferences, division of labour, perceptions, experiences and forms of access differ within the household unit. Therefore, to better understand the gendered experiences of hunger, access to food and knowledge around food security interviews and participation were conducted with men and women within the same household (see Table 1.4). Additionally, two phases of in-depth semi-structured interviews were conducted to increase rapport with the participants and gain greater insight into gendered aspects of food security. The first interview focused on questions about agricultural/household division of labour and gendered interactions. The second interview moved beyond descriptive questions to more abstract and analytical questions about individual experiences of

hunger. Questions ranged in focus including: household food scarcity, food preferences, coping strategies, food anxiety and the effect of food consumption levels on household members. In the second interview a cognitive mapping exercise was used to elicit more information on how the participant believes a 'hunger free household' could be envisioned. Cognitive mapping "is a mental devise and store which helps to simplify, code and order the endlessly complex world of human interaction with the environment" (Kitchin 1994:2). An assumption of using this technique is that the stored environmental and relational information of each individual will be used "to make spatial decisions which guide behaviour, and is, in effect responsible for geographical 'survival' knowledge" (Kitchin 1994:2). While cognitive mapping had the potential to gather more cultural information about food and agriculture, the activity was inconsistent due to literary levels. However, some cognitive maps and all conversations about hunger free households were useful in constructing narratives about gendered food roles and local food security knowledge.

Table 1.4 Intra-household interview breakdown

Interview type	HH Male and Female interviewed separately	HH Female interviewed only	HH Male interviewed only	Single parent interviewed (female)	Family interviewed together	Total Males interviewed	Total Females interviewed	Total Interviews
Interview 1	7	4	5	6	3	15	21	36
Interview 2	11	1	1	4	1	13	17	30
Total interviews	36	5	6	10	4	28	38	61
Total individuals	-	-	-	-	-	19	23	42

Participant observation was used in order to gather behavioral and contextual information about the research participants, their household and the community. Participant observation was used to view and experience ways of being, behaviors and interactions that participants discussed. In this way observations acted as confirmation or contrast to the answers given in the interview. Participant observation can be seen on a spectrum from minimum to maximum involvement. Angrosino (2008) has laid out four categories on this spectrum, the: complete observer; participant as observer; observer as participant; complete participation. As the researcher in this study, I collected data both through passive observation, as well as active participation. Using Angrosino's categories I fall under the category of observer as participant. This form of participant observation means that "the researcher is immersed in the community but is known to be conducting research and has permission to do so" (Angrosino 2008:6). Participant observation occurred across many family, food, agricultural and community activities; experiences included cooking, harvesting, travel, threshing, food processing, construction, funerals, rites of passage, political events, childcare and leisure activities. Field notes and

research memos were used to record observational data, which along with interview transcripts were analyzed and coded using Nvivo software based on inductive themes and themes found in the literature discussed in Chapters 2 and 3.

1.6 Limitations

This study had several methodological challenges to overcome, which ultimately shaped the field research, methods and analysis. The most overt and audacious challenge is that of language as I am not fluid in Swahili or the local languages of Kongwa. Ideally, research should be conducted in one's first language to provide most accurate representation of qualitative data. However, due to the nature of tribal societies this is very challenging. In Tanzania, while Swahili and English are official languages often known by citizens (especially Swahili), over 150 languages exist in Tanzania. Tribal languages are usually people's first language, making Swahili a second language. Within Kongwa, two related tribal languages existed: kigogo and kikagulu. Most people in Kongwa spoke basic Swahili, but this was not universal. Additionally, a significant number of adults interviewed were illiterate. The number of languages means research in regional first languages becomes an insurmountable task. As a result, my field work included the use of translators. Two translators were hired, one for each village. Both translators were fluent in English and Swahili, one translator knew some kikagulu and kigogo. Additionally, in conjunction with the translators, local guides were utilized at times. All three people were trained in the purpose of the study and ethical procedures for qualitative research. Debriefing on interviews and field work was conducted each day to aid in confirming hesitations about translation. Last of all, I underwent pre-departure Swahili tutoring.

Several other practical steps were taken to ensure representational accuracy of the data. Firstly, almost all interviews were recorded digitally for later clarification. Second, observations were used to check findings within interviews. While this is not proof of proper representation, these observations enabled me as the researcher to either confirm the accuracy of their words or go back to the participant with follow up questions to ensure greater accuracy of representation. In this way, multiple interviews and personal encounters with research participants provided additional legitimacy to the findings. Thirdly, the interview guides were translated and back translated by a second source to ensure accuracy. Finally, linguistic and cultural information was gathered throughout the field research to better interpret the meaning of the language used in interviews. Table 1.5 provides a brief example of some important translations and interpretations of local language.

One of the most important linguistic discoveries was around the language of food. When locals talked about food, they were discussing the amount of grain they had (Maize, sorghum, bush millet). While in western understandings of food would include vegetables, meats and other ingestible substances, the cultural understanding of food in the villages was about grain and specifically the amount of ugali that could be made from it. Therefore, hunger would begin with the absence of these foods rather than complete loss of all food stocks such as dehydrated vegetables or ground nuts. This is similar to other findings within Africa on discursive understandings of hunger. For instance for the Aluund tribe, the term 'hunger' (nzal) refers “less to a total shortage of food, than to the absence of certain specific foodstuffs which are highly valued in Luunda ritual and everyday life” (Boeck 1994:266).

Beyond language other limitations also existed such as time, access to female participants, access to attitudes and beliefs, and my role as an outsider. Three and a half months limits that possibilities for ethnographic data collection and therefore my understandings of local culture are still limited. However, the focused methodological approach and intensive participant observation allowed for significant data to be collected. As a male I was worried about accessing female participants, both to participate in their work and conduct interviews without male chaperones. Fortunately, my position as an outsider in conjunction with the trust placed in my local translators/guides proved useful in overcoming this. As a result only three women denied involvement (all single parents or widows) in the study; interviews were conducted without oversight (beyond the typical community curiosity) and participation in female agricultural and household labour roles occurred. Nevertheless, challenges existed in overcoming normative gendered answers as responses from women during interviews tended to be more normative when a male translator was used versus a female translator. Finally, it is important to note that this study does not collect ‘truths’, but rather the stated perspectives, attitudes and beliefs of participants. While this can be considered a limitation, the strength of the methods used in this study allows the researcher to ‘crystalize’ (see methodology section, this chapter) the data gathered and form a strong approximation of the perspectives and the lived experiences of Kongwa residents.

Table 1.5: Key translations and discursive differences between English and languages used in Kongwa

English	Swahili	Kigogo	Kikagulu	Significance
Hunger	Njaa	Nzala	Njara	Relatively direct translation across language, seen as normal
Hunger Season	Msimu wa njaa OR Kipinid cha njaa	-	Muda wa nzala	Seen as a normal, but subjective annual occurrence
Famine	Janga la Njaa	-	Mng'ahilo	Swahili refers to a hunger disaster, Mng'ahilo carries more weight and embodies experiences of stress, sickness and death
Men/husband/ father	Mwanamume/ mume/baba	Chilume/ mume/ baba	Goroko/mgosi/ Baba	All three terms are synonymous within masculine identities of the region.
Woman/wife/ mother	Mwanamke/ mke/mama	Wadala or Mdala/yaya or mdala wangu	Mbala/ mkangu/mai	All three terms are synonymous within feminine identities of the region. Also used often with possessive pronouns.
Traditions/ customs	Mila/desturi	-	-	Culture was an abstract concept, thus the use of these words
Role/ responsibilities	majukumu	Milimo ya wachilume/ wadala (work of wo/man)	Mbuli	Seen very similarly to work or task
Tasks/work	Kazi/shughuli (activities)	Kazi or mlimo (for ag)	Kazi or mlimu (for ag)	Fairly direct translation
Meal	Mlo/chakula (food)	Chakudya (food)	-	Food is considered grains specifically
Household	Nyumba yako/ familia yako	Kaya	-	Seen more as a home or family, could be multiple buildings and families
Decision (making)	Maamuzi (n) or kufanya (v)	Yakuwa lamula	-	Fairly direct translation
Challenges/ obstacle/ difficulties/ problems	Changamoto/ vikwazo/shida/ matatizo	Matatidho (problems)	-	Changamoto (challenges) is used mainly in academic circles, so the other words were used in its stead
Food shortages	Hakuna chakula cha kutosha	Hasina chakudya cha kutosha	Huchaka chakudia	Fairly direct translation
Normal	Kawida		Nikona	Translated as not surprised by, conditions are average, not strange or not stressed by. Often used to describe hunger
Food	Chakula	Chakudja au ugali	Chakudia	Food is considered grains specifically, but these terms could be used to describe food in general too
Help (verb)	Kusaidia	Kutaza	-	Fairly direct translation
-	Kuzurura/tembea-tembea	-	-	These expressions don't exist in English. A combination of roaming around, visiting, having fun, wandering leisurely. Kuzurura has a negative connotation
Lazy person	Mvivo	Mvivu/mdoba	-	These people don't want to do work, are not good at work, or are slow at work

1.7 Organization of Thesis

The structure of this thesis is organized around two significant themes. Chapter 2 discusses the effects of gendered mobility on food security, specifically addressing how the movement of people influences individuals' access to food in Kongwa. Within this chapter, gendered food security and gendered mobility are reviewed in order to draw conclusions about their intersectionality. This paper also describes important contextual/geographical issues related to mobility in the Kongwa District, the Dodoma Region and Tanzania. More detailed methods are described related to data around gendered mobility. Findings are then delineated based on Cresswell and Uteng's (2008) conceptual framework of movement (how people move), meaning (why people move/cultural narratives around movement) and potential mobility (access to movement). Ultimately, this chapter illustrates that women have limited potential mobility creating unequal access to food locally and through migratory work.

Chapter 3 focuses on the Traditional Ecological Knowledge that exists in Kongwa and the perceptions of this knowledge locally and externally. The first section details the definitions of Traditional Ecological Knowledge, which also describes Berkes' (2008) three layers of knowledge (knowledge, practice, belief) that are used to analyze the data. Afterwards, examples of TEK within food security are illustrated in order to provide literary examples that shaped this area of the study. Building off of Chapter 2, a brief but critical look at colonial, post-colonial, and development history in the Dodoma are brought into the dialogue about perceptions of TEK in the region. Finally, findings are split into two sections: a) Self perceptions of inefficacy within food security development and the lack of challenges to this self-perception from outsiders, and B) demonstrations of TEK within Kongwa. These two findings taken together illustrate a disjuncture between Berkes' (2008) layers of knowledge.

Finally, Chapter 4 discusses the topics of Chapters 2 and 3 under the auspice of culture, pointing out how cultural constructions like self-perceptions, attitudes and gender impact food security and development. Within this chapter, suggestions are given to further research on the intersections of culture and food security.

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Chapter 2: Tembea-Tembea, Migration and Movement: Gendered mobility effects on hunger in rural Tanzania

2.1 Introduction

Human movement is impacted by numerous socio-cultural, physical, technological, and financial barriers. It is these barriers that help shape how people move, where they move and why they move. Increasingly, planners are beginning to integrate this information into public transportation designs in order to address gender, socio-economic status, and many other demographic variables. However, outside of transportation planning, mobility is excluded from many areas of research and policy development. Food security is an important example of this. For instance, when people go hungry, improving their food security tends to focus on the movement of food (distribution), not on the mobility of people (with the exception of migration patterns as a result of famine, civil strife and urbanization). However, the effect of people's daily movements on experiences of hunger is not yet thoroughly explored in the literature. This is increasingly obvious in relation to cultural constructions of mobility, such as gender. While gendered mobility inferences can be made from papers on hunger (see Bentley et al. 1999), a mobility framework has not been applied directly as an analytic tool to study food security. Additionally, most of the gendered mobility work has focused on the physical access (infrastructure, transportation, IMTs) and financial access to transportation rather than the technical (information, education, communication) and social access to mobility (local customs, norms, practices)(adapted from Gawaya 2008). Therefore, the purpose of this paper is to analyze how socio-cultural constructions of gender impact individual experiences with food insecurity within rural Kongwa, Tanzania.

The original intention of this research was to examine the relationship between gender and experiences of hunger. However within the first week of data collection it became apparent that mobility was a vital factor in studying gendered access to food. As a result, this paper investigates a more specific question: How does gendered mobility shape individual experiences with food insecurity in rural Tanzania? Adapting Cresswell and Uteng's (2008) framework on gendered mobility, this paper demonstrates that the practiced movement, potential movement and discourses around gendered mobility allow men to more easily access food than women during times of food shortage. The two main reasons for this disparity are the potential for male migration to food producing regions of Tanzania to secure work and the expected social movement of men within their local community.

2.2 Definitions

The term hunger is used because of its operational applicability in rural Tanzania. Hunger instead of food security, carries more relevance to the local people of this study. Within the study sites, hunger is associated with a time of food shortage whereby individuals adjust their eating and working behaviors to cope with household food shortfalls. For most households hunger falls annually sometime between January and April, which I call the 'hunger season' drawing from Thurow's (2011) popularization of this term. Hunger within the communities is associated with the absence of specific types of food rather than complete food scarcity. This definition complements previous work that describes hunger as the absence of culturally valued foods that do not 'merely still hunger', but rather become 'food that feeds'(Boeck 1994:265). In Kongwa, the hunger season begins when the grains, which provide the staple *ugali*, are depleted. However, variation exists between households; for some there is no hunger season, others simply drop meals, some survive off of wild food stores (vegetables), and the worst off have lengthy periods of time without any food whatsoever. It is important to distinguish this variable hunger season from famine. Locally, famine is considered a 'Great Hunger' and is an abnormal occurrence. It is devastating to the whole community while the hunger season is expected by many households. In a study on food consumption in the Kongwa District and Mvomero District of Tanzania, 26% of the households display inadequate food consumption based on diversity and quantity of food intake during the early part of the hunger season (Mason et al. 2014). Evidence of instable and inadequate supply of household is also supported by high levels of children under five years of age demonstrating under-nutrition (%10), stunting (%55) and wasting (%8) in these two districts (Meena and Lyimo-Macha 2014).

While hunger is the conceptual lens of food security for this paper, discourses of food security are more common within the published literature. Therefore, for the purpose of supporting the findings, food security is also discussed in some detail. Food security is often segregated into three categories at the household level: nutritional adequacy, food availability, and economic access to food (Boko et al. 2007; Quisumbing et al. 1995). Beyond these three components of food security, there is a trend to include cultural preferences and a gendered lens into food security research (Ibnouf 2011; Oyekale 2013). Knowing the importance of these cultural dimensions, the definition of food security employed for this paper is "the ability of food providers to secure adequate food at all times to meet the dietary requirements and cultural preferences of their household members" (Ibnouf 2011:216).

2.3 Gender and Food Security in Development

Research on gendered mobility within food security is understudied within the literature. The few studies that do exist focus on infrastructure for food distribution rather than how men and women move or access food. Moreover, food security is generally focused on production rather than distribution. When distribution is addressed it is largely about the movement of food rather than the movement of people (see Ibnouf 2011). Additionally, gendered mobility studies tend to focus on empirical indicators of access to transportation such as the number of bicycles women own (Tanzarn 2008), distance to markets from households (Musa 2002), or capital distributed. As a result research on how norms and customs affect gendered mobility has been left as a residual afterthought in food security dialogues.

While there has been minimal research focused on how gendered mobility affects food security, the field of gendered food security has been studied in detail. For the last 40 years, researchers demonstrated that women play a significant, if not primary, role in agriculture throughout Africa and much of the developing world (Adeniji and Maiangwa 2009; Boserup 1970; Gawaya 2008; Quisumbing et al. 1995). In Tanzania, women provide for just under 50% of the agricultural labour in Tanzania, but this number could be much higher if accounting for agro-processing (FAO 2011). While much work on gender and food security has been conducted, there is need for more due to the continued power inequity between women and men.

For example, gender roles in Africa provide women with some of the most time consuming tasks such as: processing and cooking of food, collecting water, gathering firewood, child rearing and other household responsibilities. Combining these tasks with numerous social obligations as well as their agricultural roles lead to what many call the triple burden for women, which creates challenges for individual financial and food security (World Bank et al. 2009). Sub-Saharan women have poorer access to productive assets (Boon, Ogato, and Subramani 2009-Ethiopia), credit or capital (Spring 2009), land (Doss and Morris 2001-Ghana; FAO 2011), transportation (Tanzarn 2008-Uganda), education (Gawaya 2008-Nigeria) and decision-making than men (Feed the Future et al. 2012-Uganda). This is not to say that women are disempowered or have no control over their lives, but that systemic inequalities hamper their ability to become food secure or contribute fully to local development. Addressing these inequalities has the potential to increase individual, household and familial food security. Studies on these inequities are found throughout gender and development (GAD) literature. In general, five

investigative frameworks can be identified within Gender and Development research on food security including: 1) Place-based, 2) Ecological, 3) Corporeal health, 4) Gender transformative approaches and 5) Agricultural and subsistence economics.

Place is an important lens to understand food security. One way place-based investigation is demonstrated is through the study of urban and rural livelihoods. In general, studies in sub-Saharan Africa and other developing regions focus on rural areas due to the relative poverty and large population percentages in these areas (Keding et al. 2012; Whitehead 1999), however research on urban food security issues has also been conducted (Hovorka et al. 2009; Tanzarn 2008). In addition to rural-urban place-based studies, disaster research on drought and civil unrest are also engrained in a place-based analysis. For instance, Ibnouf (2011) exemplifies this in her article that outlines how women's role in agricultural continues to increase in western Sudan as a result of increased male out-migration caused by conflict and climatic pressures. Lastly, several studies use region and climatic zone to frame their contributions to gender and food security work. These studies assume that gender dynamics are relative to place due to the changes in behaviors, knowledge and worldview between different areas, one example being Nelson and Stathers (2009) work in semi-arid regions.

The ecological lens is also used as a way to study the relationship between gender, agriculture and food. For instance, Beuchelt and Badstue (2013) link both women and the ecology through problematic consequences derived from the use of many yield increasing agricultural technologies. They argue that development should shift its focus from economic or agricultural productivity, toward human development in order to better include gender, social and ecological concerns. For development and policy planning processes, they suggest analyzing trade-offs caused by development interventions in order to create a more "nutrition- and climate-smart agriculture" (Beuchelt and Badstue 2013:715). Other researchers have similarly linked women and the ecology, stating that 'gender justice' is inherently tied to climate justice (Terry 2009). There have also been critiques on so called green initiatives. Studies have shown how 'green' or ethical trade standards do not consider gendered labour in agriculture and consequently misrecognize the needs for local food security (Smith 2012). Finally, a large focus in the GAD literature is the importance of increasing gender sensitive training to help mitigate the effects of climate change (Dankelman 2002; Denton 2002; Oyekale 2013). The rational for this gender sensitivity being derived from the female labour role in agricultural production within many climate shifting regions of the world.

Gender and food is also analyzed through a variety of different health categories including nutrition, disease (i.e., HIV/AIDS), and sexuality. Nutrition is one of the most dominant aspects of food security research as dietary measures have constituted a large quantity of food security indicators. Some of these indicators include dietary diversity scores (Keding et al. 2012; World Food Program 2008, Mason et al. 2014), physical measures (wasting, stunting, see Lindsay, Gibney, and McAuliffe 2012) and survey work on perceived food insecurity (Felker-Kantor and Wood 2012). Despite the methods or measures used, nutrition work illustrates risks related to pregnant women (Lindsay et al. 2012), the importance of supporting homestead food production (Keding et al. 2012; Kent and MacRae 2010), the food gap between household headship structures (Felker-Kantor and Wood 2012), and the potential policy role gender can play in increasing overall household nutrition (Felker-Kantor and Wood 2012; Oyekale 2013). Beyond nutrition specific research, numerous studies are conducted on the gendered impacts of disease and declining health on household food security, especially related to HIV/AIDS in Africa (Gibbs 2008; Nagata et al. 2012). Similarly, sex and sexuality are integrated into discussions around HIV/AIDs, disease as well as general hunger studies (Fielding-Miller et al. 2014; Upton 2010). Fascinatingly, the links between all of these corporeal health studies and gender are championed across numerous disciplines making it one of the most researched and multidisciplinary areas of gendered food security.

Food security is also studied using gender transformative approaches such as gender empowerment, gender mainstreaming, and gender identity. Gender transformative approaches seek to provide political solutions to address gender inequity that limit hunger and malnutrition and increase people's well-being throughout the world. Hillenbrand (2010) explains the situation well,

> "Globally, gender inequity is recognized as a basic, underlying cause of food insecurity and persistent malnutrition. Women's lack of power relative to men affects every aspect of food insecurity: from low agricultural productivity, which reduces food availability on a national scale, to poor use and distribution of food within the household, and poor knowledge of nutrition-promoting practices" (p. 411).

In other words, despite women's great contribution to food production and provisioning, their limited decision-making capacity does not allow them to reach their full potential in food production and practices. Responding to the power inequity between men and women throughout the developing world, the gender empowerment movement emerged. The general goal of gender empowerment was to provide evidence of gendered contributions to agriculture and life in general, which would have policy implications. Some researchers attempted to bring the invisible work of women into the public

light (Galiè, Jiggins, and Struik 2012) while others focused on results based research that legitimized gender sensitive programming or projects. Some examples of gender empowerment research include work on fair trade (Le Mare 2012), education (Olumakaiye and Ajayi 2006) and women's challenges in homestead food production (Hillenbrand 2010). Women's empowerment in agriculture has been a key focus area that links women's empowerment to food security, helping to illustrate gender inequality and provide solutions to policy makers that help avoid the feminization of poverty and hunger (Feed the Future et al. 2012; Negin et al. 2009).

Another gender transformative lens is Gender mainstreaming, which proposes that gender relations are both a cultural issue rooted in mainstream societal norms and beliefs as well as a political issue structurally embedded in the masculine polity (Lessa and Rocha 2011). What differentiates gender mainstreaming from gender empowerment is its deep commitment to integrate gender inclusivity in all aspects of society, research and policy rather than one off targeted programs that might ignore women's interactions with other actors. Examples of gender mainstreaming research include studies on gender sensitive extension (Adeniji and Maiangwa 2009), urban agriculture (Hovorka et al. 2009) and the effectiveness of gender integration within development projects (Lessa and Rocha 2011).

The last investigative framework is agricultural and subsistence economics. I use the term economics generally as the focus on the production, distribution, consumption and transfer of food. The foundational work in this field was *Women's Role in Economic Development* by Ester Boserup (1970), which was the first piece to empirically demonstrate the extent of women's contributions to food production on a global scale. While Boserup's work was criticized heavily it led the way for decades of study on gendered agricultural roles (Fonchingong 1999; Moser 1989; Spring 1995), division of labour and time use (Whitehead 1999), and access to or control of resources such as land (Peterman 2011; Rao 2006), education, agricultural inputs, and services (Boon et al. 2009). One major development and research approach on this front is the study of using value chains as empowerment mechanisms for women to make and control capital (Kamuzora 2005; Kasente 2012; Mitchell and Coles 2011). Other areas of gendered food security research includes the study of investment (Tandon 2010), markets (Gawaya 2008) and the accumulation or control of capital (Fischer and Qaim 2012). Of the five investigative frameworks of gendered food security, gendered mobility is most often inserted within the agriculture and subsistence economics lens. However, the few studies that do exist tend to focus on the movement of food or the physical capacity for human movement through public or private transportation infrastructure. The next section will detail more ways that gendered mobility is studied in

order to demonstrate the importance of more socio-cultural study of gendered mobility within food security research.

2.4 Gendered Mobility

Cresswell and Uteng (2008) identify three aspects of mobility: *Movement, Meaning, and Potential mobility* (see Table 2.1). These three aspects of mobility have been likened to the study of 'fixity and flow' as mobility is about both the observable movements as well as the movements that can or cannot happen. For Cresswell and Uteng, ***Movement*** focuses on the tangibles of mobility such as how people move, where they move to, how fast they go, and how often. Movement becomes about the spatial encounters of men and women. To understand why these movements occur, ***meaning*** is extracted from the stories, narratives and discourse about mobility in order to understand how movements are constructed socially. In this way, meaning becomes a bridge between fixity and flow, providing the rationale for acceptable and unacceptable gendered movement. Defined by both the cultural narratives of movement as well as practiced movement, ***potential mobility*** describes 'access to movement'. Potential mobility is the ability for an individual to spontaneously move based on the restrictions and expectations placed on them by the cultural norms within the society.

Table 2.1: Breakdown of Cresswell and Uteng's (2008) Mobility framework

Conceptual frame	Description
Movement	Empirical observations of movement : • How people move • Where people move to • When people move • Who people move with • How often movement occurs
Meaning	The rationale of norms around movement. • Cultural narratives and discourses around movement • Taboos regarding movement • Ritualized movement
Potential mobility	Description of people's access to movement, both physical and social • Restrictions on mobility based on cultural norms or constructs of power • Expectations about mobility, livelihood, division of labour, family, and other responsibilities • Physical and financial influences on mobility

This analytic trifecta of movement, meaning and potential movement provides a strong framework to study gendered mobility because of its ability to include place-based context (movement) as well as the embedded socio-cultural components such as gender norms and power relationships. Additionally, this framework uses a more holistic approach to investigate current gendered behaviors, the re/production of these behaviors, and the limitations to accessing movement, which helps to study the unwritten rules that constitute gendered mobility.

While there is little research linking gendered mobility to food security, there are many studies on gendered movement. For instance, a study on gendered 'movement' in Kampala illustrates the differences between the mode, frequency, and reason for transport by men and women (Tanzarn 2008). Women were more likely to use buses while men would lean toward the use of private means of transport. In Kampala, men's and women's travel patterns are similar, with the exception of higher rates of leisure travel for men on weekends. This relative homogeneity is rather surprising, but upon further investigation Tanzarn (2008) illustrates that women are more likely to go to school or other places where children need to go. Participants did not report all their movement because they saw it as normative rather than exceptional, in other words "they perceived taking children to school as one of those things they did, just like going to the market" (Tanzarn 2008:161). Therefore, the hidden nature of movement can be difficult to gather and thus obscure the truth around gendered mobility and ultimately its effect on accessing food.

Cultural norms in post-independence Tanzania linked female mobility with promiscuity and prostitution. A narrative was created about the impropriety of female workers that did not remain bound to place and family. Even the Tanzanian nation building icon Hawa Ramadhani, one of Dar es Salaam's first female bus drivers, faced accusations of prostitution and verbal threats about the loss of her femininity (Grace 2013). Despite incredible fame, Ramadhani's popularity was overshadowed by the promiscuous reputation that her mobility brought with it. Because of her prominence in Tanzanian society, Hawa Ramadhani's story as a female bus driver has been captured in the form of a children's book. Undoubtedly, she traversed gender boundaries through her work and as a result was simultaneously valorized and prosecuted by the society around her.

In contrast, Tanzanian males are the ones expected to be mobile to provide for their family, while feminine mobility is limited to activities of nurturing or motherhood. Grace (2013) illustrates exactly this perception in her discussion of Tanzanian national development.

> "In contrast to the iconography that celebrated men's physical and social mobility as nation builders, women were mothers of the nation who were featured in advertisements that tied them to their homes, specifically to the kitchen and washroom" (p. 416).

Even the great female contributors to Tanzanian independence were labelled as prostitutes or sexual miscreants because of their constant travel demands. At one point Bibi Titi, a famous pre-independence pioneer, was asked directly by a village chief about a rumor that all TANU (Tanganyika African National Union) women were prostitutes (Geiger 1997). The husbands of TANU women also tended to become frustrated with their wives due to their travel patterns, which regularly led to divorce or condemnation. Lucy Lameck describes the divorce of one such TANU activist:

> "What was the reason (for her divorce)? The reason was because the woman attended too many party meetings. And the husband didn't want that. This wasn't a question of seclusion. The woman wanted to work for freedom. And the husband didn't see that. Just as some women didn't see it… They saw it in the narrow sense. If my wife goes out…she is going to mess about somewhere. Which is ridiculous…whether she was messing around or not, she wasn't doing the things that she would do if she would stay home" (Geiger 1997:103).

Whether it is messing around at parties, driving a bus or giving speeches around the nation, Tanzanian women that were 'on the move' faced storied references of their promiscuity and sexual deviance, a narrative that carries meaning to this day. In contrast, masculinity in East Africa is often associated with mechanics, driving and other work around automobility (Grace 2013). More recent studies demonstrate the existence of a similar gendered mobility discourse. In a conversation with a husband of one of her female participants, Porter (2011) emphasizes the perceived connectivity of female mobility with promiscuity. In the husband's words, "I think a woman who travels a lot is befriending other men and that's why she travels" (P 67). This link between female mobility and sexual deviance exists in many cultures in Tanzania, which as I will demonstrate later includes the region of this study.

Another group of studies have highlighted challenges and restrictions to female mobility. Porter (2011) for instance describes how young single women in Muslim Borno were restricted to how far they could travel without being censured. Beyond the inequity of this situation, it meant that these women were not able to get to popular roadside markets in order to sell or purchase goods. Porter also emphasizes the dangers women, especially young girls, face in walking in rural areas around Nigeria. In a study on the potential mobility of women, Ram (2012) addresses how cultural norms are held up despite obvious constraints they possess. She calls this afflictive possession. One example given to illustrate afflictive possession is a case study in a specific area of India. Female dancers in this place have limited stage movement because of the rigidness associated with femininity. The value given to a certain form

of movement shapes the potential for movement that exists for men and women. This potential movement has direct and indirect implications on men and women's ability to access food stores through purchase, accessing work and social capital.

2.5 The People and the Place

The Kongwa District is characterized by its semi-arid climate and semi-pastoral people. Pastoralism and the ownership of livestock are mechanisms of resilience for both the Gogo and Kagulu tribes of the area. Livestock are used to compliment cultivated agriculture in order to increase fertility through manure, buy grain when needed for the family as well as create an insurance mechanism to protect against drought and famine (Rigby 1969). As a result the people in the area, especially the men, assign great weight to owning livestock. While not homogenous, the Gogo and Kagulu are documented as sharing many important cultural traits brought on by the climate, semi-pastoral agriculture, linguistic traits and territory (Rigby 1969). Additionally, there is a significant amount of intermarriage between the Gogo and Kagulu tribes as well as people from both tribes living in each other's communities. Therefore, while I acknowledge differences between the tribes seen in the previous literature, the abundant similarities between them, largely based on livelihood strategies associated with place, rain fed agriculture, pastoralism, and the similar gendered labour roles allow some generalization between them.

On average, Kongwa receives an annual rainfall amount of less than 600mm, which falls in a bimodal pattern arriving as a short rainy season (October-December) and a long rainy season (March-May). A trend in recent years has been a continual drop in the average rainfall in this area, matching the finding in a recent climate report of the high vulnerability of this area to climate change (Boko et al. 2007). In addition, the unpredictability of the rains throughout the last several years has caused great angst and food insecurity in the area, but as numerous ethnographies illustrate it is not a new phenomenon (Mnyampala 1954; Rigby 1969). Maddox (1990) suggests that the identity of the people in the Dodoma region is closely linked with their ability to adapt to the harsh climatic conditions that surround them. At the same time, this harsh and unpredictable climate has created a need for many people to migrate out of the area, in some cases permanently and for others simply as temporary labour. While climate has constantly forced people in the area to migrate for work, this pattern increased throughout the colonial era due to policies intended to entrench the Dodoma region as a reserve pool of labour as well as the results of persistent and harsh famines (Maddox 1991). The harsh droughts and colonial policies that forced the Gogo people to sell off livestock each year drastically reduced the

livestock stores in the area and thus these pastoralist people's ability to cope with drought or hunger (Coulson 1982; Maddox 1991).

Gender labour roles in Kongwa will be described in more detail further on, but it is important to highlight the importance of parenthood to both men and women. Mabilia (2006) explains how Gogo women are expected to continually balance the role of mother-nurturer and mother-wife, both roles being associated with motherhood. Interestingly enough, mothers are characterized based on their ability to fulfill the responsibilities associated with these nurturing roles whether it is toward their husbands or children. For example, if something goes array in the family, especially related to a newborns health, the sexual behavior of the mother comes into question and women will often be accused of moving around the community and sleeping around (Mabilia 2006). This mothering identity ties mothers' mobility to their children and familial duties. Expectations about nurturing, managing the household and dutifulness to their husband lead women to become bound to the 'hearth' with exception to the mobility needed for fulfilling these duties, such as walking children to school, collecting water or firewood, and agricultural activities. This focus on household servitude was also intentionally reinforced by colonial governments. As Geiger explains in response to a Tanzanian colonial courts reluctance to support an improvement in women's marital relationships:

> "The colonial administration's stake in the sexual and reproductive control men exercised over women was directly related to its desire to maintain a virtually cost-free system of subsistence agriculture in the territory. As the primary food producers, women supported households and families, feeding workers and future workers who were thereby 'freed' to enter the wage labour economy or to grow cash crops so long as women continued to shoulder responsibilities for subsistence" (Geiger 1997:25).

Geiger is emphasizing the point that mothers have largely been under the authority of their husbands, which is in line with African legal work that discusses mother's access to land as a usufruct right given by their husbands or fathers (see Peterman 2011; and Rigby 1969). However, female labour opportunities and access to land entitlements have greatly improved since the colonial era. Nevertheless, the general division of labour has allowed men to become an active labourer throughout the region, despite the general rootedness of subsistence farming.

2.6 Methods

Critical ethnographic and focused ethnographic principles were drawn on to collect data over a period of 3 months (July, August, September) in 2013. Critical ethnography provided inspiration for this

study because of its focus on uncovering difficult to reach realities. Due to time constraints a full ethnography could not be conducted and thus focused ethnographic principles were applied. See Chapter 1 for a complete explanation of the study methodology.

The study location included two different villages in the Kongwa District of Tanzania; one village is linked to the Crop and Goat Project funded by the Canadian International Food Security Research Fund (CIFSERF-jointly operated by the International Development Research Centre and the Department of Foreign Affairs, Trade and Development) and one is a "control village" in a neighboring ward (see section 1.3 for more details). Sampling within these villages was both stratified and random. A random sample of the village households was created, at which time this sample was stratified based on gendered headship as well as four levels of household food consumption. The food consumption score quantified households based on dietary diversity and quantity of consumed food in order to categorize their food consumption as poor, borderline or adequate (World Food Program 2008). Due to the large variation within the adequate category this category was stratified based on high and low food consumption adequacy. Stratification was used as a way to support Gubrium and Holstein's (2001) understanding of theoretical sampling, which seeks out participants based on creating an analytical understanding of a theory. The hypotheses in this case were that A) hunger is experienced differently by men and women, and B) socio-economic heterogeneity can help to understand different experiences of hunger. Our indicator of socio-economic status was the consumption quantity and quality of food represented by a previously constructed food consumption score (FCS), which seems appropriate for a largely subsistence based economy.

Of the 25 households sampled, in 16 of them both a man and a woman were interviewed on tape. In one family's situation two generations of single mothers lived together, meaning that two women were interviewed. Twenty-four of the 42 participants were interviewed twice. The first interview focused on questions on household gender roles, gendered interactions with food, as well as a food mapping exercise to illicit more detailed understand of agricultural labour. The second interview acted as a formal follow-up and focused on questions about individual experiences of hunger. All and all, 66 interviews were conducted, 28 with males and 38 with females. However, a large portion of my data was collected through observation, participation, and informal conversations which were recorded in field notes. As part of my time in the communities I helped harvest, thresh and process grain, gather water, cook and do other chores. Significant amounts of time were also spent walking around the community and attending ceremonies with participants. The hands-on active participation helped me

confirm/question any normative answers arising from the interviews as well as gather more information about the culture and participants I was working with. Interview data was recorded, transcribed and later coded using NVivo software. Thematic coding was guided by Cresswell and Uteng's (2008) framework and gendered food movements seen in the literature (wild foods, division of labour etc.). Additionally, several codes emerged inductively such as 'tembea-tembea' or the expectation mobility of men.

With all studies, there exist limitations. Language was the largest constraint in this study. Working qualitatively mainly through translation challenges the representational authority as well as depth of investigation; however this is the nature of working in rural Tanzania where Swahili literacy is sometimes low and a large linguistic diversity exists. Additionally, the nature of being an outsider provided a challenge accessing certain spheres of study. In one local community there is increased micro-mining which was impossible to get permission to access, limiting my understanding of mining's impact on gendered mobility or food security. As a male researcher, there were also limitations on what type of interactions I could have with women in the community. Fortunately, the use of a female translator in one community and a community member in the other helped to remedy this situation. While, this study used participant observation to check the memories, perceptions and occasional cultural rhetoric that informed most of this study, these methods have limits as mobility measures. Doing more concrete tracking of physical movements would be useful to see the extent of differentiation between gendered movements.

2.7 Gendered Mobility in Kongwa

Within Kongwa, mobility is affected by numerous factors including age, position, work, gender, time, story, and ritual. While there are clear trends in gendered mobility such as women having less access to intermediary modes of transportation (bikes etc.), exceptions to these trends regularly emerge. This is in line with Cresswell and Uteng's (2008) notion that mobility is largely a social construct where there is both fixity (socially embedded immobility) and flow (expected behaviours). Within this fixity and flow, actors typically align with certain patterns seen in social norms, but personal agency provides plenty of exceptions to gender constituted notions of movement. Using the three analytical frames of movement, meaning and potential mobility, a contextual illustration of how mobility exists within Kongwa emerges. Overall, the findings demonstrate that gender constructs limit the potential mobility

of women and increase the expected mobility of men during the hunger season creating gender inequity in accessing food.

2.7.1 Movement

> "Studies establish that gender-differentiated roles related to familial maintenance activities place a greater burden on women relative to men in fulfilling these roles resulting in significant differences in trip purpose, trip distance, transport mode and other aspects of travel behaviour (which includes different times, to different locations over different distances)" (Cresswell and Uteng 2008:3)

Findings from this study compliment the above argument that gender labour roles shape gendered mobility, which in this case results in gendering access to food. In Kongwa mothers are disadvantaged in comparison to fathers in how far they can travel per trip, what type of transport mode they can use and where they go within and outside the community. However, the situation is not black and white. Some mothers have similar sorts of access to that of fathers, while men in many instances are limited by their lack of financial access to transport and poor infrastructure. Nevertheless, mothers are comparatively less mobile than fathers, which have implications to their ability to work for, find, or access food.

Mothers tend to be less mobile within the community due to their labour roles that are strongly associated with their work at the household as well as their relationship with their children. While men and women share the burden of most agricultural tasks in cultivation, mothers are the primary and often exclusive processor of agricultural goods. Mothers are expected to thresh grain (in most cases), soak the grain, remove the bran, winnow out the chaff, mill the flour (by hand or machine), and store or cook the end product. Even male children, who have in other instances crossed gender labour roles (i.e. fetching water), do not have an increased role in processing. The exception is that men will often help with threshing grains and constructing household grain storage. Additionally, mothers in Kongwa are responsible for feeding, cleaning, and nurturing children, especially those under five. As a result, women spend a significant time at their homestead during dry season weather to take care of children or to process food.

However, women are not immobile, it is just that they spend much of their time at the homestead and their movements are often associated with household work and child rearing, which supports Tanzarn's (2008) observations that mother's movements are associated with providing food for their family and taking children to school. Within the study sites this is exemplified by observations of

wood gathering, water collection and milling flour, all of which are generally considered mother's tasks. A quick visit to a water pump station, borehole or reservoir will demonstrate how water collection is dominated by women, although it is becoming common for young boys to help out and on occasion a husband takes on the responsibility.

Male labour in contrast is less strongly associated with household activities. During the rainy season the reality is that men will cultivate and share most tasks equally with woman, but during the dry season their roles separate considerably. Instead of being mobile/immobile resulting from household and processing tasks, men are much freer to move around or outside the community for a variety of reasons. Males with livestock need to go *kachunga* (graze) their animals around the fields throughout the community.

In other cases, men would partake in business ventures largely associated with trading food stuffs or household goods. Usually using a bicycle, men would buy grains, charcoal, or sugar cane from one rural setting and transport them to another in order to sell them for a higher price. Observations showed that, wage labour, civil servants and other government employees were almost exclusively male, which matches the Integrated Labour Force Survey (Tanzanian Bureau of Statistics) conducted in 2006. In Masinyeti for instance, all of the village councilors were men. These jobs potentially create more opportunity and necessity to travel longer distances. Similarly, in the dry season men typically travel further afield than females in order to secure needed work to feed and support their family through the hunger season. As far as the link to hunger, the implication is that male labour roles associated with migration results in easier access to food through employment at in-season food producing areas. For women, the connection between their household and processing labour roles confines them largely to food available locally.

During times of food shortages, gendered movements also shape how men and women access food stores. Participants indicated that the hunger season brings with it more extreme economic movements associated with work (especially migration). However, beyond the need to find work or do agricultural activities, both men and women limit their social movements due to stress and lack of money. When questioned about their current hunger season, Betoto describes the seasonal changes in his movements.

> **Researcher:** So the movements you make right now and the movements you make when there is food, are there any differences?
> **Betoto (M):** Ya there is, I will move still, but I will not move as much during the season with lots of food. I might go and play pool or visit with my friends, but I do not move as much because I have

> everything I need at home. I am not a business man so I have nowhere to go. But during the hunger season I need to go out and look for food or talk to people about where to find work and so on.

Betoto indicates that familial hunger forces him to move more to find work. The statement also implies that there is much more social movement during times with food plenty. This notion was confirmed through observation and other interviews. This increase in movement can occur to all people, but mostly impacts the fathers.

Similarly, food shortages often cause both men and women to seek food aid, as the obligation for finding food appears split. Rhetorically, participants claim fathers as responsible for food during the hunger season, but they typically only go to wealthy neighbors, family members or known food lenders in order to negotiate food loans. On the other hand, when there are food shortages, mothers more commonly go to very close family members and neighbors to request small donations of food to feed their family. This form of food aid generally occurs when household food stores are depleted and men are away doing migratory work, essentially leaving women to fend for the family's survival. Ultimately, this gendered difference between where and how fathers and mothers move to acquire food stores, illustrates the differentiated access to food within the culture. The two below statements juxtapose male and female challenges and opportunities to cultural access to food.

> **David (M):** "It is easier for the woman to get food because most of the people take care of the women. But in the case of loans, it is not easier for the woman. Most of the people that give out loans, they need the men to deal with it".

> **Salema (F):** "The man is the one to be most affected during the period of hunger. For a small amount of food like flour a woman can go and ask the neighbor but the man cannot, this is forbidden. But a woman can go and ask".

In other words, fathers and mothers have different types of access to neighborhood food stores. The father has more access to food or financial loans from community members while mothers have greater access to emergency food rations from neighbors and friends. It is hard to determine if this differentiated access to food during the hunger season informs how and where movement occurs or vice versa, but the link exists.

Finally, movement occurs as a result of social functions. All community members travel to celebrations such as coming of age ceremonies, funerals or weddings, which can increase ones food stocks through celebratory or social meals. This is true no matter the time of year. However, many social arenas, such as the 'clubs' (bars), pool halls and rest areas adjoined to *dukas* (supply stores) are populated mainly by men. As a result, men have increased access to food security through networking

about employment opportunities as well as placing them in spaces regularly where food is served, sold and consumed. Arguably, employment opportunities help increase the food security of entire families, but the fact remains that gendered mobility contributes to unequal access to work and financial security.

While there are numerous other situations where mothers and fathers move around the community, it is this triage of social movements, hunger movements and labour movements that tie gendered mobility impacts to differentiated food security.

2.7.2 Meaning

Narratives, stories, and discourses carry the underpinning meaning that help to maintain socio-cultural norms. Through the narratives in the community we can better understand gendered movements. The intention of this section is not to complete a discourse analysis on mobility or gender, but simply to demonstrate that there are certain stories and beliefs that are reinforcing the movement of people, which ultimately impact gendered experiences of hunger. Within the communities several narratives emerged including the male breadwinner and networking wanderer, as well as the female mother-nurturer/mother-wife and promiscuous *geto* goer.

When directly questioned about who was responsibility for food provisioning, participants' indicated that the responsibility for feeding the family falls to the father. While fathers certainly contribute to food provisioning, mothers also do local work during food shortages. Additionally, as discussed previously mothers contribute substantially to almost all steps in household food consumption, while men are left out of processing and cooking activities. Despite this both fathers and mothers talked about the father being the food provider of the family. This narrative came up throughout my interviews, many times occurring unexpectedly. For instance, when asking about differences in how mothers and fathers are affected by hunger some respondents stated:

> **Erevu (M):** "The man they get stressed due to the external forces from their wives and their neighbors, they think that the men have failed to feed their family. It is shameful."
>
> **Adin (M): "**There is a difference. Because I am the head of the family, when there is a shortage I am the one who plans where we can go get food. Where I can go and ask for assistance and if we need to, I will plan to find a job. The whole family looks to me".

In their statements, Erevu and Adin both discuss the headship expectations of fathers and how this creates expectations and responsibilities for ensuring the family does not go hungry. Even single mothers and female household heads stated that men are responsible for feeding the family. In one

instance, a single mother who farms by herself told me that men are more affected by food shortages than women because they need to "find a way to get food for the family". When questioned further, she admitted that she provides food for her daughters, but the male as provider narrative still came out despite its paradoxical nature in her situation. As will be shown further on, this cultural narrative of male breadwinning combined with the narrative of females as nurturers obliges men to travel more to try and provision the family, ultimately buffering them from the same level of hunger faced by mothers.

Another narrative around male mobility was related to expected social movement. Within the communities, participants described this in a number of ways. Rhetorically, male social movement was most often discussed as 'tembea-tembea' (walking around). In a conversation about male movement, Kathryn stated that "men are used to just stretching themselves and walking around". Numerous mothers and fathers described male tembea-tembea as a normative social behavior. Beyond the language of tembea-tembea, women and men also explained walking around as visiting, stretching, and kuzurura, a Swahili term meaning to wander leisurely. It is important to note that this idea of tembea-tembea was not seen as a negative expression of masculinity, rather a normative behavior. Even when I found mothers alone hard at work at the homestead, women seemed unconcerned about their husbands leisurely movements in the community; it was expected and seen as common place.

While men were perceived as the mobile food providers, the narrative about women was largely focused on women as nurturers. This finding echoes the work of Mabilia (2006) whose ethnographic study of the Gogo identify women as 'mother-nurturers' and 'mother-wives'. The best example of this comes from a man who explains the reason why polygamy is important to him.

> **Researcher**: Why do you need two wives? What is the importance of it?
> **Sefu**: I am always being taken care of. It is easy. They find water for me, they will support me, like a child. They will take care of me like a child.

While not all husbands explained the wifely responsibilities this way, men and women did regularly identify mothers as responsible for the care and nurturing of their children, husband and the family. Badriya for instance explained the responsibilities of a mother to be "taking care of the kids, to raise them and to fulfill their needs". Ghubari similarly stated female responsibilities as "to take care of the husband and children" amongst other roles. The result of women as the mother-nurturer and mother-wife creates an identity for women that bind them to activities related to roles associated to caregiving, which reinforces ties to the household.

Adhering to Grace's (2013) and Porter's (2011) work on gendered mobility in Africa, another narrative that arose in Kongwa is that women who are mobile are often assumed to be sexually deviant**.** Men on the other hand have no such stigma attached to their mobility. This is not to say that men are assumed to be innocent, just that men in motion are not assumed to be committing adultery. The reality in the communities seem to indicate that both men and women's actions lead to sexual misdemeanors and infidelity, but the problematization of these acts generally falls upon women. Two separate encounters help to reinforce this understanding of appropriate sexuality and how mobility factors into it.

The first story comes from the only polygamous participant in one Wagogo community. When asked about polygamy he explains that marrying multiple wives is often the result of male mobility.

> **"**Sometimes polygamy happens this way: men move around a lot because they drink and they move place to place for work, so there is movement. These men find women, and maybe they do not plan to marry her, but then the man can find that he has already impregnated that women and have a child. And he cannot leave the child, so he has to take care of the child and that is accepted in the community and society. From there you might even find people with four wives, because they move a lot" (Sefu interview 1).

Sefu states that mobility leading to sexual encounters for men is accepted in the community. This explanation was reiterated in different ways by other participants. In contrast, women who move around by themselves are often seen as out of place and can be assumed to be sleeping around at '*getos*' (single males' houses). Gladys suggests this in her story about how the people have changed over her lifetime.

> **Gladys (F):** There are some changes. Nowadays girls don't behave very well, there is no respect. Why, for example girls don't sleep at home. They pretend to sleep and then they leave slowly and sneak over to sleep in the geto. The geto is a place, a house for (single) men and you find girls there. So the girls spend the whole night there and then maybe come back at 5 in the morning. So back in my time, the men used to come and introduce himself at the home, but now it doesn't happen.
> **Researcher**: So are there a lot more unmarried women having children now?
> **Gladys:** Ya, there are a lot of cases of pregnancy before marriage. And the bad thing is there are a lot of pregnancies without a responsible man. Why, because you will see a girl that will stay a night in the geto, and the next day or maybe a month they will see her at another man's place. So when she gets pregnant the man will say it is not mine, it is yours and the other will say the same. So at the end of the day you will find a girl having a kid without a father.

This portrayal of sexual encounters does not give a positive image for either the man or woman, but the story places the most blame on the woman. For Gladys, the deviance occurs as much in the act of leaving the house as it does in the sexual misdemeanor. Gladys would prefer a return to times (or perceived times) where the man is the mobile one courting the woman. Additionally, more blame is

placed on the woman in the story because of her movement between multiple partners, disregarding the fact that the men are doing the same. In this same community, one of my village hosts admitted to me that he has three different 'nyumba ndogo' (mistresses) and one extra marital child. Despite the reality of infidelity on both men and women's part, the narrative that emerges is that of female deviance that is tied to their mobility.

None of these narratives restrain women or men from movement in the community, but they do create and reinforce normative behaviors of movement. Essentially, they help to justify the movements that men and women take, or do not take. Whether it is fathers feeling obliged to migrate to feed the family or mothers being bound to the homestead in order to continue being a good nurturer and avoid suspicion of adultery, these narratives shape the potential movement men and women make. The resulting potential movement influences the capacity for women and men to respond to food shortages and hunger, reinforcing a gendered system of access to food.

2.7.3 Potential Mobility

Within the community, fathers have been identified as more mobile than mothers, which is reinforced by the previously described narratives of gendered mobility. Fathers have the ability to spontaneously move around the community, whether it is to network, visit friends, look for work or simply to tembea-tembea. As a result, fathers are more likely to share meals with other families or find food in 'the streets'. This is true despite seasonality, but becomes especially important between January and April when families often experience food scarcity. On the other hand, mothers are much more bound to the homestead. They do move, but have greater expectations to take care of household tasks. Chiku exemplifies this in her statement about how hunger affects the family:

> "In the period of hunger women are most affected because we are staying at home. But men, they can go out of their way, and if they find someone eating *ugali*, they can sit and eat there. And then when they go back home, they will say I am hungry."

In her statement, Chiku illustrates two important mobility implications. Firstly, men have great potential to move around the community regardless of the season allowing them to be fed easier during times of food shortage. Secondly, mothers' roles and narratives of femininity fixate mothers to the homestead, limiting their potential movement and consequently hampering their ability to procure food through their social capital like their husbands do. Betoto similarly emphasizes the potential mobility held by men and women in his conversation about gendered access to food.

Betoto (M): It is easier for men to find [food] because men are always walking around the community.
Researcher: Is it possible for the woman to walk around the community and find a meal?
Betoto: Ya, it is possible, but it is rare.
Researcher: Why?
Betoto: It is different from a man who will go tembea, tembea, tembea and walk around.

This ability for men to spontaneously move around the community affords them greater access to food through visiting other homesteads during meal times and social spaces closely associated with food (ie. Clubs, *dukas*-stores).

The cultural understanding that fathers are the primary food providers for the family coupled with the relative immobility of mothers creates a social expectation for men to migrate to find work once local employment sources have been exhausted. This falls in line with Rigby's (1969) assessment of familial mobility of the Gogo as well as Maddox's (1991) argument that Dodoma is both a historic and current reserve pool of labour for Tanzania. Male migration has two main implications for gendered food security. Firstly, father's ability to migrate to work in regions with greater financial and food security allows them to be fed on a daily basis. Jacob states as much in his explanation about how the hunger season affects mothers and fathers differently.

> "Women and children are more affected [by food shortages] because the men move somewhere to find a job to buy food. And that place they go they get enough food because they work and must eat. But the women and children are the ones that stay in the house."

When probed if mothers ever migrate for work, participants stated that this is rare and usually only done in extreme cases. Rather mothers typically work locally as Pamela describes when asked if she ever goes far enough away for her to stay over: "It depends, sometimes I can stop working in the afternoon and sometimes in the evening, but I have to be home each evening". The general inability of women to migrate for work creates differentiated access to food for men and women during times of food shortages.

The second implication for gendered food security from male migration is that mothers are often left without adequate amounts of food to feed their family back in the communities. In some cases, the father ensures that there is enough food at home for the amount of time when they leave. However, in other situations this is not the case as women are left without any food stores or there is a miscalculation of the food needed or time spent away. Betoto's family is one such case. He explains that "when I leave, I will leave the place with no food and the wife will also have to find food in the community somewhere when I am gone". One result is that women are forced to try and find work in an

already exhausted employment environment, while at the same time conducting their role as mother, household manager, and agriculturalist. So not only do father's mobility create a favorable food situation for themselves, but migration of fathers simultaneously increases the pressure on mothers to feed the family during this time of crisis. Habiba explains this situation in acute detail:

> **"**According to my experience, the woman is the one that is mostly suffering from food shortages. For example, if there is no food we have to go cultivate for others or clear the fields of stalks. And sometimes we find there are no places that we can go for that because what we do today we cannot do tomorrow. So what you see is that there are people that are in need of labour which does not exist**.** So if this happens, women do not go very far from the home because they are taking care of the family. So the man will go very far away to town for maybe two or three days maybe working for cash. So what I am trying to say is that the husband that goes very far away working, he can eat there, he can get something to eat, maybe from the boss who he is working for. He can give him food or money for daily needs, but for me, for women it is a little bit hard because I am alone and I have nowhere to go. So I have to suffer a lot thinking about the family and the other people around. So for women, even for myself sometimes it is really stressful."

Additionally, the limited potential for women to move around the community caused by household and caregiver rootedness creates a barrier to enter the labour pool. Several participants explained obstacles for women to gain employment from local farmers because of the stereotype that women are lazy and less effective workers than men. Badriya explains:

> **Badriya (F):** In the community it is easier for a man to be trusted to find food or to find work. It is easier to get '*miraba*' (fieldwork), it is easier for someone to hire a man rather than a women.
> **Researcher**: Why?
> **Badriya:** You know some women are lazy, so if you are the boss it is better to hire a man because you know they will work well.
> **Researcher**: Do you think women are lazier than men?
> **Badriya:** Some of them are lazy for real, but others are not lazy. The problem comes because when you want to work and are a woman, someone hires you and you work on the shamba, but in the evening you have to go back to cook, or have to leave early because you have to go and prepare food for the family. So people do not prefer women because they make the work go slower. But a man can work even up to 7pm if there is light, but a woman will have to leave earlier and maybe will come late as well because she has to take care of the children.

The childcare and homecare responsibilities of women create difficulties for women to find off farm labour. The result is the creation of discourses of laziness and uncommitted work ethic that reinforce the immobility of women based on gendered division of labour, making access to food or finances through local work very challenging. This is compounded by the limited employment opportunities that exist locally and the even more difficult challenge for women to migrate for work.

While there is a general sense of immobility for women, exceptions do exist. Despite the pressures and constraints highlighted for female migration, single mothers and some female headed households travel great distances to acquire work or food. This means that they will be willing to leave their children in others care to migrate for work if necessary. However, despite these exceptions the data illustrates that male potential mobility and female's relative immobility provides fathers a greater buffer during the hunger season.

Despite most of the findings that illustrate male privilege born from greater freedom of movement, this paper is not attempting to persecute men. In fact, dozens of encounters with husbands and fathers in the community illustrated the deep care and effort they put into their families. Surely there are exceptions, but the truth is that even if men have more positive experiences with hunger does not mean they are in a good position. On a recent survey of the Kongwa and a neighboring district over 50% of households did not have enough food for the entire year (ILRI 2013). At the time of the survey (not yet the normal hunger season) approximately 25% of the households did not even reach the minimum amount of points on a World Food Programme index to be considered having adequate food supply (Mason et. al 2014). Additionally, the harsh climate, poor colonial policies and a cultural tendency of familial migration also leads to a culture of migratory work (Maddox 1991; Rigby 1969). Unfortunately, this necessity to migrate to find work, an ameliorated climate, new land or food has negative consequences for the entire family. This paper simply suggests that men have a greater buffer from this unfortunate situation, which is an important finding for food security research and development.

2.8 Gendered Mobility and Food Security

Gendered (im)mobility in Kongwa provides another example of gender inequity within sub-Saharan African outside of those found through the study of accessing productive assets (Boon, Ogato, and Subramani 2009), credit or capital (Spring 2009), land (Doss and Morris 2001; FAO 2011), transportation (Tanzarn 2008), education (Gawaya 2008) and decision-making (Feed the Future et al. 2012). Just like the bus driving Ramadhani who struggled against social milieus around promiscuity, women that seek equal access to movement in rural Kongwa struggle against similar social constructions. This limited potential movement for women hampers their overall access to food stores both directly and indirectly. The use of social capital embedded in sharing food through the act of visiting/tembea-tembea allows men direct access to food during food scarcity as well as knowledge about local work. In contrast, the cultural constraints on women's mobility resulting from the labour roles associated with

the household (also found in Moser 1989; World Bank et al. 2009) do not afford women the same luxury. This has the potential to impact the entire family's food security as "assets and income in the hands of women result in higher caloric intake, better nutrition, and food security for the household than when they are in the hands of men" (World Bank et al. 2009). Additionally, greater access to mobility for women may enable them to further contribute to cropping activities through the ability to travel further afield, whether it is to work on their land or others'. More research on gendered mobility and production constraints would be useful. Finally, food security research benefits from a stronger understanding of gendered mobilities due to the relationship between potential mobilities and the ability of men and women to adapt to changing climate, agricultural settings, and the adoption of new technologies.

In order to address the inequity seen in gendered mobility, gender transformative approaches to research and development could be employed. However, addressing potential mobility of men and women is situated in complex culturally embedded knowledge about behaviors as well as local and regional economics. In some ways the structured mobilities of men and women are deeply rooted in the local identity as mother-nurturers (Mabilia 2006) as well as pastoralists (Rigby 1969). The limitless ability for men to walk around or outside the community provides the needed ability to graze livestock. Additionally, these gendered mobilities back the structured reserve pool of labour found in the Dodoma Region, which supports the labour needs of much of the nation as well as providing some financial and food security locally (Maddox 1991). Without women's mobility ties to homestead labour, men may not have the same ability to migrate for work. Paradoxically, women's mobility constraints that allow for men to migrate are beginning to disintegrate as a result of the ebbing of cash/food flow back to the family unit, creating a trend for women to also work further afield out of necessity. However, the discourses of promiscuity and deviance accompany migratory women reminding them of their abnormality. Therefore, improving female mobility in the region must coincide with or at least take into account the restructuring of social taboos around mobility as well as opportunities for women to temporarily remove themselves from household responsibilities, whether it is through increasing access to local work or shifting homestead/childrearing responsibilities to be more gender equitable.

This study has several research, development and policy implications. Most importantly, in places where hunger drives the need for migratory work, attention could be given to creating opportunities for local work. A larger focus on local work could help to break the cycle of migratory work, potentially dispersing the hunger season stress on everyone, but specifically addressing the needs of

women by providing greater access to work that is within women's current mobility capability. Additionally, a better base of research is needed to understand how all categories of access to food (physical, technical, financial and social) are interrelated to gendered movements. Finally, quantifiable or spatial representations of gendered mobility would expand our understanding of men and women's mobility patterns allowing for greater empirical insight of gendered access to movement.

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Chapter 3: The Knowledge Paradox: Dependency, Traditional Ecological Knowledge and Food Security in Kongwa, Tanzania

3.1 Introduction

> "Why do you ask me to think of things to change, you are the one that is supposed to think of these things. You are the one that see us the way we are and you are the one that is supposed to say what we need." (Endesha, Community Participant)

Farmers possess a great deal of agricultural knowledge based on generations of farming experiences disseminated through time as well as empirical observations of cultivation and animal husbandry (Elwert and Sehoueto 1999). This generational knowledge is called Traditional Ecological Knowledge (TEK) and development research provides agricultural examples of this, which are seen in or practiced through local institutions, social norms, work behaviours, gender roles, and general interactions with food (Beckford and Barker 2007; LaRochelle and Berkes 2003; Nadasdy 1999; Sehoueto 2006). Many of these scientists acknowledge that intergenerational agricultural knowledge has enabled peasant farmers to survive for hundreds of years despite times of famine or catastrophe (Elwert and Sehoueto 1999). However, TEK in agriculture has often been discounted in development organizations and community members in favour of disciplinary western scientific knowledge (Breidlid 2009; Rist 2008). For instance, there are few TEK research requirements in grant funding, green revolution philosophy (Kerr 2012), and the agricultural extension programs organized by national level bureaucracies (Elwert and Sehoueto 1999). Peasant farmers are assumed by many to have less knowledge or at least inferior knowledge than that of proponents of western science. In some cases, peasant farmers also believe their knowledge is substandard for the development of their personal and community wellbeing. An example of this is denoted by Endesha's response above about her knowledge for community improvement. However, despite Endesha's lack of self-efficacy and the prioritization of scientific knowledge in development, this study finds important food security related TEK in the Kongwa District of Tanzania. Local knowledge about wild food identification, local soil conditions, crop selection, livelihood diversification and the complexity of agriculture within nature provides resiliency within the harsh semi-arid climate zone where Kongwa is situated. Thereby a knowledge paradox exists in Kongwa. On the one hand, local farmers possess a great deal of knowledge about land, climate, cultivation and wild foods seen through agricultural practices, and drought coping strategies, while on the other hand these same farmers do

not believe they possess any knowledge for community development, life improvement or agriculture. As a result, locals both sought out and prioritized knowledge of outsiders.

The knowledge paradox was born out of investigating the question: *how does knowledge around food security manifest itself within the lives of people in Kongwa District of Tanzania*? While originally hoping to create a local definition of food security, the direction of this research shifted to a dialogue about food and agriculture in place with this dialogue containing two distinguishable conversations. In answer to the research question, this paper documents both the Traditional Ecological Knowledge of local farmers as well as discusses perceptions of the existing TEK from within and outside the communities. Data is taken from observations, participatory experiences detailed in field notes and interviews conducted in two villages within the Kongwa District. The analysis of this data will be framed using Berkes' three layers of Traditional Ecological Knowledge (Knowledge, Practice, Belief) that will be adapted to the agrarian context in rural Kongwa. Ultimately, findings indicate that a knowledge paradox exists within this region whereby local peasants possess TEK seen through agricultural practices and strategies to cope with hunger, but this knowledge is devalued resulting in a lack of collective efficacy and an internal dependence on outsider knowledge for development.

3.2 Directions in Food Security Knowledge: Research and Practice

> "But today we should be far wiser; with the help of our ***Gods and our science***, we must not only increase our food supplies but also insure them against biological and physical catastrophes by international efforts to provide international granaries of reserve food for use in case of need" (Norman Borlaug, Nobel Lecture 1970, emphasis added).

Through the green revolution, a global agricultural shift occurred from agriculture driven by cumulative experiential knowledge to agriculture driven by science and technological innovation. In his lecture as a Nobel Peace Prize Laureate, Borlaug emphatically states that scientific expertise in agriculture can lead to the abolition of hunger and food insecurity. More recently, this paradigm continues as seen by three major multilateral food agencies. In a report on women in agriculture, the authors suggest that gender parity is linked, at least in part, with universal access to agricultural technology (World Bank et al. 2009). In a recent paper on feeding the world by 2025, Swaminathan (2007) also argues for the prioritization of technological innovation in agriculture through four global food security pillars: technology (creation and adoption), training (basic and technology focused), techno-infrastructure (commons technology (i.e. soil labs), roads, granaries etc.), and trade. These four pillars closely link food security to scientific discovery and the dissemination of scientific knowledge.

Swaminathan's four pillars and Borlaug's green revolution are but two examples of how the western scientific method has become the dominant paradigm for researchers, development practitioners and policy makers to support and enhance global food security.

However, numerous researchers oppose this dominant paradigm, critiquing the green revolution and the dominance of science driven agriculture. Early on the green revolution was critiqued for its lack of ecological consideration toward water resources (Lansing and de Vet 2012) and use of pesticides, impact on rural livelihoods and migration, technology centered elitism (Liodakis 1997), inability to support food or biological diversity, as well as dependency on western nations, resources and knowledge (Glaeser 1987). Similarly, numerous academics have critiqued dominant agriculture as leading to the loss or stigmatization of indigenous knowledge bound in cultural practices (Berkes 2009, (Grenier 1998; Lo and Chen 2011; Sehoueto 2006; Shiva 1988). These criticisms combined with indigenous rights movements and the slow adoption of green revolution technologies in parts of the global south have brought about a re-emergent interest in indigenous knowledge as a component of effective natural resource and agricultural management systems.

Individual researchers on the margins of food security work have studied indigenous knowledge for quite some time. In certain disciplines this pedagogical approach has been more important than others (see Action Research OR Participatory Methodologies). In cultural anthropology for example the study of indigenous knowledge has been very common (Kloos 1963; Parlee and Berkes 2006). In the field of agriculture, however, the study of indigenous knowledge is less established. At the policy level, organizations have only just started to integrate indigenous knowledge into food security strategies and documents. For instance, the most recent FAO (2014) "State of Food and Agriculture Report" includes a section about utilizing indigenous knowledge to foster research and development for family farms. In contrast, the state of food and agriculture report three years previous never mentioned indigenous knowledge, and discussed knowledge as something to transfer to farmers (specifically women) through farmer field schools, extension services and other vocational training (FAO 2011). Additionally, while the International Development Research Centre (IDRC) of Canada has supported indigenous knowledge research for at least 15 years (Grenier 1998), the most recent funding round for food security projects never mentioned the inclusion of indigenous, traditional or local knowledge (IDRC and DFATD 2014). Therefore, despite the advances in supporting TEK in development, local indigenous knowledge remains at the periphery of most development projects, especially in agriculture and food security.

3.3 African Knowledges: Western and Traditional thought on Food Security

While the western scientific paradigm has largely monopolized the process by which knowledge is constructed and legitimized, alternative ways of legitimating knowledge exist. Some academics argue that local knowledge follows similar deductive reasoning that legitimizes our own scientific discoveries and thus is a valid form of science.

> "The strength of local knowledge systems is based upon the fact that parameters of (agricultural) production, which are too complex to deal with by centrally-planned approaches are covered by a meticulous empirical research…this research follows basically the same methods as scientific endeavor: namely, logical deduction plus empirical falsification" (Elwert and Séhouéto 1999:249).

Collecting local knowledge can become a powerful tool for development projects to both build off and grow from. With collecting local knowledge in mind, development projects and researchers have used numerous concepts or methodologies such as participatory research (Castleden, Morgan, and Lamb 2012; Castleden, Mulrennan, and Godlewska 2012; Gaventa and Cornwall 2001), indigenous knowledge (Berkes 2009; Breidlid 2009), practical knowledge, cultural knowledge, place-based knowledge, community-based knowledge, traditional knowledge, Traditional Ecological Knowledge (LaRochelle and Berkes 2003; Parlee and Berkes 2006) and metis (Scott 1998) to promote, study, act upon and demonstrate other ways of knowing.

Within Africa, indigenous knowledge has been the purview of many development enthusiasts (Breidlid 2009) and feminists (Nnaemeka 2004). Indigenous knowledge has been defined in many ways, but is often referred to as:

> "the combination of knowledge systems encompassing technology, social, economic and philosophical learning, or educational, legal and governance systems. It is knowledge relating to the technological, social, institutional, scientific and developmental, including those used in the liberation struggles" (Odora Hoppers and Makhale-Mahlangu 1998).

Hoppers and Makhale-Mahlangu are referring to indigenous knowledge both as information as well as the practice of systems and institutions. These opinions have been reinforced by other researchers as well. Sillitoe (2000:4) suggests that identified indigenous knowledge to be as "much skill as knowledge, and its learning across generations is characterized by oral transmission and learning through experience and repetitive practice'". While indigenous knowledge provides a strong lens to study generational knowledge in place it is semantically loaded with baggage. Proponents of the western scientific paradigm often view indigenous knowledge as inefficient, backwards or unimportant (Breidlid

2009) and the term conveys historical connotations associated with slavery and colonial remediation of 'backward' beliefs (Sehoueto 2006).

As a result, this research draws on the concept of Traditional Ecological Knowledge (TEK), which encompasses much of the important characteristics of indigenous knowledge (ex. experiential knowledge, social institutions, philosophical understandings of the world etc.). TEK emerged in the early 1980s through the work of indigenous studies and international development scholars. Traditional Ecological Knowledge has been described as "the knowledge, however acquired, of relationships of living beings with one another and with their environment" gained through "generations of intelligent reflection" and adaptation to place (Berkes 2012:4-5). Essentially, TEK is the knowledge gained through generations of experiences and interactions with living organisms, non-living systems and cycles, the land, the water and the other interacting parts of the ecology. An important aspect of TEK is its focus on both the process of acquiring knowledge as well as the information about ecology itself. While TEK is intentionally holistic drawing on socio-cultural understandings of the ecological intersectionality with society, this research specifically focuses on the societal knowledge embedded in, shaped by or ritualized through agriculture. Therefore, for the purpose of this study TEK will be defined as knowledge that is passed down through generations of reflective thought that represents the cunning intelligence needed for a people based in place to grow, interact with, ritualize, philosophize, store and consume food.

Berkes (2012) lays out four spheres of TEK that will be adapted to an agrarian focus for this paper. The first layer of knowledge is that of local empirical knowledge of the ecosphere whether it is the plants, animals, landscape, or climate. This can be macro forms of knowledge gained from observing the agricultural system of place (community, climatic zone or microclimates) or more detailed indicators of knowledge such as plant descriptions (taste, texture, colour, biological phases or other identifiable traits). The second layer of TEK is resource management systems. Embedded in the strategies and practices of resource management, knowledge exists that defines how farmers operate on the land they live on. For instance, in the semi-arid climate of Kongwa it could be the strategies that allow families to cope with food shortages. Wendell Berry and others have commented that these experiences of rural farmers have created 'tacit' knowledge from continual observation of practice (found in Filipiak 2011). Although the inconsistencies or knowledge gaps between farmers demonstrates the challenge of assessing this tacit knowledge. Berkes' third layer of TEK is based in social institutions. Social institutions are based on observed human practices, but focus on the norms, rituals, and customs that govern the

way of life of the people living in place. While both of these have distinct attributes they are both rooted in observed human interaction with the food system and will be condensed for the purpose of this paper into the notion of 'practice'. The final layer of TEK is belief, which has also been talked about as worldview (LaRochelle and Berkes 2003) or attitude. Belief is the frame of reference that allows individuals to interpret the happenings of the world. It is based upon the experiences and observations of people as well as the ways we perceive the universe. Belief includes the moral foundations of societies and individuals such as religion, moral guides, and a general belief system (Berkes 2012). These multiple layers of knowledge make up Berkes' trifold conceptualization of Traditional Ecological Knowledge: Knowledge, Practice and Belief. Applying the knowledge-practice-belief framework to the data allows for the identification of traditional knowledge as well as provides a venue to investigate how knowledge systems in the community are or have been changing.

For the last twenty-five years within Africa, scholarship has been conducted on Traditional Ecological Knowledge albeit under the terminology of indigenous and local knowledge. These scholars argue the importance of indigenous knowledge in Africa rests in the:

1) "The long-term generation and transmission of knowledge of the local ecosystem offers a unique historical [and contextual] perspective into indigenous risk adjustment options" (Lalonde 1993:55),
2) Ability for communities to use generational knowledge to weigh the short term and long term consequences of decisions around social and ecological change (Lalonde 1993), and
3) Practice of ecologically sustainable resource management systems. Although these same scholars recognize that many examples exist whereby commons management has eroded ecological protections (Mazur and Titilola 1992).

Additionally, scholars suggest that utilizing indigenous knowledge both in the process and decision-making aspects of development provides greater self-reliance for local communities as well as more accepted routes to change. Arguing about the importance of local knowledge in the maintenance of a long term sustainable agricultural system Mazur and Titilola (1992) state:

> "Development approaches that have undermined local self-reliance through ignorance, or occasionally through malice, must be wholly replaced if 'sustainability' is to constitute anything more than a desperate 'last resort' in attempting to reverse stagnant or declining agricultural production. (p.279)"

Their primary suggestion is that local knowledge systems enhance self-reliance through supporting the capacity to learn from one another. Mazur and Titilola (1992) firmly believe that farmers in Africa are cognizant of the constraints of the local farming environment and the challenges to production, food security, obtaining wealth, and resource conservation. For them, the knowledge for development

already exists locally and development projects should provide the opportunity for the horizontal dissemination of this knowledge from farmer to farmer.

There are numerous examples of projects that demonstrate the innovative nature of local farmers and how providing a platform for them to share their ideas and knowledge with others helps to disseminate local knowledge for development (Kibwana 2003; Kibwana et al. 2001). Projects supporting innovative farmers have demonstrated the ability for local knowledge to be disseminated broadly, but lessons learned within these cases often point out the struggle for development or extension agents to release control of the leadership aspects of development as well as the exceptional (rather than traditional) nature of the innovative knowledge that is shared. It is hard to say if Traditional Ecological Knowledge is truly being depicted in these instances or if it is simply a bottom up approach to western development ideas. Nevertheless, the ability for this development philosophy to create platforms for horizontal knowledge dissemination between farmers as well as peasant led development provides incentive for culturally, ecologically and locally appropriate development.

However, while projects supporting grassroots involvement in development exist, the most common form of development are structured through top down knowledge dissemination of western scientific thinking (Grenier 1998; Hiruy and Eversole 2012; Kibwana et al. 2001; Mazur and Titilola 1992; Scott 1998). Researchers have argued that these top down development interventions often are focused on short term goals, neglected the long term repercussions that situated in cultural decision making processes that are engrained in many cultures of Traditional Ecological Knowledge (Lalonde 1993). Top down development often uses reductionist or analytical modes of thinking that can sidestep the large pools of contextual, ecological and generational knowledge that exist in the holistic hermeneutic that is generally associated with indigenous knowledge systems. It is mainly for these reasons that scholars suggest that development programs should be consultative and integrate local traditional Ecological Knowledge with their own prescribed knowledge. African imagery of development that neglects to consult with local knowledge depicts developers as trying to clap with one hand (Kibwana et al. 2001). For these critics “rural development in Africa has been constrained because the people who regarded themselves as the "developers" were clapping with one hand” (Kibwana et al.:133). In other words, developers often overlook the wealth of knowledge that exists locally that could contribute to development. Clapping with two hands implies the cooperation of development stakeholders as well as the inclusion or at least dialogue between bodies of development knowledge.

Within Africa and Tanzania there have been many studies on Traditional Ecological Knowledge even if it is under other conceptual frames. Lalonde (1993) summarizes case studies on indigenous African societies that include knowledge on soil, plant knowledge, agroforestry, animals, integrated pest management, resource management (soil erosion, soil fertility, fodder management, water conservation, anti-desertification strategies), and agronomic practices (ex. Terracing and organic fertilizers). In the Kibaha District of Tanzania, Maasai and Barbaig pastoral communities are documented for their impressive wealth of knowledge on animal behaviour, pastoral management, milk production, soil and plant knowledge, rangeland identification, and animal husbandry (Kilongozi, Kengera, and Leshongo 2005). One example of this knowledge is the connections that they draw between palatability of fodder with the quantity of milk production, which is utilized regularly when new grazing land must be identified. Additionally, knowledge about seed selection for certain soils, for cash cropping and for drought resistance all exist locally within Tanzania (Lazaro and Bisanda 2005; Liwenga 2003, 2008). A study in the southern highlands demonstrated the gendered aspect of food security knowledge (Das and Laub 2005). As a result of roles created from the division of labour, men and women contain different knowledge sets about plants, agriculture, resiliency and food. Again in the southern highlands, a pilot program between a university and the national extension office attempted to provide agricultural services through the respect and inclusion of local knowledge (Kibwana 2003). This program supported innovative farmers to share their innovations with other farmers through conferences, community forums and support networks. While this project has great potential, its conceptual understanding of local knowledge is somewhat shallow, looking only at the innovative and new adaptations rather than a more rooted or holistic understanding of agriculture. This being said, the project attempts to 'clap with both hands'.

While many examples exist of Traditional Ecological Knowledge in Tanzania, there are only a small handful of research projects throughout the Dodoma Region that focus on local knowledge. One such example is an international program called "Gender, Biodiversity and Local Knowledge Systems for Food Security"which is financed by the Food and Agriculture Organization. Within this study, researchers identified the use of a local informal seed saving system that provides farmers with most of their seed in the area. In contrast, the multiple formal seed programs that exist in Tanzania through government or NGOs have proven relatively ineffective for the local people demonstrating the reliance of local knowledge for food security (Lazaro and Bisanda 2005). Additionally, ecological knowledge and the ability to preserve germplasm and choose appropriate cultivars for the soil and climatic conditions are forms of TEK found in this same study. Another example of TEK in Dodoma is seen in a research study in

Mvumi. Within the study, the people (Wagogo) of Mvumi demonstrate numerous practices and strategies that help them cope with drought and environmental hardship. While the coping mechanisms differ by socioeconomic situation, each sector of the population uses strategies such as livelihood diversification and agricultural intensification to increase their resiliency to hardship (Liwenga 2003). The ability to migrate for work, purchase labour, sell labour and pool labour resources (depending on the socioeconomic bracket) are all examples of local livelihood strategies that the Wagogo use to cope with food insecurity. While these two studies illustrate the existence of Traditional Ecological Knowledge in the region, research in Dodoma within this area is relatively uncharted territory.

More broadly speaking, there are several themes around agriculture and food security within the literature on Traditional Ecological Knowledge throughout Africa and around the world. TEK studies often focus on wild foods, exploring placed based knowledge in the Canadian north (Parlee and Berkes 2006), Sirerra Tarahumara Mexico, (LaRochelle and Berkes 2003), Niger (Muller and Almedom 2008), and Morocco (Powell et al. 2014). Many of these studies illustrate the multiple layers of knowledge looking at rules-in-place, social institutions such as systems of reciprocity, worldview, communication exchange, skills, and strategies for food security (LaRochelle and Berkes 2003; Parlee and Berkes 2006). However, most wild food studies focus largely on measuring the overt knowledge around identifying wild/traditional foods (Muller and Almedom 2008; Powell et al. 2014) or famine foods (Muller and Almedom 2008). Additionally, research has been conducted on the loss of local knowledge of wild food and agricultural practices. For instance, Bezner Kerr (2014) identifies the near elimination of sorghum and the decline in finger millet as a food crop in northern Malawi. She found that locals had lost the understanding of why it is important to grow multiple food crops for food security. As her argument states,

> "Growing a mixture of these grains allowed farm households to have effective strategies in the face of changing rainfall patterns, reduced landholdings, and different soil fertility conditions. They provided a backup for farmers in times of drought, as well as greater dietary variation and more income options" (Bezner Kerr 2014:590-591).

Similarly, Raschke and Cheema (2008) argue that there is a slow eradication of traditional food habits in East Africa brought on by a series of factors including: international trade, land seizures, the move to cash crops, ecological degradation, the loss of indigenous markets, colonial schooling, food aid/import dependency and the move of women into the work force amongst other factors. Therefore, wild food research has identified the existence of Traditional Ecological Knowledge as well as its adaptation or disintegration resulting from global influences within local food systems.

TEK is highlighted within research on seed biodiversity including work by scholarly activists (Shiva 1988) as well as those focusing on cultural knowledge situated in place (Elwert and Sehoueto 1999). TEK research provides examples of farmers pairing seed stock with different soil types or methods of planting. Farmers are also noted in their ability to protect biodiversity as well as experiment with local genetics and plant breeding in order to adapt to changing climate, cultural demands and relationships with food (Elwert and Sehoueto 1999).

One of the oldest research interests of Traditional Ecological Knowledge (albeit not labelled as such) in agriculture is found in ethnographic tomes and cultural anthropology. Ethnographers have long been identifying socio-cultural systems that predicate the operation of societies. While these authors rarely point out self-identified knowledge of their research communities, they regularly extrapolate social interactions, practices, survival strategies, systems of capital (social, economic, human) and philosophies of people in place. An example of this is the 'cattle complex' or the high value of cattle in many African cultures. Ethnographers (Mnyampala 1954; Rigby 1969), historians (Maddox 1995), and archeologists (di Lernia et al. 2013) have all documented the long lived importance of cattle to many African societies. In Tanzania, the Wagogo have used cattle as both a value of wealth and prestige as well as a system of capital, which brings more resilience to a harsh semi-arid agricultural system (Rigby 1969; Maddox 1995). There are many other examples in the literature beyond the cattle complex. Historical and current practices are also recorded about self-identity (Bryceson 1995), ritual and politics (Mnyampala 1954), power (Sanders 1998), marriage, and economy amongst other social systems.

Gendered knowledge has also been a target of study in TEK. Local food knowledge in the literature is typically gendered as a result of social organization of labour as well as normative behaviors. Gendered power dynamics are regularly studied, often identifying the knowledge used in decision-making as male in (Bezner Kerr 2014). Even emancipatory research methods such as participatory action research and the gathering of TEK have been criticized as gender blind (Guijt and Kaul Shah 1998). However, the study of wild foods and other domains of female food security knowledge demonstrate the gendered nature of Traditional Ecological Knowledge (Garibay-orijel, Ramírez-terrazo, and Ordaz-velázquez 2012). Moreover, gendered TEK exists as a result of labour roles and social upbringing making gender an integral component of food security research.

Coping mechanisms for disasters such as famine or climate change are studied regularly using a TEK lens. Knowledge on coping during times of hunger has been collected in order to better understand local reactions, resiliency and challenges to famine. Studies in this field indicate that women and men

have different access to food and coping strategies, usually positioning women as more vulnerable to food scarcity (Bentley et al. 1999). Other coping literature posits that TEK is a form of cultural capital that can often be understood as cultural resilience to external stresses. Beckford and Barker (2007) argue that Jamaican farmers' local environmental knowledge, crop and soil knowledge, crop diversification, and continual agricultural experimentation maintain a resilient agricultural system that acts as a safety valve to agricultural variability. For these authors, Traditional Ecological Knowledge is mutually reinforced through agricultural crises and thus can be used as a building block in future challenges to food security, although they also recognize the limitations of TEK.

In the field of public health Local knowledge is collected and utilized to study the impact of health and nutritional interventions (Bezner Kerr et al. 2011; Satzinger, Bezner Kerr, and Shumba 2009). Interestingly, participatory public health studies often identify tension between facilitator's belief in scientific knowledge and their urge to respect traditional knowledge. However, this tension in some instances is seen as an opportunity for discussion and integration of multiple knowledge paradigms (Satzinger et al. 2009). Nevertheless, sometimes this tension is simply an example of dominant paradigms influencing others including food and nutritional systems. Raschke and Cheema (2008) discuss how in East Africa a myriad of health benefits from indigenous food sources and Traditional Ecological Knowledge are being eroded in order to accommodate the food available created by cash cropping, global trade, migratory labour, urbanization and other globalizing factors.

Finally, the most extensive agriculture focus within TEK research is in the field of natural resource management. Within this literature there are researchers that integrate TEK in soil science (Barrios and Trejo 2003; Corbeels, Shiferaw, and Mitiku 2000) and mixed crop and livestock systems (Corbeels et al. 2000). Beyond soil science, research on TEK is focused on agro-ecology and sustainable agriculture. Studies have documented TEK around organic fertilizers in Mali (Blanchard et al. 2013) as well as the horizontal communication of local knowledge in the campesino-a-campesino movement of Latin America (Rosset et al. 2011). The study of TEK in soil science and agriculture provides opportunity for other development researchers to integrate traditional knowledge into food security work. More importantly, all of these areas of TEK research demonstrate the existence of local knowledge around the world, legitimizing the use of TEK in development whether it is to empower locals to improve their own food security or to build off of in conjunction with new ideas or technology.

3.4 Famine, Food and Fodder in Dodoma, Tanzania

The study site is located in the Kongwa District of the Dodoma Region. While there are regional differences within the Dodoma region, the vast majority of the region rests on an elevated area called the Ugogo Plateau (see Figure 3.1). The Dodoma region is semi-arid, with a short rainy season starting in November or December and continuing until early May (500-800mm rainfall per annum). In much of the region the rains are interrupted for a month or two of dry conditions from January to February. Agriculture is dominated by a mixed crop (rain fed) and livestock system, although not everyone owns animals. Wild foods are also prominent in the diet of the local Wagogo and Wakagulu people including several leafy greens (collected and dried) and the occasional fruit from local trees (i.e. Baobab). Throughout documented time, Dodoma has been noted for its harsh dry conditions. Talking about the early colonial era one author describes the region "as the most famine-prone area of German East Africa (Maddox 1991:7)".

Figure 3.1: Typical agricultural landscape at the start of the dry season throughout the Kongwa District and Ugogo Plateau.

During the German and British rule of Tanganyika (mainland Tanzania), colonial policy, administration and war exasperated droughts and famine throughout the Dodoma region. Most notably, the famine of 1918-1920 called "Mtunya", which aptly translates as 'the scramble' (Maddox 1990).

Mtunya was a period of social breakdown for the Wagogo people. Brought on by the acquisitions of large stores of grain and cattle by war torn colonial powers as early as 1915 and accelerated by inconsistent rains in later years, approximately 30 000 (%10) people died in Ugogo. By the end of the famine the Wagogo social disorder run rampant saw pillaging cattle from the rich, violence to one another, and widespread begging. Aid was given at times, but many did not feel any improvement. The result of Mtunya, the greatest of recorded famines, was death, loss of knowledge, mass migration and the beginning of cultural dependency on external food, development and know-how. Maddox (1990) explains it well:

> "The Gogo also have an interpretation of the effects on their society of this famine. The Mtunya disrupted regular social relationships. The Gogo therefore use this famine in a negative way to define their social norms. All that was forbidden, all that was 'uncivilized,' took place during this famine. When the famine ended they had to reconfigure their society in the light of the new strains caused by the famine and colonial rule. This interpretation perhaps stresses the extent of social disorganization because it also explains why the people of Ugogo are now dependent on the outside world for survival" (P. 189).

As Maddox explains the Wagogo redefined their social norms around the experience of famine and the scramble to find or receive food, ultimately reinforcing a culture of external dependency. With the additional loss of agricultural knowledge from migration, homelessness and the desolation of cattle herds, this famine began a cycle where the Wagogo lost "the ability to control the reproduction of their own society" (Maddox 1990:197). This is especially problematic as the deterioration of social and political structures as well as 'the lack of endogenous development perspectives hamper the effective application of local knowledge" (Antweiler 1998:490). Antweiler (1998) believes that with the breakdown of social structures indigenous knowledge erodes and the society becomes increasingly individualized, looking further afield to urban or external sources to survive through means such as the exploitation of resources and personal labour. In other words, if historic or current trauma is impacting the social order of the Wagogo, there could be a prioritization of survival techniques found locally or beyond the region.

Before and after Mtunya, ground nut plantations were developed in the Kongwa District of Dodoma in an attempt to increase 'agricultural productivity' (Coulson 1982; Maddox 1991). While the Ground nut scheme ultimately failed because of its misunderstanding of local agricultural needs amongst other things, the colonial era brought with it a modernist approach that simplified agriculture to the understandable elements science could deliver at the time. Additionally, this form of agricultural knowledge is dependent not on experience, but on western style education and technology. In the post-

colonial or independence era, the collectivization of people into Ujamaa villages again reintroduced new agricultural technologies in an attempt to both improve the well-being of the people as well as to boost export revenue (Jennings 2008; Hyden 1980). The new African socialism embodied by Ujamaa attracted large amounts of interest from foreign donors, flooding the newly formed nation with cash in the form of low interest aid from Scandinavian countries and Canada (Rugumamu 1997). The newly inherited skeleton bureaucracy had little notion of how to deal with the floods of aid that entered the nation, resulting in corrupt civil servants. Much to the chagrin of Tanzanian visionaries, the world recessed as a result of the OPEC crisis and donor nations began to cut funding and call back loans, dooming Ujamaa and the Tanzanian economy (Rugumamu 1997). Scott (1998) argues that the process of Ujamaa and villagization was always doomed to fail as it was a large scale state sponsored social engineering of society that ignored the bounty of cunning experience that existed in place. Despite good intentions and theory, uprooting people's knowledge with their physical transition to new homesteads created massive loss of local agrarian knowledge. The final result of villagization for the Wagogo was the reinforcing of externally created agriculture and state centered decisions for development.

Tanzania has an extensive agricultural extension program, which since 1989 has been consolidated under one organization in order to "improve the delivery of technology to a large portion of the Tanzanian farming community, which should lead to increases in yield levels for both staple food and export crops" (World Bank 1989:3). While the newest national agricultural policy addresses the importance of gender and participatory focuses within agriculture the overall paradigm still focuses on imparting western scientific knowledge, as demonstrated by the 2013 national agricultural policy:

> "It (extension service) enables producers to realize increased production and productivity through accessibility to marketing information and other support services essential for agricultural development. The transformation of agricultural extension services is important in order to impart the right tools, knowledge and skills as well as ensuring farmers adhere to Good Agricultural Practices" (Ministry of Agriculture Food Security and Cooperatives 2013:14).

The notion of imparting the 'right' agricultural methods and technology as well as the policing of 'good' agricultural practices emphasizes the mindset that agricultural extension is conducted. Additionally, the implementation of extension focuses on the farm visit method, which sees extension officers spend short visits at farms that are often sporadic and limited (C, Kalungwizi,, and Msuya 2013; Elwert and Sehoueto 1999). Despite the many benefits extension officers bring to communities, they exist as a concrete reminder of western scientific knowledge that is prioritized by the government and bureaucrats.

The valorization of outsider knowledge has also come from the development field. Within Dodoma, there are many new development interventions focused on improving agriculture, food security, public health, governance, water accessibility and people's quality of life. However, development organizations are generally hierarchical in their structure as well as reliant on technological solutions (Muzio 2008). The result of these characteristics is that decisions are often made without local consultation and are based upon outside factors such as donors' agenda or philosophy. Additionally, the development interventions use of technological innovations fosters a reliance on operational knowledge within the area they are working in. This is not to say that there is not any grassroots development NGOs or CBOs, nor successful development interventions. However, the common hierarchically structured unaccountable and technologically driven development groups do foster a sense of knowledge from above that validates western scientific knowledge over Traditional Ecological Knowledge. In one researchers words: "Viewed as marginal lands inhabited by marginal people, policies and programmes sometimes put in place [throughout Dodoma] failed to take account of centuries of local experience and accumulated knowledge in dealing with the harsh environment (Liwenga 2008:775)".

The resilience of the smallholder farmers in Dodoma is clearly evident in the 23% increase in regional population from 2002 to 2012 (Geohive 2014). Despite harsh famines, challenging climate, and problematic colonial policies (Hyden 1980), the people of Dodoma have survived and grown in number continually over the last 100 years. Part of the population increase can be attributed to increases in healthcare, aid response, supra-regional advances and development interventions. However, the contributions of resilient agricultural systems should not be overlooked. Maddox implies as much in his description of the Wagogo people stating that they are defined more than anything else by their "adaptation to the (harsh semi-arid) environment" (1991:7). The ability to live, work and multiply within these harsh conditions throughout ages means that Traditional Ecological Knowledge for survival and food security exists within the region. In the following sections this TEK found in Kongwa will be detailed as well as the paradoxical belief that the research participants have no knowledge/efficacy for development.

3.5 Methods

In order to gather data on the multiple layers of Traditional Ecological Knowledge, I employ a mixed methods approach which draws upon critical ethnography. The rationale for this methodology

comes largely from Gubrium, Holstein, and Atkinson (2001) when they talk about culture's influence on memory.

> "Memory is a cultural phenomenon, and is therefore a collective one. What is "memorable" is a function of the cultural categories that shape what is thinkable and what is not, what is counted as appropriate, what is valued, what is noteworthy, and so on" (p. 810).

Knowing that much of the knowledge about food security and agriculture is embedded in norms, lifestyle, everyday behaviors, ritual and rules within social institutions it is important for me to address the world with a critical eye in order to discover what is unmemorable for the participants. Therefore, following Ricoeur's approach to studying the world, research was conducted using a mixture of hermeneutic vantage points, the hermeneutics of affirmation and suspicion (Ricoeur 2008). As implied, the hermeneutic of affirmation means to take texts, knowledge and life in good faith, while suspicion believes the world to be a farce, manipulated by greater systems at play (i.e. capitalism, power relationships etc.). While these hermeneutics may seem at odds with each other, the intention is to have multiple ways to consider truth claims and interview material. Coleman (2009) describes how Ricoeur saw these two worldviews intersecting. "Ricoeur's point is not to argue for the value of one of these approaches to the exclusion of the other; rather, he insists that they form a tension, an extreme polarity, which is "the truest expression of our 'modernity'" (p. 32). Therefore, to discover Traditional Ecological Knowledge bound up in normative behaviors or social institution an analytical approach that both valued and challenged the data collection and analysis was applied. In this way, the influence of western scientific knowledge on TEK can also be discussed.

The study location included two different villages in the Kongwa District of Tanzania; one village is linked to the Crop and Goat Project[1] and one is a control village in a neighboring ward (see section 1.3 for more details). 25 households were randomly sampled, 10 in one community and 15 in the other. In 16 of the households both a man and a woman were interviewed in order to understand as much nuance as possible about their family, gender relationships, agricultural knowledge and practices around food. Additionally, from the 42 participants interviewed, 24 were interviewed twice. Multiple interviews were used in order to allow time to build relationships, observe farming lifestyle and farming practices between them, and act as a follow up for more nuanced in depth questions. During the second interview a cognitive mapping exercise was conducted. Participants were asked to think abstractly about what they would dream a hunger free household or future would look like. Results varied widely from

[1] https://sites.google.com/a/ualberta.ca/diary-goats-and-root-crops-tanzania/home

this exercise, but was used to elicit how people view the "environment which they then use to make spatial decisions which guide behaviors, and is, in effect responsible for geographical survival knowledge" (Kitchin 1994:2). However, a large portion of the data was collected through observation, participation, and informal conversations which were recorded in field notes. As part of the time in the communities I helped harvest, thresh and process grain, gather water, cook and do other chores. Significant amounts of time were also spent walking around the community, attending ceremonies and experiencing social events with participants. The hands-on active participation helped me confirm/question any normative answers arising from the interviews as well as gather more information about the culture and participants I was working with. Multiple interviews helped to get past the initial outsider perception. Yet despite this rapport, the best data that could be collected is based on the reported attitudes and perceptions to the questions asked.

This study is sponsored by the Crop and Dairy Goat Project (CGP) funded through the International Development Research Centre of Canada and the Canadian Department of Foreign Affairs, Trade and Development. The CGP was developed with limited local consultation. As a food security intervention, the CGP brought new technologies (improved sweet potato, cassava and goat breeds) to communities in Kongwa. As a result, my position within the communities was seen as an expert on agriculture, food security and development. As a perceived expert within the communities there is undoubtedly a level of inter-subjectivity between me and the research participants, whereby my words and actions affect their responses. Additionally, a level of inter-subjectivity exists between the community members and the development projects within the area, which will be discussed in the next section.

3.6 Findings: Paradox in Kongwa

> "'*Theato xolu na nyemto'* intelligence teaches knowledge, that is, the capacity to learn – or understand – gives knowledge. '*Xilu xolu na theato'* hunger [lit. the stomach] teaches intelligence, that is, one acquires the capacity to learn or understand by living through famine" (Sehoueto 2006:124).

The two above Lokpa proverbs illustrate both the cultural significance of hunger in sub-Saharan Africa as well as the interconnectedness of hunger and knowledge. While the Lokpa live across the continent from the Wagogo and Wakagulu, the message of these proverbs remains poignant. Resistance to hardships in the form or hunger or famine enables agrarian knowledge to manifest in the form of coping strategies, social norms and agricultural systems. Therefore, it is surprising to find farmers in Kongwa neglecting their own experiences and valorizing external scientific paradigms. In this section,

attitudes about knowledge for development will be presented detailing the perceived helplessness of the people in Kongwa. After which the Traditional Ecological Knowledge in agriculture will be presented, detailing the knowledge paradox in Kongwa.

3.6.1 No Knowledge

Throughout recent history there is very little recognition of the knowledge that exists within rural communities in the Dodoma region. Externally, there is a sense that the inhabiting Wagogo are a tribe that is lazy and backward. Informal conversations with local agricultural extension officers, politicians and once in a while my own university colleagues confirmed this to me. When asked about the Wagogo, cynicism was the first response while praise and optimism were rarely expressed. In the literature, Maddox (1991) also describes external stereotypes of the Wagogo that often label them beggars and transient casual labourers (Maddox 1991). He argues that the necessity for migratory work is structurally created rather than a facet of laziness or the individuals self-perpetuated poverty. It is not my intention to disregard or condemn these perspectives about the region, but rather to highlight the fact that the people in Kongwa are perceived negatively. Therefore, Traditional Ecological Knowledge engrained in the institutions of the region is regularly discounted or absent from conversations about development.

Even more concerning is the self-perception elicited from interviews with smallholder farmers in the Kongwa District. Despite clear observations of agricultural capabilities and self-identified strategies to deal with hunger and drought, research participants discussed how they had no capacity to do development, depicting two themes around knowledge. One theme is the local self-representation of helplessness and the second theme describes the stated desire for outsider, expert or conventional development knowledge.

3.6.2 Valorization of Outsider Knowledge

From Within--

> "Today, we stopped by a household with many women working in order to give medicine to one of their calves. Of course, my work came up and they grilled me on it. This year they had a very poor harvest because of drought, so they wanted my advice about how to create food security. I was flustered by their passionate frustration with their situation and said some ignorant things like get a sunflower mill in the community and diversify into other areas of agriculture…in hindsight I realize she really just wanted to vent, but also wanted to hear my point of view as an expert. I need to be better prepared for these conversations as I will be considered the expert no matter the field, even more so than my translator despite his training in agricultural extension".

This excerpt was taken from my field notes on July 16th 2013; it was one of the first days in the region. I was unprepared for the fervent frustration of not knowing what to do in order to become more food secure that greeted me at this household. My place as an expert in the development field continually had locals both within and outside my study approaching me for suggestions or advice of how to improve their lives. At nearly every turn and during almost every interview I would be asked about my thoughts on agriculture, livestock, water shortages or other community improvements. The mothers that I talked to in the above passage were just one of the first and most impassioned to talk to me. Despite the experiences about their soil, their food, their livelihood and their children, these women assumed that I would have had more important contributions to their well-being than their own family, politicians, experiences or community could give them.

In a neighboring village, a similar occurrence developed within an interview with Endesha. Endesha was recognized by our research team as one of our most insightful research participants. After asking her what she would want to have in the community to make her life better, she paused and replied:

> "Why do you ask me to think of things to change, you are the one that is supposed to think of these things. You are the one that sees us the way we are and you are the one that is supposed to say what we need."

While Endesha did eventually share her opinions on the matter, her sentiment about my role in the village was clear. You are educated, you are foreign from this village, and you are the expert, why should you not bring development with you?

It is not surprising that research participants would view the researcher as an expert; in fact most researchers would consider themselves one in some sense of the word. However, the regularity of these encounters and the position of people asking me to provide solutions to hunger and community development problems gave me pause. Moreover, the severity of their pleas for help combined with the quantity of times I was asked for advice lends credence to the theory that my knowledge as an outsider and scientist was privileged above that of local expertise developed through practice.

This focus on external development knowledge demonstrates that there is a self-perception within the communities that local knowledge and experience is less important than western science to development work. This self-perception affects the perceived efficacy of individuals within the community, which is seen through the communal perception of laziness. Dozens of people within the community described neighbors, especially men as lazy. Women especially felt men were being lazy as

their division of labour did not end at harvest as seen in Chapter 2. Meriem explains her feelings on the matter:

> "Some of my women friends I hear them complaining about their husbands, they don't get any money from their husbands or any support. Especially for those that go and drink. You can find some husbands that get money and then go and drink, and some women complain about this… For the case of the husbands that are not responsible, you can find that the husband can leave or stay outside the family for 3 months. "One example is a relative of mine that went away for 3 months and he came back with very little money. So they wonder what he was doing out there (Meriem)."

Throughout my interviews other participants mentioned laziness as a behavior within the community, often referring to the way in which people work in agriculture. Zuberi emphasizes this in his description of a healthy person. "I think that there is a person who does not eat well because they are a lazy person, they don't want to work. So during the rainy season they don't go to the shamba to prepare the farms". Other interviews also elicited conversation about laziness or irresponsibility within the community by both men and women. These perceptions of laziness within the community demonstrate mistrust of others abilities in the community as well as the normative nature of inaction. These circumstances foster an attitude of mistrust in each other that ultimately devalue knowledge and contributions from the community tradition, culture and collective experiences in agriculture.

Moving beyond the perceptions of laziness, when asked about how to develop or improve the community people often pointed to the dependence or desire for aid. The starkest representation comes from Sanura:

> **Sanura:** (laughter) For me, in order to make life easier in the community, there should be a program for providing rice.
> **Researcher**: Why do you think rice is important? And how would this program work?
> **Sanura**: It is not necessary to be rice, but if not rice maybe maize, wheat, oil, soap or anything. The functioning of the project would depend on those in charge and the donors. Maybe once per month or week or daily. It would depend on the program procedures.

Sanura is not only hoping for aid, but also accepting external authority over community affairs. She suggests that the donor procedures outweigh the community needs and opinions. Others also indicated their desire for aid. In her depiction of a future without hunger Fila included food aid as one aspects of her vision. Additionally, other interview statements demonstrated the reliance or at least hope of outsider intervention.

> **Researcher:** If you were able to choose anything to help the community and improve the problems with finding food, what would that be?
> **Imani**: Maybe some aid (money) given to the people in the village would be good?
>
> **Endesha:** One improvement (in the community) could be that during the cultivation season, maybe you could give us money. You know money for labour. If I can hire people then I can have many farms.

For these and others interviewees, community improvement strategies rest on the shoulders of government, development agencies and other external aid programs. The perceptions within the community suggest that external knowledge holds authority over that of Traditional Ecological Knowledge within the Kongwa District. As a result, a self-perception of inefficacy in development exists throughout the region.

From without--

Three experiences during my data collection provide examples of how development projects, the government and people external to the region do not challenge the perceived knowledge dependency within Kongwa. Firstly, during my time in Masenyeti a high ranking member of the National Assembly came to visit the community. His stay included a town meeting where he heard complaints about the status of the community, announced new funding for the region and provided some advice to the community members. His advice as recorded in my field notes was this:

> "The politician told the people that they must work hard and not to be lazy, just relaxing on the off season. He said that they need to work so that they can feed themselves and help themselves when they are not cultivating. He even suggested that Tanzania is a big country; if you cannot find work in the area go further until you can".

While the politician is trying to convince the local people they have the capacity for life improvement through migratory work, he is also building off of the stereotype of laziness that supports a general understanding of inefficacy throughout the region. In contradiction to the politicians call for improved self-reliance through work, he also simultaneously announced the majority funding of a medical clinic and electrical lines to the community. Undoubtedly, these gifts are important steps for community well-being, but they also unwittingly reinforce the dependence of the locals on external aid and development. Therefore, simultaneously the politician advocates for more self-reliance through migratory work and provides another example of community development through a top down outsider process. Additionally, his comments do not discourage the internal and external perceptions of local inefficacy through his comments on laziness throughout the dry season.

The second example comes from the national agricultural extension program, reestablished in 1989 (World Bank 1989). Extension officers are trained in conventional animal husbandry and crop science. One role of extension officers in the communities is to act as a liaison to development practitioners. As a result, the officers' act as a translator to the local community, imparting ideas of development from outside sources. As a result, the presence of agricultural extension agents provides a concrete reminder of the value others place in western scientific knowledge. While the knowledge these officers share with communities is important and also informed through local experience, their position as an outsider reinforces the importance of outsider knowledge and devalues the agricultural knowledge in the community. Several of the cognitive maps created in the research process indicated that an ideal community would include extension officers. In his description of his future without hunger Asani states: "this is a field, but I think if I got more training about how to fight against drought in my field, then I think I can design my field to fight against drought". The challenge for a bureaucratic extension service is to provide a relevant product or information that is able to grasp the complexity of the climatic needs. However, the hierarchical approach of extension services generally ignores the complexity that is developed through generations of passed on TEK (Elwert and Sehoueto 1999).

The last example is that of development agencies and projects in the community. Ironically, my own presence in the communities was due to a development project funded by donors in Canada with no local representation. While I see the great merits of what we are doing I also had to reflect on the increased amount of technical scientific knowledge thrust into the community in the form of a dairy goat and root crop program. Additionally, this scientific knowledge was not accompanied with a study or integration of local knowledge or practices potentially reinforcing the dependency behaviors shown above.

Other development projects have similar effects. While it is hard to differentiate where knowledge comes from, conversations with farmers often elicited techniques, needs and ideas that were clearly part of development projects. When asked about community, agricultural or household needs, participants would discuss 'sunflowers', certified maize seed, fertilizer and dairy goats. The Tanzanian Government, the Small Industries Development Organization (SIDO), and the Rural Livelihood Development Company (Swiss funded) are constantly pushing the increased growth of sunflowers throughout Dodoma, hoping to both bolster rural household income as well as cash crop industries (RLDC 2008). The politician that visited Kongwa also suggested locals grow and process more sunflowers as a life improvement strategy. Feed the Future and USAID are prioritizing both the use of synthetic

fertilizers to increase yields as well as improved varieties of maize seed within the area (see Figures 3.2 and 3.3). Their slogan “Natumia Mbegu Bora” (I use good/certified seed) was posted at every corner store and watering hole in the villages. Amongst other projects, “Feed the Future is promoting improved technologies and inputs for maize farmers” in the Dodoma region (Feed the Future 2014).Therefore, it is unsurprising that discourses about seed, sunflowers and fertilizer emerged through the interview and mapping process. In the maps of a hunger free household, several people indicated that a hunger free future would include certified seeds, while many others indicated their wish to grow or continue growing sunflowers (see Figure 3.4). While positives certainly came out of many of these development projects, many of them have components that would create local reliance on technical professionals such as seed growers and fertilizer companies. Additionally, few of them address or consult with Traditional Ecological Knowledge that already exists. In fact, most of the agricultural development projects work with non-indigenous plant species such as maize, sunflower or cassava. Without the utilization of TEK by development projects or a very strong education initiative these externally reliant projects are unlikely to be successful, largely because of the reliance on outsider knowledge to maintain them.

Figure 3.2: USAID poster promoting synthetic fertilizer, Slogan: “I use synthetic fertilizer to get high yields”

Figure 3.3: USAID poster promoting certified maize seeds, Slogan: “I use good seed”

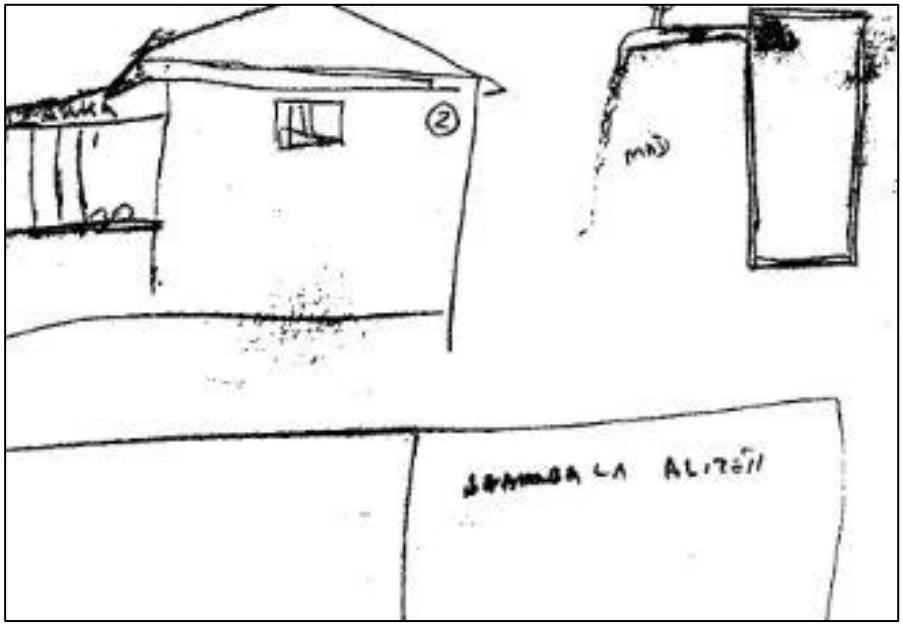

Figure 3.4: Map of a hunger free household depicting water access, a sturdy house with attached store and a sunflower field, writing: ‘corner store’ (top left), ‘water’ (top right), ‘sunflower field’ (bottom right)

3.6.3 Paradox in Kongwa: Knowledge and Practice uncovered

During the interviews many participants were asked about their knowledge or techniques to stave off hunger generally eliciting an emphatic response that they had no knowledge. However, later on in the interview participants would casually volunteer information around water conservation, cultivation techniques, food storage, wild foods, or livelihood diversification. In some cases participants would unknowingly state this knowledge contradiction within the same response. Sanura for instance told me in the same breath that she has no strategies to combat hunger and then states how she survives when there is hunger.

> "I do not have any kind of strategy. I do not have any control over drought. There is nothing that I can do to fight against it and its side effects. What I do when there is not enough food is I go to find work for food or money to make sure we can survive."

Sanura is adamant that she has no way she can prevent drought caused hunger, but she also explains that she uses her labour to cope against hunger, thus identifying that she has both the knowledge to find work and the ability to do it. Similarly, others when asked about their strategies to deal with hunger respond with statements such as "I don't have a way to cope with hunger" or "There is nothing", but later when probed about the procurement of food during the hunger season they mention selling livestock to acquire the money, using social capital or sometimes growing an garden to ensure access to food. Sanura and other farmers demonstrate disconnect amongst the Knowledge-practice-belief framework developed by Berkes. Their self-perception demonstrates an attitude of incapacity for life improvement, while their practices and institutional knowledge demonstrate the collective and individual capacity for agricultural self-sufficiency within the harsh climate Kongwa offers. Following are some examples of this knowledge. Findings from observations and interviews illustrate how Traditional Ecological Knowledge around hunger manifests itself within Kongwa including agricultural knowledge, gendered knowledge and resiliency strategies. These categories help to capture the institutional knowledge as well as the empirical knowledge identified by locals.

Local Agricultural Empiricism

Through experimentation, experience and generational reflection many observable and identifiable pieces of knowledge about agriculture exist in Kongwa. For instance, a wealth of knowledge about plants, specifically plants for cultivation, exists locally including yields, sustenance capacity (heaviness), water requirements and soil quality. Each family weighs these against each other in order to plan what they will grow where each season. Take Sanura for instance, when asked about crops she

describes several factors that go into deciding what to plant including yield, drought resistance, preference, and marketability.

> **Researcher**: Is there a specific crop that is the most important?
> **Sanura:** White sorghum.
> **Researcher:** Why do you think that is the most important?
> **Sanura:** That sorghum is resistant to drought, which is why it is the best crop to plant when there is inconsistent rainfall.
> **Researcher:** If that is the most important crop, why do you choose to plant other crops?
> **Sanura:** We need to add up to other crops like uwele or other types of sorghum; we do that because even those other crops, they mature even faster than the white one.
> **Researcher:** So why do you like the white one better?
> **Sanura:** For food and it produces more per acre than another sorghum or uwele (bush millet). The yield will be higher. Also, it is easier to sell. But then we have to have other crops in order to support us.

Seed and crop traits were identified in almost all of the interviews. Most participants in Sanura's community agreed that while maize had good yields with lots of rain, unpredictable drought conditions made it too risky to rely on. As a result locals either did not plant it or also maintained a diversity of more drought resistant crops. This TEK formulated through experiences of cultivation is formative to understanding seed selection and thus the adoption or new seed varieties, especially maize that local development projects are supporting.

General water needs of cultivated plants were one of the main examples of local knowledge in Kongwa. When asked about the most important crop to feed their family, farmer after farmer explained the benefits of drought resistant varieties. Ronaldo captures the general sentiment of the interviews:

> **Ronaldo:** The most important crops are cassava, sorghum, and bush millet.
> **Researcher**: Not maize, you planted 6 acres of it this year, why?
> **Ronaldo:** I planted maize for money, it is much better to sell than the others.
> **Researcher:** So why are the other three crops the most important?
> **Ronaldo:** They are drought tolerant crops. This is very important.

The intimate, but conflictual relationship that farmers have with the land and climate around them provides knowledge focused on how to grow food. In the case of Kongwa, this includes the necessity to plant a variety of crops that are drought resistant. Additionally, TEK exemplified by crop diversification is noted as a protection mechanism from drought and other climatic disasters in other areas of Africa (Bezner Kerr 2014).

Plant knowledge is one of the most overt and observable forms of knowledge within the villages. Due to the dominance of agriculture in the area, farmers develop their behaviors and decision-making

processes based on plants ability to produce food. Women will go to collect vegetables during certain parts of the rainy season; farmers will choose the most promising plants to save for next years seed; and the thumps of 'kinus' (hand mills) can be heard daily as food is processed from storage. However there are less overt systems of agricultural knowledge, which would often become more apparent in combination with the ways in which planting occurred. This came out throughout the interview process.

> **Researcher:** Which crop is the most important?
> **Ghuberi**: All crops. Maize, sorghum, bush millet, cow peas, green peas and bambara nuts.
> **Researcher:** Why do you think these are important?
> **Ghuberi:** Because we grow different types of crop on different pieces of land, due to the climatic changes and shortages of rainfall, some of the land and some of the crops even if there is a shortage of rainfall I can harvest. So that is why I grow different types of crops.

Ghuberi is demonstrating knowledge that is embedded in practice, which is recognized through a complex set of observations and experiences. The experiential knowledge that comes from growing food on a certain plot of land enables Ghuberi to use his understanding of his land and the regional micro-climates to choose the best crop based on his knowledge of plants he grows. This is in line with findings in other parts of Africa where research illustrates the ability for locals to match seed variety to a variety of conditions including soil type and climatic conditions (Bezner Kerr 2014; Sehoueto 2006). Additionally, there could be a variety of other factors, which he is drawing on such as indicators of rain, the likelihood of certain pests, or factors affecting soil fertility.

Smallholder farmers in Kongwa have a wealth of agricultural knowledge in other areas. Almost every farmer in Masenyeti described the problem of soil fertility, especially in relation to the number of years a field has been used. These farmers upon questioning of how to increase their soil fertility described practices of using animal manure or fallowing to increase the yields they receive from a certain plot of land. Additionally, tacit knowledge seemed to exist in the form of agricultural practices. Intercropping legumes (cow pea) and grain was a common practice in the area, which only was discussed when farmers were directly probed about this practice. Not only does the cow pea potentially increase available nitrogen in the soil through nitrogen fixation, but after the pea harvest, grazing is allowed on the fields adding organic matter and nutrients through livestock excrement. Similarly, a variety of techniques to dry and store grain exist in the communities. These techniques only were seen through personal observations; farmers did not include these skills in their knowledge about agriculture. Nevertheless, farmers built drying bins, granaries and shelters in order to store food for the entire year, ultimately providing greater food security and protection against drought.

Another form of tacit knowledge is women's knowledge about wild foods, vegetables, and pulses. These foods are crucial to the flavour and nutrition of meals, but no information about them was volunteered during the interview process. It was only through eating, cooking and working with families that I discovered the existence of wild foods. They are the most common and sometimes only food eaten beside grain based ugali. When asked about wild foods women described how to find, harvest, process, store and reconstitute a large variety of wild vegetables including *Kunde* (cow pea leaves), squash leaves, sweet potato leaves, new leaves on cassava, *safe* and *mlenda*. Wild food present two important findings; firstly, knowledge found in practice is tacit or embedded through years or generations of experience. Secondly, knowledge is relative to the social roles performed by people as men did not know much of this TEK. Different places within the social fabric of a culture allow or create differentiated knowledge. TEK in agriculture is found in many ways within Kongwa. Knowledge described in interviews such as plant species and seed selection is the most overt. However, TEK seen through agricultural systems (crop diversification, intercropping) or farming practices (seed drying and storage) demonstrate the veiled nature of much of the knowledge that exists in these communities. For outsiders, new to Kongwa, much of this knowledge would likely be unexplored.

Resiliency: coping strategies and resource management

Although there is evidence of rich sources of knowledge and capacity within Kongwa, it is important to avoid romanticizing the experience of local farmers. Population pressure and poor management have caused environmental havoc on grazing commons, grasslands and forests. However, there are some success stories. For instance, mixed crop and livestock systems coexist in Kongwa, whereby cattle or goats are grazed on the fodder left in the field after harvest at which point organic matter (manure) is added to the field. The TEK found in this system has existed in various forms for countless generations. Even the earliest ethnographies and stories about the Wagogo and Wakagulu state that semi-pastoralism has operated in the region for hundreds of years. One book suggests that this form of agriculture may be the only truly sustainable method of using the land in such an arid locale (Rigby 1969). Several farmers also recognize the importance of mixed crop and livestock farming.

> **Ghuberi:** I think that it is cultivation agriculture, farming is the most important (activity for feeding my family) because when I get enough harvest we sell the crops and buy livestock. When you only have livestock and you don't practice cultivation, during the hunger you can only sell animals to get food and you can remain with nothing. So I think that agriculture is the most important.
>
> **Ronaldo:** For me it is having both livestock and crops. This way if one fails, the other can make up for it. If the crops are poor I can sell a cow for food. If the crops are good I can buy cattle.

As demonstrated by farmers, Ghuberi and Ronaldo, the discussions about livestock were less about resource management and more focused on food and financial security. However, the value placed on this form of agricultural system is based in generations of practice suggesting cultural knowledge of the sustainability features embedded within it. Other farmers also emphasized the importance of mixed crop and livestock farming for protection against drought and food insecurity.

> **Jacob and Flora:** In order to protect against drought, the important thing is to make sure the soil fertility in the farm is to increase in order to get enough harvest. The year we have good rain, after getting enough harvest we sell those crops and then we buy livestock like goat or cattle. These animals we put at the house for reserve and then when there is a drought we sell those animals to get money and buy food.

Jacob and Flora's family utilize their livestock as an insurance mechanism to cope during years of drought. Many community members stated similar strategies in agriculture, with some additions of livestock bankrolling education, illness or home improvements. Therefore, TEK seen in systems of farm diversification provides strategies to improve food security and resist catastrophe such as drought or illness.

Other tacit knowledge around coping with drought and hunger exists in Kongwa beyond farm diversification. During the interviews many participants suggested that they do not have strategies to cope with hunger, through participant observation many coping mechanisms were uncovered including how to access emergency food stores (through loans or social capital), casual labour, migrating for work, collecting and storing wild foods, and eating famine foods. For many of these coping mechanisms, the knowledge about them is hidden in the mundane, not discussed because of its normativity. For other coping strategies the Traditional Ecological Knowledge is embedded by the social systems. In Kongwa, systems of reciprocity informed by attitudes of kin and friendship (especially among women), allow women to borrow grain for preparing a meal or two worth of food from a neighbor. While this does not always occur, the social capital found in this act and where to access it is important for survival during the hunger season. Whether TEK is overt, based in norms, hidden in social structures or influenced by cultural worldviews it is useful for coping during times of hunger. More importantly, Traditional Ecological Knowledge that supports food security exists in Kongwa despite local and external attitude emphasizing the inefficacy and laziness of people in the region.

3.7 Discussion

Traditional Ecological Knowledge is knowledge created through experiences with the ecology and social systems that are passed on after generational reflection. Berkes (2012) explains how TEK is found in three main spheres, the first of which is local empirical knowledge. Within Kongwa this knowledge mirrors that of previous studies in other areas including knowledge about plant breeding (Lazaro and Bisanda 2005), intercropping, farm management (Beckford and Barker 2007), and wild foods (Garibay-orijel et al. 2012; Powell et al. 2014). Locals commonly discussed the importance of drought resistance crops and the proper pairing of soil type to crop, which has been well documented within the literature (Bezner Kerr 2014; Corbeels et al. 2000; Liwenga 2003).

The second layer of TEK is practice. Practice includes both the resource management systems based in place as well as the social institutions that shape behaviour through institutional rules and norms. Examples of practice as resource management in Kongwa include strategies for coping with hunger such as the use of mixed crop and livestock systems of agriculture, which has also previously been documented in the region (di Lernia et al. 2013; Mnyampala 1954; Rigby 1969). Tacit knowledge embedded within social institutions also exists within Kongwa. Social capital seen through emergency food loans (and where to get these from) provides food during times of hunger for many families. The ability to navigate the migratory labour system, which has existed for at least 110 years (Maddox 1990, 1991) is also an example of tacit TEK within the region. Both local identifiable knowledge as well as practice intertwine and co-construct each other. Over years of experience and trial and error, knowledge gained informs and adapts social structures and management practices. In reverse, practices inform the knowledge that is easy to identify and transmit through generations. This same integration of knowledges is assumed to exist with the knowledge sphere of belief as seen in previous work on TEK (Berkes 2012; LaRochelle and Berkes 2003; Parlee and Berkes 2006).

Belief is the frame of reference that allows individuals to interpret the happenings of the world. It is based upon the experiences and observations of people as well as the ways we perceive the universe. While belief in Kongwa certainly includes religious, spiritual and moral guides, it also includes the self-perception and attitudes that provide identity both individual and collective. In this regard, the layers of TEK are at a disjuncture. Evidence demonstrates that Traditional Ecological Knowledge exists in Kongwa seen through practice or strategies, but interviews uncovered a seeming soft resolve for this local knowledge. While it is unfair to suggest that locals perceived a lack of efficacy toward local

development objectives, perhaps Antweiler's (1998) suggestion that social breakdown will slow development through the prioritization and individualization of survival strategies has some merit in this local. Through historical trauma such as 'Mtunya' (1917-1920), their ongoing struggle with drought and famine, and the associated social breakdown from these, the peasants of Dodoma could be prioritizing their belief in outside intervention over their own local knowledge for development. This perspective is consistent with the writings of Maddox (1990) who describes early famines as symbols of lost autonomy for the Wagogo and "a loss of the ability to control the reproduction of their own society" (p.197). . However, in contrast to this notion of external dependence is the ability of locals to reach the food security level they already have reached. Despite the climatic hardships of the region and the habitual hunger seasons, the people of Dodoma have survived and increased in population drastically since this time of dependence. Moreover, the historically rooted self-perception that people in Kongwa do not have knowledge to reproduce their own society and develop/adapt to the changing climate and times is contrasted by the Traditional Ecological Knowledge found in local practices, behaviours and social institutions. Therefore, this research identifies that Berkes' (2012) layers of TEK/knowledges can form a disjuncture, whereby practice and belief (or at least part of their belief) embody contradictory information.

Understanding the creation and maintenance of the self-perception embodying this disjuncture is beyond this study, but there are some examples of other beliefs that intersect with the local self-perception. While development interventions do not necessarily perpetuate the self-perception of inadequacy in Kongwa, the reliance on external knowledge embedded within their projects does not discourage this notion. Projects focused on new technologies, inserted knowledge or outside monitoring and evaluation provide concrete examples to locals of development knowledge situated as expert or scientific. While these interventions do not disable local agency, they do not challenge the external stereotype of inefficacy of the existing knowledge and people. Agricultural extension services in the region similarly provide an example of prioritizing scientific understandings of agriculture over that of local tradition and know-how. Therefore, through the development and extension services in Dodoma, knowledges about agricultural practices, nutrition, gender roles, land management, cropping, livestock and food are introduced into communities creating opportunity for the contestation of Traditional Ecological Knowledge. The tension that arises between dominant agricultural practices and those seen locally in Traditional Ecological Knowledge provides more fodder to feed the disjuncture between the existing knowledge and the stated self-perceptions found in Kongwa.

So what would a development project look like that attempts to bridge the disjuncture between local self-perception (belief) and practiced knowledge? In order to bridge this disjuncture local and external people could try to demonstrate the existence and value of Traditional Ecological Knowledge. Development projects, researchers and extension offices could all integrate training and methods that legitimize knowledge in the region. However, conflicting knowledges will likely arise whether it is between layers of TEK or between TEK and western scientific understandings of the world, ultimately creating tension. However, the ensuing tension could create opportunities for project or community discussion between competing perspectives, creating meaningful reflection on values, practices, attitudes and knowledge. This reflective discussion on local and external knowledges can help bring value to the practices, social institutions and beliefs that locals hold and use. This is seen in certain research and development projects that use participatory methodologies as a core part of their work (Kibwana 2003; Satzinger et al. 2009). Therefore, one possibility to bridge the disjuncture between knowledges could be the assertion of participatory methodologies that create tension and dialogue both within the community as well as between the community and those working on development, therefore providing the second hand to clap with.

However, tension created by conflicting knowledges may not be useful in itself. Without dialogue between these knowledges or about differing beliefs, disjuncture like the one in Kongwa may be fueled. Additionally, the use of participatory methods is not a catch all cure to legitimizing local knowledge. Numerous practitioners of participatory methodologies criticizes the use of participatory methods due to the potential reinforcement of local power dynamics as seen in gender, superstition, tribe, position, or status (Guijt 1998, Hickey and Mohan 2004). Berkes (2012) also cautions the absolute legitimization of Traditional Ecological Knowledge, describing instances where TEK inflects harm on others in the form of mistaken medicines or structured inequities. One strategy to navigate these challenges would be to use Ricoeur's (found in Coleman 2009) idea of hermeneutic dialogue as a philosophical guide for researchers, development projects and locals. The conflictual hermeneutics of affirmation and suspicion could be an analytic methodology to guide dialogue between Traditional Ecological Knowledge and external paradigms of knowing such as western science. These dialoguing knowledges (or people) can question and complement each other, hopefully providing safe guards from perpetuating harm and inequity as well as legitimizing the benefits of the each form of knowledge.

Research and development in Kongwa have many more avenues that could be taken. As seen through this study, attention to Traditional Ecological Knowledge within research should not assume

that the layers of knowledge-practice-belief will complement each other. Further research could evaluate the complementary and contradictory nature of these spheres. In Kongwa, more participatory research could be conducted to gain better understanding of the beliefs and the knowledge subsects (caused by gender, age, tribe etc.) that exist within the communities. Additionally, development projects and researchers could investigate the local agricultural and food security knowledge that exists within Kongwa with more nuances in order to provide local development that seeks to bring value to local knowledge and build off local needs, desires and involvement.

3.8 Conclusions and Limitations

Agriculture continues day after day in the communities of Mautya or Masenyeti. Seeds are collected, rains come, the ground is ploughed, grains are planted, food grows, crops are weeded, animals graze, wild vegetables are collected, crops are harvested, seeds are collected, observations are made and the cycle begins again with more experiential knowledge informing the next year. Traditional Ecological Knowledge does exist in the communities and it is shared, if not always known to those using it. The challenge exists in the acceptance and valuation of this knowledge. In many places where TEK has been studied, conversations of power often place this knowledge in conflict with or discredited by western scientific knowledge. In Kongwa, the story is different. TEK handed down to a new generation, adapted, and then handed down again supports food security in a semi-arid region of the world. As Maddox pointed out the people in the region are defined by their “adaptation to the (harsh semi-arid) environment” (Maddox 1995). However, the TEK in the community is not always recognized by local farmers as important to agricultural development and food security. More than that, the TEK that sustained the existence of people in the region in the area is often discounted by locals and development practitioners in favour of outside, western, or scientific agricultural knowledge. So how will the Traditional Ecological Knowledge survive over time? And will the knowledge that replaces it be able to adapt to the challenges of the semi-arid drought prone Dodoma region. These are questions that merit further investigation in the region.

3.9 References

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Chapter 4: Conclusion

In addition to the conclusions provided in Chapters 2 and 3, there are several important reflections to take from them together. First of all Chapters 2 and 3 provide two examples of studying food security while being sensitive to certain aspects of culture essentially demonstrating the important intersectionality between food security and cultural norms, attitudes and behaviors. In Chapter 2, examples from Kongwa illustrate the impact gender, specifically how gender shapes mobility, has on accessing food. Women's potential mobility is limited by the cultural narratives and meaning that inform attitudes and behaviors around movement. The local perception of female promiscuity resulting from female mobility combined with the rooted lifestyle shaped by gendered labour roles and child rearing mean that women in Kongwa have limited opportunity for personal movement around and outside of their community. As a result, women are not in the physical position to receive food from other households or cash/food from migrant employers like men do. Men on the other hand are expected to move about the community (tembea-tembea) and country (through migratory work), providing them the opportunity for procuring food external to the household. The large amounts of potential mobility men have in comparison to women means that gender influences individual's access to food. While Chapter 2 provides a new focus of intersecting gender with food security, food security literature is full of other examples of gender relations impacting food production, nutrition and other aspects of food security (see Bezner Kerr et al. 2011; Fischer and Qaim 2012; Oyekale 2013; World Bank et al. 2009). Generally, these papers investigate how power relations embedded in gender identity and behavior shapes household and individual food security. The work of this thesis combined with the repeated illustrations of gender influencing food security (seen within the literature review of Chapter 2) suggests that culture can greatly affect hunger and food security.

Beyond discovering that cultural constructs of gender shape food security, Traditional Ecological Knowledge developed and passed on through generations of experiences provides another example of culture intersecting with food security. Chapter 3 provides concrete examples of TEK that are important for maintaining or improving local food security. Knowledge about drought resilience, soils, crops and integrated livestock systems enables people in Kongwa to survive harsh semi-arid climatic conditions. Despite knowledge loss from colonial agricultural policies and famine initiated diaspora (Maddox 1990), people in Kongwa have held onto agricultural knowledge bound in place that provide ecological knowledge, social systems and practices that enable them to produce, store, prepare and eat food.

However, as in other places, this TEK is often set aside by policy makers and development practitioners who have been trained to rely on science (Breidlid 2009; Sehoueto 2006). In Kongwa, this is seen in part through the lack of opposition to local self-perception of inefficacy for community development in Kongwa. Nevertheless, people in Kongwa possess agricultural and food security knowledge that allows them to adapt to harsh climates and provide food for their families, which could aid in discussions of local or regional food security. Traditional Ecological Knowledge about food, seen through rules-in-place, practices, or social systems, provides another example of how culture and food security intersect. The intersections of culture and food seen in Chapters 2 and 3 demonstrate the necessity for more studies that investigate the links between culture and food security.

The second important point demonstrated by examining Chapters 2 and 3 together is the complex nature of the study of culture. Culture has multiple layers; it is understood differently based on our relative perspective; it is iterative and it is not always a positive force. Some of this complexity is illustrated through analyzing the earlier chapters together. For instance, the Traditional Ecological Knowledge embedded in the social structures and practices of community life in Kongwa is dependent, in part, on the constructions of gendered mobility that inhibit female access to food. It is through the current division of labour that local semi-pastoral farming is made possible; men are able to graze their animals because women are able to take time to do important household activities like process food and look after the children. This short example illustrates how TEK is partially tied to other aspects of prevailing culture within the Kongwa society. While this topic cannot be studied in depth for this paper, the point of this illustration is that cultural effects on food security are complex and intertwined with other aspects of society. Moreover, to better understand the interconnections of culture and food security, greater attention needs to be applied to how culture informs behaviors, attitudes, agricultural systems, individuals' access to food, food preferences and the production of food.

Another point provided by the earlier chapters is about the general discourse around food security. The study of food security largely focuses on the poorest people and regions of the world, hoping to improve the food access and availability in these places. A focus on food insecure populations is important, but one unintended result is the promotion of an image or identity of food insecure or food vulnerable people in the global south. This study also promoted a similar image through the discursive focus of hunger and food insecurity rather than a more positive angle on food security. Rarely is the human-food relationship in the global south reported for its positive identity that exists such as pleasure, joy, or nostalgia. Therefore, while more study of culture and food security is very important,

these studies could also attempt a discursive shift whereby food is not seen solely as an agent of food security, but also one of well-being, happiness and pleasure. For instance, Whitehead (1999) suggests one way to do this is to include participants opinions about which labour tasks are burdensome and which are pleasurable. Her rationale for this stems from the shifting perspectives of female labour in Africa.

> "It has increasingly been recognized that many rural African women have heavy workloads; in some accounts, this is contrasted with apparently light work burdens for men. I argue that in making women's work visible, where once it was not, it is possible to slip into thinking of African rural men as not doing very much at all. There is a danger in some policy discussions of producing an image of rural men as standing idly by, while their wives and daughters are overburdened with work" (Whitehead 1999:49).

In other words, the focus on food production as burdensome has both ignored the vocational or enjoyable parts of its activities as well as problematized male work ethic which may not be fair. Beyond gendered roles in agriculture, food can be positively associated with identity, vocation, learning, spirituality, or human-ecology interactions that affect our behaviours, relationships and institutions. In his journalistic auto-ethnography of self-discovery within the food system, Pollan (2006) writes about food identity as he describes the excitement of learning about food and the experience of growing, gathering and hunting for his personal subsistence. Similarly, Berry (2009) explains how "farming, animal husbandry, horticulture, and gardening, at their best, are complex and comely arts; there is much pleasure in knowing them" (p. 233). For Berry, learning about and experiencing food in its many facets provides enjoyment. He argues in a North American setting that participation in food production, preparing our own food, learning about the food system and creating relationships with food producers provides and 'extensive pleasure'. His argument is formulated in the hopes people use the pleasurable side of food to realize eating is an agricultural act that shapes their food system. Unlike in most of the western world where eating is often disconnected from agriculture, people in the global south are connected to food production every day through experience (i.e. %70 of Tanzanians are employed in agriculture). However, this does not mean Berry's argument is meaningless for the global south, simply that the study of the 'extensive pleasures' of food in places like Kongwa has the opportunity for a deeper understanding of the human-nature relationships. Additionally, research on these pleasures may provide a venue to dialogue about the important (local, regional, global, ecological or cultural) characteristics of food and food systems, including those that may have been lost within the western scientific understandings of food. Few sociologists have attempted to investigate these extensive pleasures of food in the global south.

One of the original goals of this research was to provide an opportunity to voice knowledge around marginalized ideas of food security and agriculture. The work on local knowledge in this study certainly provides this, but it also demonstrates the importance of emancipating this voice to provide the confidence or reassurance that these voices matter. This study was also partially conceptualized around the goal of making visible what is now hidden in our food system. Some of the important findings in this area demonstrate the importance of broadening our understanding of food security to include unconventional factors such as culture, gender, local knowledge, mobility, and self-perception. Moreover, conventional definitions of food security (focused on production and financial capabilities) likely would have missed the gendered inequities created by differential gendered mobility in Kongwa. Therefore, researchers, policy makers and other proponents of food security should consider broader understanding of food security that includes cultural knowledge or constraints to accessing food. Not only would these perspectives of food security better represent people in places like Kongwa, but they may also help uncover more hidden aspects of the current food system.

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