

OCTOBER 2011



Feinstein International Center

Strengthening the humanity and dignity of people in crisis through knowledge and practice



Milk Matters in Karamoja: Milk in Children's Diets and Household Livelihoods

Elizabeth Stites & Emily Mitchard



Save the Children®
in Uganda



Tufts
UNIVERSITY

Gerald J. and Dorothy R.
Friedman School of
Nutrition Science and Policy









unicef 
unite for children

©2011 Feinstein International Center. All Rights Reserved.

Fair use of this copyrighted material includes its use for non-commercial educational purposes, such as teaching, scholarship, research, criticism, commentary, and news reporting. Unless otherwise noted, those who wish to reproduce text and image files from this publication for such uses may do so without the Feinstein International Center's express permission. However, all commercial use of this material and/or reproduction that alters its meaning or intent, without the express permission of the Feinstein International Center, is prohibited.

Feinstein International Center
Tufts University
200 Boston Ave., Suite 4800
Medford, MA 02155
USA
tel: +1 617.627.3423
fax: +1 617.627.3428
fic.tufts.edu

Contents

Acknowledgements	2	
Executive Summary	3	
Introduction	5	
Background	5	
Methods	5	
Literature Review	7	
Livelihoods and diets in Karamoja	7	
Nutritional patterns in Karamoja	8	
Milk in livelihoods and diets	9	
Findings	10	
Sources of milk	10	
Uses of milk	13	
Milk in diets of young children	17	
Livelihood adaptations	23	
Thinking through Interventions	25	
Local perspectives	25	
External interventions	26	
In the meantime: conclusions and key recommendations	28	
Endnotes	30	
Works Cited	33	

Acknowledgements

The authors wish to acknowledge the work of Khristopher Carlson, Darlington Akabwai, Michael Kapolon, Irene Emanikor and Joyce Ilukori in collecting the data for this report. Berhanu Admassu ran the training, and input on the study design came from Kate Sadler, Andy Catley, Thomas Cole, Lorin Fries, Tanya Khara Latimore and Claudia Hudspeth. Thank you to Richard Ofwono, Luc Vanhoorickx, Vincent Abura, Diane Francisco, Peter Nkhonjera and the field staff at Save the Children in Uganda for logistics and support of this project, and appreciation to UNICEF/Kampala for donor support. Administrative support at Tufts University was provided by Anita Robbins, Elizabeth O’Leary, Rosa Pendenza and Ann O’Brien. Khristopher Carlson took the photographs and Bridget Snow did the layout. The lead author takes responsibility for any errors in this report and can be contacted at elizabeth.stites@tufts.edu

EXECUTIVE SUMMARY

The Karamoja region of northeastern Uganda has seen a precipitous decline in access to and availability of animal milk at the household level in recent years. This change has affected livelihoods, food security, and the nature of market exchanges, but has had the greatest impact on the diets and nutrition of young children.

The Milk Matters–Karamoja study is part of the joint Milk Matters research initiative which was started in Ethiopia in 2008 by the Feinstein International Center (FIC) at Tufts University and Save the Children – US. Milk Matters–Karamoja, the Ugandan component of this initiative, builds on the findings of the Ethiopia work and was designed with input from the joint team. Save the Children in Uganda (SCIUG) provided support for all stages of the research, and funding for the study was provided by UNICEF/Kampala.

Three over-arching questions informed the conceptual framework, study design, data collection, and analysis for Milk Matters–Karamoja:

- How have the amount and sources of milk coming into households changed?
- How has what households do with available milk changed?
- What are the impacts of these changes on child nutrition and household livelihoods?

A team from FIC collected data in September 2010 and February 2011 in six sub-counties split across the three livelihood zones in the region: pastoral, agro-pastoral and agricultural. The study took a livelihood (as opposed to a nutritional) approach and thus the data do not include anthropometric indicators. The research team prioritized local perspectives and experiences and data collection was as participatory as possible. Respondents created timelines of recent events to establish *before* and *now* periods, and the team compared milk supply, diets and livelihoods across these two time periods.

There has been a marked shift in milk produced from a household's own animals to milk acquired through market purchase or exchange. The milk supply in households dropped sharply across all livelihood zones over the two time periods. Respondents attributed the decrease in milk availability and access to multiple factors, including loss of livestock, distance of animals from settlements, poor animal health, the engagement of the military in animal husbandry, and shifts in livelihoods.

The uses of milk have changed in accordance with the decrease in milk supply within households. The primary shift is an increase in the relative portion of milk set aside for young children at the expense of all other uses. As total milk in households has decreased, people use milk for fewer purposes, though with variations in reporting by gender and location. In particular, milk is rarely used in the *now* period for rituals or ceremonies, and the amount of milk dedicated to sharing with visitors or with poorer households has dropped sharply. These changes have negative implications for the social networks of reciprocity that assist communities in managing vulnerability over time.

Providing milk for young children is the priority across all livelihood zones as emphasized by both men and women, and sour milk is the preferred form of milk for feeding children. Although the portion of total available milk given to children increased across the two time periods, the total *amount* of milk in children's diets dropped dramatically due to the overall decline in milk supply within households. Wild fruits and vegetables replaced the loss of milk and other animal proteins in the diets of young children. Respondents in all locations were clear as to the negative health and nutritional impacts of the loss of milk in the diets of their children. Parents also ascribed behavioral changes to the dietary shifts, and worried about the long term effects of the loss of dietary diversity.

Households have shifted livelihood strategies to improve food security and lessen vulnerability, but these adaptations have been insufficient to

counter recent shocks. Efforts to bolster food security fall into three broad categories: adaptations to replace items that have been lost in the diet, adaptations to decrease reliance on these same items, and adoption of new or different livelihood strategies to mitigate food insecurity. Ways to replace items previously in the diet include, for instance, increased natural resource exploitation or engagement in casual labor to acquire food or milk. Examples of adaptations to decrease reliance on critical dietary items include shifting to other food sources (such as relief food, wild foods and residue) and decreasing quantity of food and number of meals. New or different livelihood strategies often entail migration by some or all household members and shifting away from animal husbandry. Implementation and extent of all of these strategies vary by age, gender and access to assets.

Respondents had clear and relatively uniform opinions as to how to improve the situation. Many saw the absence of milk at the household level as emblematic of much broader issues, including the erosion of traditional pastoral livelihoods and the absence of state-provided law and order. Improved security and peace between groups in the wider region were the most commonly cited solutions to inadequate milk supply within households. The need for better protection was raised as critical in all locations.

In considering interventions to counter the decline in milk and corresponding negative impacts on the health and nutrition of children, international and national actors need to recognize the complexity of factors affecting milk supply at the household level. Additionally, programmers, policy makers, and donors should carefully consider the experience and literature from other contexts on livestock and market interventions. The Milk Matters team compiled examples of programs to improve milk supply in pastoral areas, and these strategies fell into broad categories of interventions aimed at increasing the number of animals, improving the health of animals, promoting better breeds, and preserving milk in less perishable forms. Unfortunately, the team found that there are few publically available evaluations regarding the specific impacts of such projects on milk supply.

In Karamoja, the combination of politics, conflict and insecurity create a difficult environment for most of the interventions reviewed by the Milk Matters team. For example, projects such as restocking could increase vulnerability to raids, while programs focusing on fodder support would require national government policies and funds to prioritize pastoralism as opposed to settled agriculture. Enhancing the marketability of milk may have potential, but only after overall milk supply is bolstered. Improving livestock health is likely to have the most short-term promise for Karamoja, and can build upon existing systems of community animal health workers and veterinary outreach projects. Any improvements to livestock health, however, will be only temporary if restrictions on herd mobility remain in effect and overcrowding of animals at or near military barracks continues. Improving households' access to milk will be incremental and will require action at multiple levels, including targeted nutritional support, protection and promotion of livestock-based livelihoods where appropriate, national policy change, and market support to expand dietary diversity.

INTRODUCTION

The children are not the same anymore. They are weak, sick, malnourished. The older children are more resistant to disease and I think that children who do not have milk are more likely to be sick. This is what I am seeing with my own children and I hear other people say this about their children too.... The day that my youngest gets milk then she smiles, plays and is happy.¹

Background

This report covers the findings and patterns based on fieldwork conducted in the Karamoja region of Uganda in September 2010 and February 2011 under the project Milk Matters–Karamoja. Milk Matters is a joint initiative between the Feinstein International Center (FIC) at Tufts University and Save the Children–US, and was initiated in Ethiopia in 2008. The Milk Matters–Karamoja research was developed with input from the combined FIC–Save US team, and was conducted by an FIC team with support from Save the Children in Uganda (SCIUG). The Milk Matters–Karamoja project is funded by UNICEF/Kampala.

The objective of the Milk Matters–Karamoja research was to better understand the livelihood and nutritional impacts of shifts in access to and availability of animal milk in Karamoja in recent years. We designed the study to examine this question through a livelihood as opposed to nutritional lens, and thus the data do not include anthropometric indicators of nutritional status. Data from pastoral areas in Ethiopia do provide information on nutritional changes: we designed this study with members of the Ethiopia team in order to examine some of the unanswered livelihood questions while still examining important aspects of nutrition for young children. This study does not attempt to replicate the Milk Matters Ethiopia project or methods; it is hoped that the two country studies will stand alone while also complementing each other.²

Methods

A team from FIC conducted two research trips and collected data in six sub-counties in Karamoja, interviewing men and women in their semi-permanent villages, widely known as

manyattas. Using the official designations for sub-counties by livelihood zone,³ we sampled two agricultural sub-counties (Irii, Napak and Lobalangit, Kaabong), two agro-pastoral sub-counties (Lokopo, Napak and Nakapelimoru, Kotido), and two pastoral sub-counties (Rengen, Kotido and Rupa, Moroto) across four districts. We worked in two locations in each sub-county, conducting at least nine focus groups and an average of 12 individual interviews per sub-county. The team targeted men and women with children under five years of age,⁴ with women making up approximately two-thirds of respondents. We used gender-specific focus group discussions and semi-structured individual interviews to gather data through participatory methods, including timelines, proportional piling, and pair-wise ranking exercises. In all questions, we sought to understand change over time, impacts of these changes, and the ways in which households and families had adapted to or were continuing to adapt to livelihood and nutritional shifts.

Interviews in all sites began by creating a timeline to illustrate periods of recent change. This exercise involved men and women of varying ages and also served to introduce the research and objectives of the project to the community. Each of the timelines indicated a shift in recent years based on conditions of drought and, in most cases, shifts in the security environment resulting from disarmament. Two distinct periods, called *before* and *now* in the subsequent analysis, were established and named according to characteristics listed by the communities.⁵ The participatory exercises, focus group discussions, and open-ended semi-structured individual interviews used the mutually agreed upon *before* and *now* time periods as reference points, and respondents were asked to describe conditions in the wet seasons in the two time periods.

Field research took place in September 2010 and February 2011. We intentionally selected these time periods to illustrate differences in current experiences and perspectives. September 2010 correlated to a period of above-normal crop production and more optimism and better health among the population. The improved rains during the preceding wet season had resulted in milk production that was much improved over the previous years. In contrast, interviews conducted in February came at the height of the dry season and at a period when many crop stores from the previous harvest had been exhausted. We followed the same method of establishing timelines in each research trip, and asked respondents for information pertaining to conditions in the wet seasons in the *before* time period and conditions in the wet seasons in the *now* time period.⁶ These exercises, by definition, involved recall and reconstruction of past events. Although respondents in both September and February would have been recalling the same most recent wet seasons (i.e., in the *now* time period), we received markedly different responses in September versus February. We ascribe this difference to the general state of affairs at the time of data collection—a period of optimism following a relatively good harvest versus a period of hardship in the dry season. As we were seeking information on wet season conditions, we take the September data to be more accurate, as the recall was for a less distant period and the conditions in September more closely resembled the conditions that would have been experienced several months earlier in the wet season. This report does discuss and reference the February data when relevant, often to illustrate the differences in perceptions.

We selected study sites in an effort to illustrate the range of experiences in the three livelihood zones. Sites were strategically selected with a balance of proximity to trading centers and to neighboring potentially hostile groups. This study is not and did not aim to be statistically representative. The findings, therefore, *apply only to the study population* and cannot be taken to represent the experiences of the populations across Karamoja or across the respective livelihood zones. We do believe that patterns in the findings as discussed in this report are likely

to hold true to varying degrees in other areas, but these findings should not be extrapolated without additional research.

A group training at the start of the research ensured that all team members were conducting the participatory exercises in a consistent, standard manner. Two participatory tools used in the exercises, proportional piling and pair-wise ranking, are specifically designed to facilitate numerical presentation and statistical analysis. Thus, once the data was collected, we were able to convert it to quantitative data and analyze it using SPSS software, version 19. We cleaned the data and discarded responses in which errors in collection or transcription were apparent. The sample size therefore varies for each question, and this is noted where we believe it to be particularly relevant. We used NVivo 8 software to analyze the qualitative data from the focus group discussions and the semi-structured individual interviews.

This report begins with a literature review and then discusses the major findings on sources of milk, uses of milk, milk in the diets of young children, livelihood adaptations, and lessons learned from the field work. The report ends with conclusions and recommendations.

LITERATURE REVIEW

The primary objective of this review is to summarize key findings in the academic and 'gray' literature related to diets, nutrition, and the role of milk in the Karamoja region from a livelihoods perspective. Where gaps in Karamoja-specific literature were identified, we drew on literature from relevant topical areas of livelihoods, peace and conflict, climate change, and other related fields, as well as from literature on pastoralist societies in the broader horn of Africa. This review builds off of an earlier literature review conducted by the Milk Matters team in Ethiopia that summarized the scientific underpinnings for the contribution of milk to children's growth patterns, nutrition and overall health, the importance of milk in the diets of pastoralists around the globe, as well as the impact of animal disease and poor health on milk production. While it draws heavily on input from this review, it avoids replication by focusing on factors and characteristics specific to Karamoja. Finally, an emphasis was placed on capturing change over time, particularly as related to issues of access and availability of livestock and, by extension, milk.

Livelihoods and diets in Karamoja

The semi-arid region of Karamoja is home to multiple ethnic and territorial groups: the Dodoth, Nyangia, Napore and Ik in the north, the Jie and Tobur, or Acholi Labwor, in the central region, and the Bokora, Matheniko, Pian (together called the Karimojong) and the Tepeth in the south. Most of these groups have historically relied on pastoralism as their primary livelihood strategy, depending on mobility and diverse livestock herds to counter the vagaries of weather such as unpredictable rainfall and frequent droughts (Gray 2000; Akabwai 2007; Rugadya 2006). Where appropriate, agricultural production has been incorporated as an opportunistic strategy to complement livestock herding, but is largely restricted to cereal production due to the dry climate (WFP 2007). A large proportion of livelihood systems in the region fall into the category of agro-pastoralism: cultivation of mainly sorghum or maize by

women and children occurs at the more permanent settlement site or manyatta, while men and a smaller number of women herd livestock in search of adequate pasture and water, following seasonally established routes (Akabwai 2007). Herders establish dry season cattle camps, or kraals, and often return to the same locations year after year.

While subsets of the population have adopted agricultural production or retained transhumance to varying extents, the commonality of livelihood strategies confers a striking level of homogeneity to diets across Karamoja (Levine 2010; WFP 2007). Livestock products (meat, milk, and blood) form the basis of the diet, complemented with maize or sorghum, and sometimes beans and groundnuts, from households' own agricultural production. Vegetables and wild fruits gathered through foraging or purchased in the market, along with fats and oils, supplement the diet depending on factors such as availability, access to markets, and household income (Galvin 1992; Shell-Duncan 1995; Nathan 1996; WFP 2007).

Serious changes to diets and subsequent nutritional status among the populations of Karamoja have been noted since the 1970s. These changes have been shaped not only by environmental pressures, but by politics of marginalization and structural inequality, a history of cattle raiding, an influx of weapons, and more recently escalating insecurity and military presence (Gray 2000; Mirzeler and Young 2000; Ocan 1992; Stites and Akabwai 2009). While beyond the scope of this literature review, the unique confluence of these factors has pushed the debate around the future of pastoralism and agro-pastoralism for livelihoods, food security and nutrition in Karamoja in a direction distinct from most other pastoralist regions. Where the threat of climate change dominates discussions on the survival of pastoralism in other parts of Africa, the restriction on mobility is the overriding threat to Karamoja pastoralists (Levine 2010; FAC 2011).

Nutritional patterns in Karamoja

Pastoralists across many regions have in common their tall and lean physique, a phenomenon attributed to diets high in animal protein and low in caloric intake (Gray 2000; Sadler 2009). High levels of milk consumption in particular have been linked to these distinctive linear growth patterns (Allen 1994; Hoppe 2006). Agro-pastoralist children from Karamoja, as demonstrated through a nutrition study comparing children from three geographically distinct areas of Uganda in the 1960s, were no exception: the study found that, while lean for their ages, Karamoja children were generally healthy despite an ongoing drought at the time of data collection (Rutishauser 1969).⁷ The results also provide unique insight into the dietary resilience of pastoralist and agro-pastoralist strategies in the face of harsh environmental conditions in pre-conflict Karamoja. However, by the early 1990s, nutritional studies emerging from the region were painting a very different picture. A team of researchers from the University of Kansas led by Sandra Gray collected anthropometric data from a representative sample of Karimojong (Matheniko, Bokora and Pian) children and adolescents in 1989-90 and again in 2004. The results of their analysis, presented through a series of papers, revealed high rates of malnutrition, with nearly half of the children stunted, half underweight, and 25 percent wasted (Gray 2008, 2009, 2010).

In explaining the high rates of malnutrition seen among the Karimojong, Gray et al. (2008, 2010) point to a precarious web of insecurity and constrained livelihoods that exacerbate poor health outcomes for children. Insecurity leads to denser settlements with often unsanitary conditions, rising rates of childhood infections, loss of milk and other appropriate foods for weaning, poor maternal health and nutrition status, and other psychosocial stressors. All relating to insecurity, these factors create a dangerous combination for children's health (Gray 2008). Moreover, the absence of livestock and milk as economic resources for women to sell or trade for other food and non-food items appears to be leading many households to resort to unsustainable and potentially unhealthy

coping strategies such as extensive natural resource exploitation and beer brewing. Beer brewing has the added benefit of producing residue, which is then fed to children and other household members in the absence of other foods (Dancause 2010).

While the factors of change are numerous and complex, the reduction of livestock in household assets and the associated decrease in livestock products, including milk, in diets are dominant themes in the decline in nutritional status and rise in food insecurity in the Karamoja region (WFP 2007; Gray 2008). In a 2007 assessment, WFP identified these same elements as two of the primary factors driving vulnerability and food insecurity. The assessment found that a striking 75 percent of households were food insecure or moderately food insecure in the Karamoja region, and that food insecurity was significantly associated with a lack of livestock owned. Households reliant on agriculture/gathering or casual agricultural labor were also found to be on average more food insecure than, for example, households classified as agro-pastoralist or with members who were professional/civil servants. Moreover, the study revealed that for food secure households, milk and blood were consumed a significantly greater number of days compared to food insecure households. Lack of access to animals and poor health of animals were the main reasons for less milk and blood consumption. Finally, the assessment found that the greatest proportion of children experiencing severe acute malnutrition were residing in food insecure households, which were predominantly characterized as those lacking access to animals and to milk (WFP 2007).

More recent surveys conducted by international organizations, government agencies, and other institutions have continued to amass data on the state of nutrition and health in Karamoja. While these surveys and reports document a positive trend of declining overall rates of global acute malnutrition (GAM) and severe acute malnutrition (SAM) between 2003 and 2009, they also reveal persistently higher rates in Karamoja than other regions in Uganda. The data also indicate ongoing vulnerability of the region to shocks that could result in rates

surpassing emergency threshold levels for GAM and SAM set at 10 percent and <1 percent respectively (MOH 2008; UNICEF 2009; Chotard 2010).⁸ The United Nations Office for the Coordination of Humanitarian Affairs (OCHA) coordinated a series of papers titled the Karamoja Special Reports to monitor the humanitarian situation, including any fluctuations in GAM and SAM rates, through the end of 2010. However, given the favorable rains in 2010 and marked improvement in food security at the household level, the special focus on Karamoja has been eased into routine monitoring of the security situation by OCHA for the upcoming year (UN 2011). Despite these modest improvements in nutrition statistics for the area, insecurity continues and households remain vulnerable to crisis.

Milk in livelihoods and diets

Consistent across the literature on pastoralism and agro-pastoralism is the pronounced importance of livestock and, in particular, milk to livelihoods and diets (Galvin 1992; WFP 2007; Sadler et al. 2010; Sadler 2009). Milk as a renewable resource is a remarkably efficient means of converting pasture to energy and is a major source of critical vitamins and minerals for growth (Sadler 2010). However, milk availability for the diet is a function of several factors: availability and access to pasture and water, animal husbandry practices, and the disease status of animals. In semi-arid regions, rainfall patterns determine the availability of pasture and water, thereby bringing a seasonal component to milk production and availability: in pastoral and agro-pastoral areas in Karamoja, men and livestock follow seasonally available pasture, often leaving most of the women and children behind at the settlements with limited access to livestock (Sadler 2009; Akabwai 2007). Many of the patterns seen in nutritional surveys in pastoral areas indeed reflect this seasonal element, with elevated levels of child malnutrition during the dry season (Shell-Duncan 1995; Sadler 2010).

In addition to its nutritional role, milk plays an important part in the social and cultural aspects of the lives of pastoralists and agro-pastoralists. Complex systems of reciprocity and gift-giving

have traditionally functioned as critical components of risk-management and resource-sharing strategies in many pastoral societies (Sikana 1993; Gray 2000; Rugadya 2006). For example, lending of milking animals to poorer households is a common practice, and the household that is helped may return the favor with labor or gifts in the future (Rugadya 2006; Sikana 1993; Sadler 2009). Sharing of milk itself also features in maintaining social relations. Indeed in some pastoralist societies, selling of milk is prohibited due to its importance in hospitality and sharing (Sadler 2009). In all cases, the decisions around the particular uses of milk either for household consumption, sale, hospitality, or gifting are often meticulously planned to maintain a careful balance between social relationships and norms and household needs.

Sources of milk

- **The most pronounced shift in milk supply at the household level is the decline in the production of milk from animals owned by a household, which has been replaced by a sharp increase in purchased milk.**

The most pronounced change in sources of milk for households in all three livelihood zones (agricultural, pastoral and agro-pastoral) is the decrease in production from the animals owned by a household (referred hereafter as “own production”) from the *before* to *now* time periods. Both September and February data in the *before* time period show own production to be the primary source of milk into the household, providing 76 percent and 88 percent or more of the milk in September and February respectively across all three livelihood zones. In comparison, September data from the *now* period show own production to be the source of only 23 percent of the milk coming into the household in the agricultural zone, 48 percent in the pastoral zone, and 67 percent in the agro-pastoral zone. February data from the *now* period show no milk from own production in the pastoral zone, only two percent of milk from own production in the agro-pastoral zone, and 18 percent of milk from own production in the agricultural zone. As shown in Figure 1 below, variations in sources of milk in the *now* period in the February data are reported only by men: women in February reported 100 percent of milk as coming from purchased sources.

Purchased milk has replaced own production as the most important source of milk for households in the *now* period in all livelihood zones. September data show purchased milk at 66 percent in the agricultural zone, 45 percent in the pastoral zone, and 29 percent in the agro-pastoral zone. Proportions for purchased milk from the February data are higher: 100 percent of milk is said to come from purchases in the pastoral zone, 98 percent in the agro-pastoral zone, and 77 percent of milk in the agricultural zone.

Households acquire money for purchase of milk through sale of natural resources and engagement in casual labor for pay or for in-kind exchanges (either milk or other commodities that can then be traded or sold for milk). Milk is purchased either in trading centers or from the herders or soldiers at the kraals.

Milk purchased in town can be purchased from shops “in packets” or by the cupful from herders or traders. (Women in Iri sub-county report that the milk in the kraal is about one-third less expensive than milk purchased in the market in Iri town). The amount of milk available for purchase in kraals depends, in part, on the portion that must be given or sold to the soldiers. Milk often sells out quickly, and women who live farther from markets or kraals report that there is often no milk left to buy by the time they reach the market. Respondents in multiple locations complained that purchased milk was diluted with water, often twice if purchased in towns—first by the herders and then again by the traders.⁹

The purchase of milk does not make up for the drop in own production because of both cost and availability. Buying milk requires the generation of adequate cash, normally through the sale of natural resources (such as firewood, charcoal, building poles or grass for thatch) or through casual labor, and the small amounts of cash must be used for multiple purposes, including the purchase of other food commodities such as cereals. Kraals are often far away from home areas, and traveling to kraals can pose a security risk. Women who go to distant kraals for milk try to travel in groups for increased safety and will usually spend a few days at the kraals before returning home. As a result of these factors, the total supply of milk in households has dropped abruptly and the purchase of milk only modestly improves household supply (discussed in detail in next section).

As a final note, the gender of respondents plays an interesting role in reporting of sources of milk, particularly in reference to the current period. As shown in the graphs below, women in both September and February reported higher

proportions of milk coming from purchased sources than did their male counterparts.

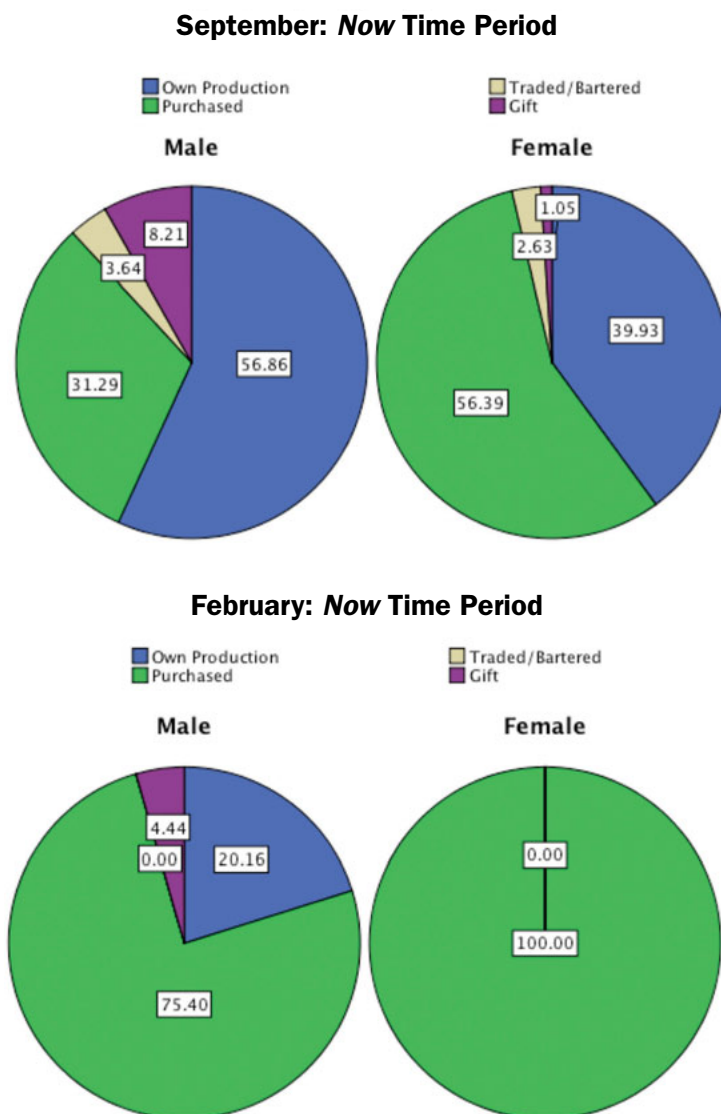
These differences are likely due to gender divisions in livelihood activities and milk procurement associated with these livelihoods. Women generate the cash for the purchase of milk through the sale of natural resources or casual labor and are thus more closely linked to this aspect of market exchange, whereas men are more likely to be engaged in animal husbandry and exchange (through gifts) with other herders. Although not specifically asked of respondents, these differences likely also reflect the variations in the sources of milk as consumed or allocated by men and women. Men are using more milk

that comes directly from animals, whereas women are using a greater amount of milk from market sources.

- **The milk supply in households dropped precipitously across all livelihood zones across the two time periods.**

The most profound overall change between the two time periods was the decrease in the overall milk supply to households. Data from September show several locations in which milk supply was reported at zero, and the number of locations reporting zero milk within households was higher in the February data. The figure below shows the mean percent decrease in milk

Figure 1. Milk supply to households by gender in the *now* period, September and February data



supply by livelihood zone and month of interviews.

While the above graph illustrates the shifts in responses based on the month of data collection, the more important information is the extent of the steep overall decrease in milk supply. Even if we opt to ignore the February data, the mean percent decrease across locations for September are extreme, and indicate that the amount of milk coming into households has dropped precipitously in all areas.

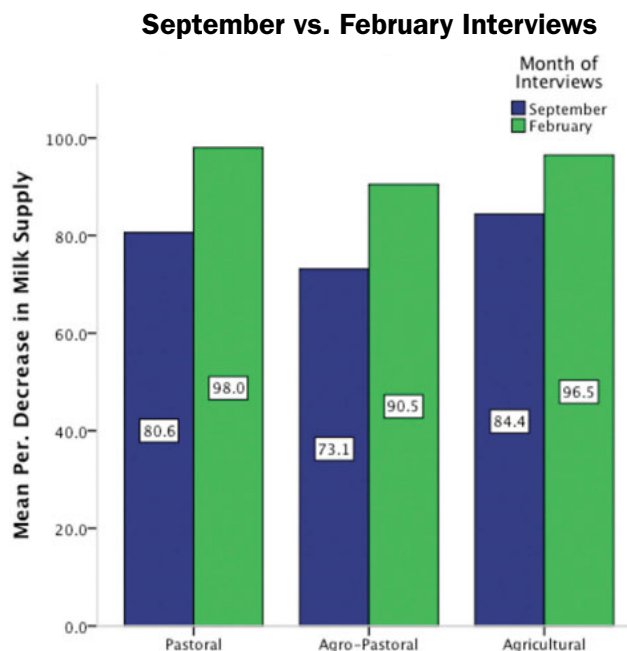
- **Decreased milk supply is due to the loss of both availability and access caused by a variety of interlinked factors, including loss of livestock, distance from herds, animal health, the involvement of the military in animal husbandry, and shifts in livelihood strategies.**

As discussed in the literature review, milk supply normally fluctuates seasonally, and households would generally experience periods of greater or lower access to and availability of milk, with intra-household distribution dynamics affecting

individual consumption of milk. When comparing the *before* and *now* time periods, however, we see an overall decrease in both the availability of and access to milk that exceeds what is typically seen with seasonal fluctuations. This decrease is due primarily to the loss of own production, which is a function of the overall loss of livestock (or access to livestock) at the household and community level. Decreased own production and declining access to livestock are processes influenced and exacerbated by the following factors:

- Households once kept “milk herds” near to their homesteads for regular access to milk, even when the larger herds were out at dry season pasture. Insecurity led households to put all of their animals into kraals at or near military barracks, which usually increased both the distance to these animals and negatively impacted the health of the animals. Military personnel often limit regular access to livestock, thereby constraining both milk off-take and the management of herds for optimal milk production (through techniques such as restricted nursing of the young).¹⁰

Figure 2. Mean percent decrease in milk supply to the household by livelihood zone and month of interviews



Furthermore, individuals in multiple locations reported having to buy milk (from their own animals) from the security personnel or having to give a proportion of milk to the soldiers “in exchange for them taking care of the animals.”

- Years of successive drought have caused increased morbidity and mortality of animals. Many animals have died or been sold, and those that remain produce less milk. Limited mobility of herds has worsened the impact of the droughts. Traditional systems of animal migration enabled herders to mitigate the impacts of drought by accessing dry season grazing areas, dividing herds, and sending animals out to the care of allies in less arid areas for the duration of the drought season (Gulliver 1955). Mobility has decreased due to insecurity, restrictions on (internal and external) cross-border movement of herds, and the establishment by the military of protected kraals.
- Overcrowding and decreased mobility, combined with the stress of drought, have led to an increase in the prevalence of animal disease. While the military’s protected kraal system has brought some improvements in security, respondents and key informants (including district veterinary officers) reported that the crowded and static kraals have brought decreased rates of reproduction, increased death rates of animal offspring, and increased transmission of disease.
- Some individuals and households have moved away from animal-based production systems. Those who abandon or decrease animal-based systems usually migrate to towns and cities, move to the less arid western and southern regions of Karamoja, or increase engagement in natural resource exploitation and/or petty trade. Reasons for decreasing animal production include the security and economic liability of keeping herds, loss of animals (due to factors listed above), the belief that economic opportunities will be better in urban areas, and the (perceived) promise of humanitarian

and development assistance in the “resettlement” sites.

With the exception of purchasing, means of procuring milk through avenues other than own production have also decreased. These alternative sources in the *before* time period included sharing among households, exchange with migrating pastoralists from other areas, and gifts. These systems of exchange were important means of building social reciprocity and allegiances between groups, and the erosion of these sources not only reduced the amount of milk coming into households, but also heightened vulnerability by eliminating sources of potential assistance.

Uses of milk

With the decrease in milk supply at the household level have come important shifts in how milk is used. The primary shift is an increase in the portion of milk allocated to young children, and a decrease (or cessation) of all other uses of milk. This section first examines changes in how milk is used and then discusses the role of milk in the diets of children across the two time periods.

- **The decrease in milk supply has narrowed the range of reported uses of milk, though with differences based on gender of respondents and livelihood zone.**

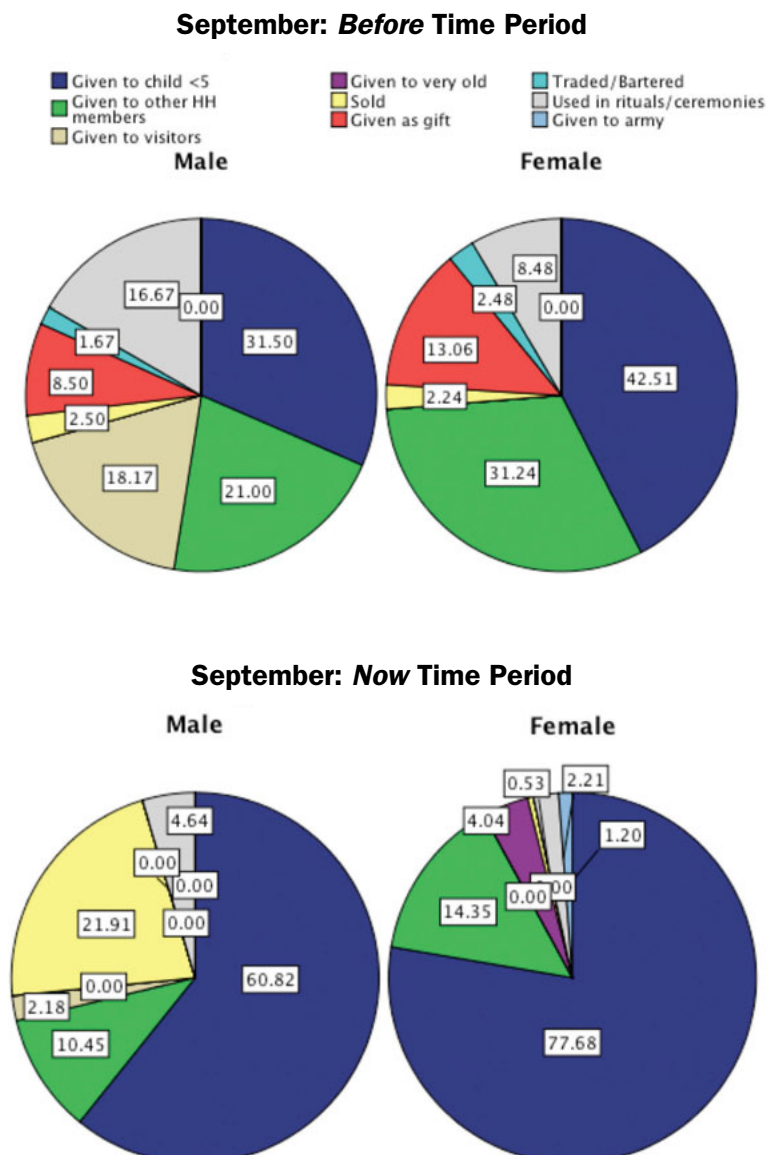
In the *before* time period, milk was an important part of household diets, social exchange, and commerce. Along with consumption by all household members, respondents listed using milk in ceremonies and rituals, as a gift, as an offering for visitors, and for sale and trade. Women made ghee from a portion of the milk which was then consumed, sold, exchanged or used for decorative purposes such as greasing metal jewelry or in hairstyles. While the average number of uses for milk has remained consistent across the study population, the portions of how milk is used have shifted in important ways. These reported shifts vary considerably by gender, as shown in Figure 3 below.

In the September data, women reported very little milk being used for anything other than consumption by household members (children, other household members, and the very old) in the *now* period (under four percent), whereas men report almost 29 percent of milk being sold, used in rituals or ceremonies, and given to visitors in the *now* period. In several locations men reported that much of the available milk had to be sold to purchase non-food and food commodities. Male elders in Rupa sub-county said that milk was sold to buy beer in the *before* time period;¹¹ it can be assumed that men in some areas continue to sell milk when available

to buy traditional brew. In contrast to the September data, women interviewed in February reported no use of milk in the *now* period other than milk for young children, and the only additional use of milk reported by men in the *now* was for use in ceremonies.

Differences in how milk is used across the two time periods are more pronounced when compared by livelihood zone (Figure 4). Milk use in the *before* time period was markedly similar in the three zones, but diverges in the *now* period, particularly in the agricultural zone.

Figure 3. Use of milk as reported by gender, September data

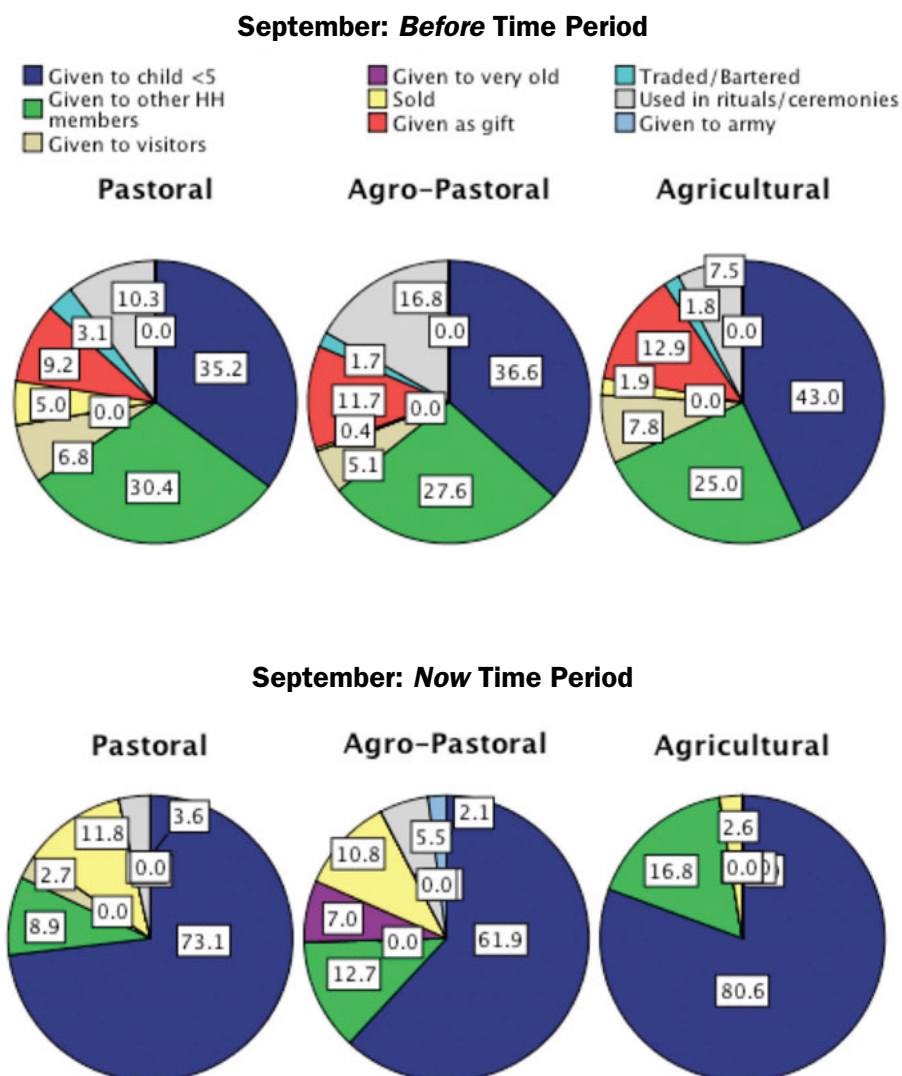


The greater diversity of uses for milk in the *now* period in the pastoral and agro-pastoral zones as compared to the agricultural zone could be due to variety of factors. Our study did not seek to quantify the amounts of milk available, but the greater diversity of uses in the first two zones may imply that more milk is available in these areas. Alternatively, the increased portion sold in the pastoral and agro-pastoral zones (11.78 percent and 10.82 percent respectively) could be due to the need to purchase foods that are available through own production in the agricultural zone (2.6 percent reported sold). While each representing only a small portion of total milk usage, the milk given to visitors in the pastoral zone (2.67 percent) and the milk given to the army in the agro-pastoral zone (2.07

percent) may be indicative of important coping mechanisms in these areas as local populations seek to maintain social networks and positive relations with the military.

The sale of milk is an important non-consumption component across all livelihood zones in the *now* period.¹² Selling milk generates cash for essential commodities and other food items, including medicine for children, veterinary supplies, clothing, shoes, salt, ground maize (*posho*), dried fish and school books. Milk can be sold at multiple locations in the *now* period, whereas in the past milk was usually only sold or traded in towns, as “everyone in the village had enough milk.”¹³ Commodities purchased in the *before* time period from the sale

Figure 4. Patterns of Milk Use by livelihood zone



of milk also included tobacco, beads and other decorative aspects. The form in which milk is sold varies, with some respondents reporting the sale of both fresh and sour milk (as well as some ghee), and others selling milk primarily as sour. The form of milk sold likely varies based on who is doing the selling (i.e., herders would always sell fresh), proximity to markets, and the nature of demand. The use of money generated from sale of milk will also differ based on who is doing the selling. For instance, female respondents in Lokopo sub-county explained that when there was adequate milk, young herders would be allowed to sell some of the milk to generate cash to buy small things for themselves.¹⁴

- **Two of the most pronounced changes in uses of milk from the *before* to *now* periods are decrease in milk for rituals/ceremonies and decrease in sharing of milk. These shifts have important implications for the political order and for management of vulnerability.**

In examining figures 3 and 4 above, we see a marked decline across the two time periods in the amount of milk used in ceremonies and the amount of milk given as gifts and given to visitors. Men reported a combined total of over 43 percent of milk used for these three purposes in the *before* period (figure 3). (Women, less likely to be in a position of hosting, did not list “given to visitors” as a category and had a total of 21.5 percent of milk used for gifts and rituals in the *before* time period.) Milk is not used in ceremonies today both because of both the relative scarcity of milk and because ceremonies and rituals are rarely performed in periods of drought or hardship. A group of women in Iriri sub-county said: “How can we have ceremonies? Milk is necessary to perform ceremonies.”¹⁵ Ceremonies in which milk was particularly important were weddings, initiations, and the naming of babies. As the regularity of ceremonies decreases, so too does the political and social cohesion within and among communities. In particular, the stagnation in initiations of male youth exacerbates tensions between the generations, while the decline of official marriage has

important consequences for the vulnerability of women and children.¹⁶

The loss of sharing of milk through gifts or with visitors is a particularly important finding from the data, as it indicates both the overall loss of milk across the population and the erosion of social exchanges that previously helped to mitigate vulnerability. There are subtle but important differences in gifting of milk and giving milk to visitors that add to our understanding of these aspects.

As shown in figure 3 above, women and men both report giving milk as a gift in the *before* time period, but only men report giving milk to visitors.¹⁷ Households most often made gifts of milk to those who had a new baby, did not have milk animals, or had animals that had not yet reproduced, or, as put simply by a group of men in Rengen sub-county, “A household with milking cows supported those households without.”¹⁸ While some of these gifts were expected to be reciprocated, gifts of milk made to households who were experiencing hardship were acts of kindness or charity.¹⁹ The widespread loss of animals and decrease of milk availability and access have led to a sharp decrease in offering of milk to those in temporary or longer term need. As a group of women explained, “There is no trading or gifting happening anymore because there is not enough milk.”²⁰ However, although the ability to gift milk has declined drastically, women in locations in Kotido and Kaabong described a system whereby “some children are invited to others’ households when there is no milk in their own household. They will share milk with other small children.”²¹ Outright gifts in these areas are no longer possible, but dividing meal portions between children allows for some assistance to the more vulnerable. Such accounts indicate that social networks are attempting to offer support, but as most children are eating only one meal per day, splitting meager amounts is unlikely to be a widespread practice or a sustainable solution to ease hunger. The difficulties of helping others were particularly acute for respondents during the February interviews, as evidenced in the thoughts of a woman in Kaabong:



At the village, everyone is looking after themselves. There is little people do anymore to try to help others because households do not have extra resources to share. I must think about my home, not my community.²²

Offering milk to visitors is an important cultural part of the pastoral cultures in the region. Although women did not list milk for visitors as a use of milk in the proportional piling exercise, women did talk about the importance of providing milk to guests in open-ended interviews. A group of women in Kaabong explained how this has changed over time and the impacts of this:

We had plenty of milk for visitors....Fresh milk was the form of milk given to visitors. It was a special food to offer and its significance is that it was the traditional thing to do. This is something we learned from our own mothers. But now it is a big challenge to do this. It is not possible because there is no milk. Now it is nothing but shame. We collect sunflower [seeds] and crush [them] with green vegetables and this is what we give to the visitors instead of milk.²³

Not being able to provide milk for visitors brings shame for women, and they struggle to provide

an alternative dish. (Note that Lobangit is considered a particularly rich agricultural area; in most of the study sites, households would have nothing at all to offer visitors.) Hospitality and reciprocity are critical in maintaining the social order, and it is the social order that forms the basis of marriages, allegiances among groups, trading relations, and shared access to natural resources. The collapse of rituals associated with these social systems threatens the systems themselves over time.

Milk in diets of young children

- **Although the milk supply in households decreased sharply from the *before* to the *now* time periods, consumption by young children remains the priority use of milk, and the percentage of total available milk fed to young children increased across the two time periods.**

Households are prioritizing milk consumption by young children, even with extreme decreases in milk supply. As illustrated clearly in the bar graph below (figure 5), this shift is managed by sharply decreasing the amount of milk going to all other uses (with the exception of milk sold, as discussed earlier), including the amount of milk

consumed by all other household members. A group of men in Kotido explained the difference in uses of milk:

There was plenty of milk for both children and adults. Everybody was strong and healthy because of taking milk. Milk was consumed at the household by children under five as well as by other members of the household. It was also available for households that had no animals to milk. There was enough milk for visitors too. Butter from milk was used to massage children and was smeared by girls and women to make their skins and hair smooth and shiny. Presently, milk is too little to be consumed by everybody. It is not even enough to be sold. Instead, it is only given to children.²⁴

In the *before* time period, women reported that of the total amount of milk strictly consumed in the household, other household members received approximately 43 percent and children consumed 57 percent, while men reported other households members receiving 40 percent and children 60 percent. In contrast, in the *now* time period, women reported that other household members (including the very old) received 19 percent of the milk consumed in the household, with

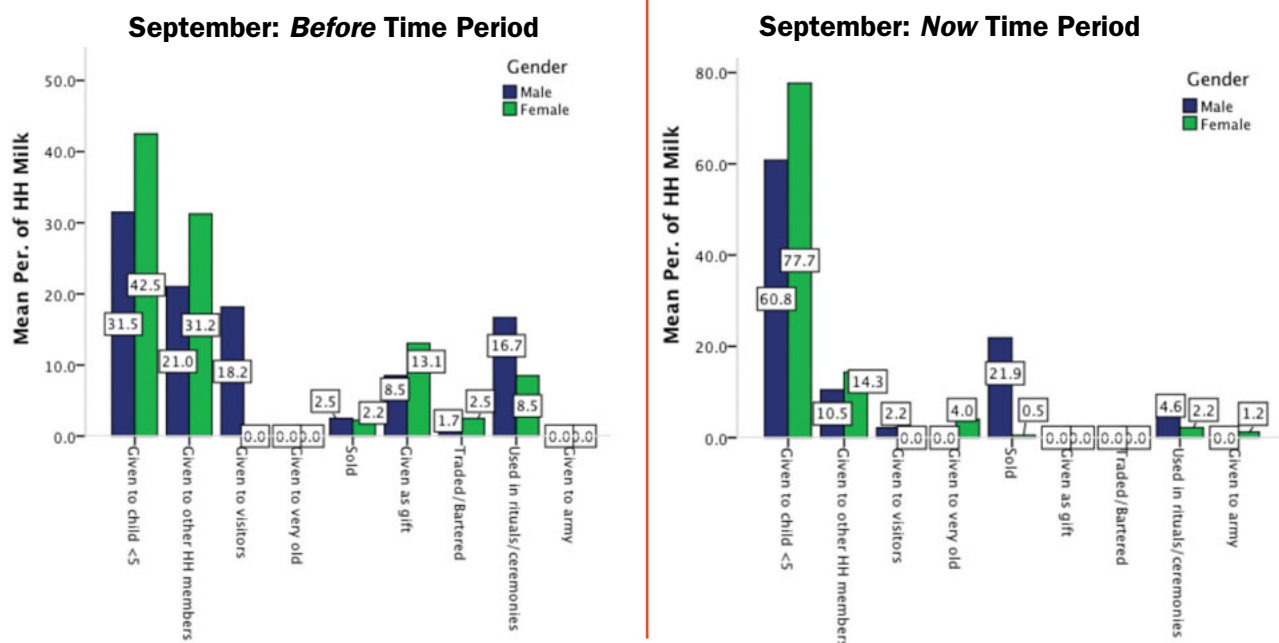
children receiving the lion's share of 81 percent. Men reported that other members received 15 percent and children received 85 percent in the *now* period.²⁶ Interestingly, while men and women differ somewhat in their accounts of the percentage of milk consumed by household members versus children, both show clear trends in increasing the amount to children from *before* to *now*, and conversely decreasing amounts to other household members from *before* to *now*. This consistency adds confidence to our interpretation of the data.

It is important to remember, of course, that even though young children are receiving a greater percentage of the total milk supply than they were previously, the precipitous drop in total available milk means that children are receiving significantly less milk than in the previous time period.

- **The form in which milk is fed to children remained relatively consistent across time periods and livelihood zones.**

Sour milk is the preferred form of milk for young children across both time periods and all

Figure 5. Patterns of Milk Use as reported by gender, September data (bar graph)²⁵



livelihood zones. Respondents feel that sour milk is easier to digest than fresh milk, less likely to cause diarrhea, and mixes easily with porridge and vegetables.²⁷ It is also easier to purchase sour milk than fresh milk on the market. Donkey milk, considered to have medicinal properties, was an exception and was consumed as fresh milk. Goat milk is considered to be the closest to cow milk, and is often fed to infants in lieu of mother's milk. Camel milk is very sweet and camels are valued for their milk, as they can be milked three times a day (compared to one milking per day for cows). Camel and cow milk were reportedly the best for children.

In line with the increase in the purchase of milk, reported consumption of fresh milk and ghee decreased from the *before* to *now* period, while the consumption of sour milk increased. Consumption of milk in its sour form allows available milk to last longer. Figure 6 below compares the responses by women across the two time periods and by livelihood zone.

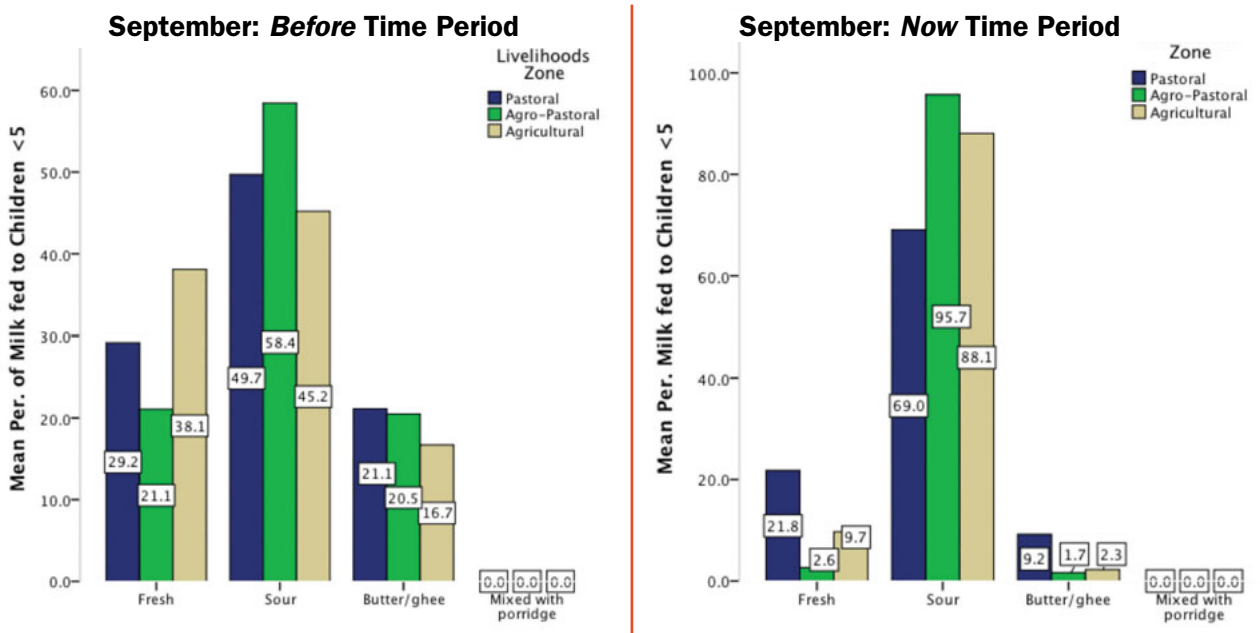
We can assume that fresh milk is the most prevalent in the pastoral zone due to easier access to animals by at least a portion of

respondents, and that sour milk is thus consumed in the lowest proportion (69 percent) in the *now* time period. Female respondents did not report "mixed with porridge" as a category of milk fed to children, but this was a common response among male respondents, with an average across livelihood zones at over 46 percent in the *now* period (not shown). The lack of data from women on "mixed with porridge" does not imply that only men are giving children porridge, but rather that women are reporting the types of milk consumed (i.e., fresh, sour, ghee) in multiple forms (i.e., mixed with porridge, used in cooking, etc) without clarifying specific uses.

- **Wild fruits and vegetables replace milk and other animal products in the diets of children across the two time periods.**

Respondents used proportional piling and pair-wise ranking to discuss how the diets of young children had changed across the two time periods.²⁸ The most pronounced shifts are the decrease in milk and other animal products (blood and meat) in the diets and the increase in mostly foraged food (figure 7).

Figure 6. Forms of milk fed to young children by livelihood zones, as reported by women in September



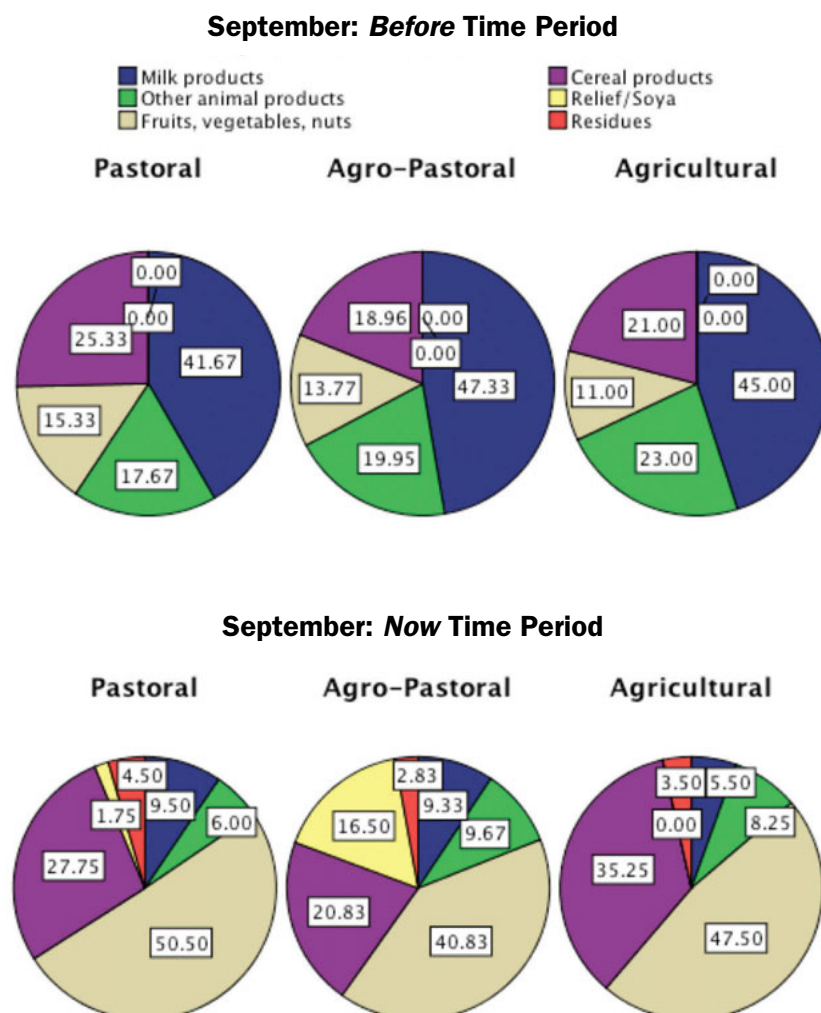
Understanding the complete diet of young children and how the relative proportions of foods have changed makes clear the impacts of loss of access to animals for the study population. Milk went from being the primary food item in all livelihood zones to one of the least represented food items in children's diets. Other forms of animal protein also dropped markedly in all areas from an average of 20 percent to 8 percent of the diet. Wild fruits and vegetables (captured as "fruits, vegetables and other nuts") were always an important part in the diet (ranging from 11 percent to over 15 percent of food consumed), but the portion of these foods in the diets jumped sharply in all areas and consisted of between 40 percent and 50 percent of food consumed by children in the *now* period. Cereals made up one fifth to one quarter of diets

in the *before* time zone, and would have been both grown where possible and purchased. Cereals increased in importance in the *now* time period, and come from a combination of own production and purchase, depending on the harvest and location of respondents.

Figure 7 illustrates clearly the central role of milk in the diets of children in Karamoja in good years. As a group of women explained, milk was used in the preparation of multiple forms of food:

We could afford to give children plenty of milk. Every preparation of food had milk and butter included. For instance, blood was given to children mixed with milk and even wild fruits were mashed in milk.²⁹

Figure 7: Change in composition of diet for young children by livelihood zone



Women seek to substitute tamarind, sesame paste, and oil pressed from sunflower seeds in place of milk when conditions allow, but wild greens are the most commonly reported staple in children's diets in the *now* period. Complaints about the effects of over-consumption of wild fruits and vegetables in the absence of milk were common:

*The children are tired of taking porridge without milk now. Sometimes we use tamarind to flavor the porridge so the child will eat the porridge. If we don't have tamarind then we will mix in other wild fruits into the porridge but we cannot use too many wild fruits because they will disrupt the child's stomach.*³⁰

Women at another location in Kotido said:

*We are trying to make up for the loss of milk. We try to feed the children more porridge and add leaves of trees to add flavor to the porridge. We are now making a soya porridge when there is soya. From the relief we get 5 mugs of soya.*³¹

As the *before* time period shows, foraged and harvested fruits and vegetables have long been an important component of children's diets, even during the wet season. The sharp increase in this food source, however, has important impacts upon not only the health of children but also on livelihood roles for household members. As discussed in greater depth elsewhere, these impacts are highly gendered, with increased pressure on women to gather sufficient natural resources to feed their families, either directly (in the case of wild foods) or through sale or trade (in the case of firewood, charcoal, and other natural resources) (Stites and Fries 2010). With greater reliance on natural resource exploitation comes greater exposure to security risks in the bush while gathering resources, and less time dedicated to domestic duties at home, including cultivation. Children, especially girls, often participate in these livelihood activities with their mothers or other women in the community, and are exposed to the same security risks and opportunity costs.

In previous research in the region, women often mentioned 'residue'—the dregs from making traditional beer from sorghum or other cereals—

as the "main thing we are feeding our children." Residue did not come up as a major aspect of children's diets in either the proportional piling or pair-wise ranking exercises for the September data, with all three livelihood zones showing residue as under five percent of children's diets in the *now* period. Residue was listed as much more important in the February data in the pastoral and agro-pastoral zones, where it was reported to be 29 percent and 12 percent of children's diets respectively. We believe that this likely more accurately reflects dry season consumption of residue in these areas (as opposed to referencing the most recent wet season as per the interviewer's instructions).

Relief food appears as a portion of the diet in the September data from the *now* period only in the pastoral zone, where it makes up less than two percent of children's diets. Interestingly, the small impact of relief does hold true in the February data as well, where relief makes up just over four percent of children's diets in the agro-pastoral zone, under two percent in the agricultural zone, and is not present in the pastoral zone.

- **Respondents in all locations voiced concern about the impacts of reduced milk for their children.**

Men and women in the study population were well aware of the health benefits of milk. Respondents indicated that milk is "good for growth," that children who consume a lot of milk are "strong and healthy" and that butter "keeps coughs and colds away." Intelligence and proper development is also associated with high-milk diets:

*Those who have access to milk are brighter, smarter children. Those who have access to milk can develop into healthy, growing children and are more suited to become strong shepherd boys.*³²

Respondents ascribe many negative health outcomes to the relative lack of milk in children's diets and the decrease in dietary diversity in recent years. The most common complaints regarding children's health were emaciation, an increase in diarrhea, malaria and scabies, "hair that is yellowish, silky and scant,"

and general “fevers” and “cough.” Children were said to be weak, lethargic, to have dry skin, to have “puffy eyes and swollen faces” and big bellies “from eating porridge without milk.” Various respondents said that the growth of children was stunted, and that children who did not have regular milk did not grow quickly. One woman in Rengen reported, “The children are eating so many vegetables now that it is bringing disease.” Eating vegetables in lieu of other items, she explained, led to loss of weight and general weakness, which made children more susceptible to disease.³³

Parents also reported behavioral impacts of poor diets. Mothers said the children did not listen well because they were tired, weak and inactive, and lacked appetite. They were “slow to wake up” and “look tired at all times of the day.” Children were “not playful like when they used to drink milk.” A mother in Lokopo said:

*The children were very active before but this is not the case now. They are dull, tired. Their behavior is also very disrespectful to me and others. They do not listen well and I think this is because they are hungry.*³⁴

One group of women in Kaabong compared the young children of today to their older siblings who had better nutrition when they were young:

*The difference between the children now and those from before who had milk is great. Most of them now are malnourished. They are missing milk. The older children are now in school, healthy, playful. The [young] kids now eat greens. They are used to never having milk. They are sickly, tired. When the health workers come here the kids are given supplemental foods – soya porridge and plumpy nut. Some children who eat those things get worse. They get diarrhea. The foods are not good for them and they need something else to eat. We are worried for them because their future is not good. They eat green vegetables and they are stricken with diarrhea. The infants survive on breast milk but the mothers are eating only greens, salt and sim sim [sesame].*³⁵

Numerous respondents associated poor nutrition for young children with the lack of adequate diets for nursing mothers and subsequent

problems with breast feeding. “Children who are breast feeding receive poor quality milk because the breast milk is of poor quality since mothers feed on vegetables and sorghum and without animal proteins in their diets.”³⁶ Nursing mothers complained of their own weakness and lack of energy:

*The mothers also fall sick often. There is too much work to do also. The child suckles most the time and there is nothing else for them to eat often. The mother does not have energy after so much suckling. The mothers cannot eat enough food to reenergize.*³⁷

Mothers’ low energy hinders their engagement in the labor-intensive resource collection required to feed their households. Poor nutrition of mothers is linked to early weaning (Gray 2008).³⁸ Reported age of the start of weaning ranged from six weeks to six or seven months, as compared to two years or until the next pregnancy reported in most locations in the *before* time period. The sole reason given for earlier weaning was poor diet for the mother and lack of ability to produce adequate breast milk. Goat milk was the main substitute for breast milk in the *before* period, as it is considered the closest to human milk (especially when diluted with water). Other animal milk would also be offered, followed by porridge mixed with sour milk and meat soup. These items were started at about six months. Due to the shortage of milk in the *now* period, mothers reported giving infants sorghum porridge with little or no milk and black tea mixed with sugar.

Women struggled with the absence of both breast milk and viable substitutes to offer their young children. Team members observed one or two instances in which the ways respondents sought to cope with these shortages was contributing to poor health and nutritional outcomes. During the February field work, one team member noted that the women he was interviewing reported no milk whatsoever. In line with the findings of Dancause (2010), the team member added:

The women said they sell charcoal and firewood so as to buy food like posho, tomatoes [and] cabbage for children and herders. They also give children

*the local brew in place of milk because there is no milk to buy. They literally gave the brew to the crying children during the interview so as to keep them quiet. They said their mothers had taken charcoal to the market.*³⁹

Most parents sought healthier alternatives. In Napak district women explained that when they see that the children have diarrhea after “eating too many vegetables” they gather any available natural resources (such as thorns, firewood and grass for thatch) and sell them in Irii town to buy milk from the markets. This is the only time they procure milk for the children, and illustrates the scarce and erratic nature of milk in the diets of children.⁴⁰

Livelihood adaptations

- **Efforts to improve food security and mitigate vulnerability through livelihood shifts at the household level have not been able to counter the impact of recent shocks.**

Households across Karamoja are seeking ways to adapt to the changes in their livelihoods brought by loss of livestock, repeated drought, insecurity, and external pressures on animal-based production systems. As discussed in the literature review, milk is important not only for nutritional purposes, but also in the economic and social relations of people in the region. Livelihood adaptations therefore seek to balance all of these aspects. Many of these have been discussed earlier in this report, such as substituting alternative foods for young children and providing sunflower paste mixed with greens for visitors. The literature on livelihood change in Karamoja has grown significantly in recent years. This section, therefore, highlights only the patterns of livelihood adaptation apparent in the study population that relate directly to food security.

Livelihood strategies at the household level are usually quite diverse and involve multiple activities by different household members. We know from the extensive literature on livelihoods that when faced with hardship, households—or individuals within households—will usually seek to diversify their existing

livelihood activities, intensify specific livelihood activities, or relocate in an attempt to improve the environment in which their livelihoods take place (Scoones 1998). These trends—diversification, intensification and migration—may happen in sequence or simultaneously, and may vary by individual, often based on age, gender and perceived vulnerability. In Karamoja, for example, the women in a household may intensify their gathering of natural resources, young men may diversify their activities by seeking casual labor in town, and male and female youth may migrate on a temporary or longer term basis.

Most of the patterns of livelihood change related to food security and apparent in the study population fall into the following broad categories: 1) adaptations to acquire cash or equivalents to replace items that have been lost within the diet; 2) adaptations to decrease reliance on these same items in the diet; and 3) adoption of new or different livelihood strategies in an effort to prevent increased food insecurity. In line with the trends discussed by Scoones, many of the patterns of livelihood change in the first two categories involve diversification and intensification, whereas those in the third category are mostly a combination of diversification and migration. The first category, efforts to replace items lost within the diet, would include the following specific strategies:

- Increased natural resource exploitation, particularly by women, in order to engage in market transactions for food, including milk;
- Increased engagement in casual labor by both men and women in towns and trading centers in exchange for cash or in-kind payments in food;
- Increased sale of traditional brew by women as a means of income production;
- Increased sale of any surplus crops in agricultural areas to buy milk and other commodities;
- Sale of livestock and essential household items to buy food staples; and
- Illegal or illicit means of acquiring lost items or cash, such as theft (usually by young men) or begging (usually by women or children).

Strategies within the second category—adaptations to make do without the scarce inputs—would include the following:

- Decrease in sharing of food and other necessities among households;
- Decrease in provision of food and milk for visitors;
- Increased dependence on relief foods and therapeutic feeding centers for children;
- Shifts towards a more vegetable-based diet, with substantial decrease in animal proteins;
- Decrease in quantity of food and number of meals, with most people (including children) eating only one meal per day; and
- Decrease in cultural rituals and ceremonies due to lack of milk and other foods.

The third category, adopting new or different livelihood strategies, includes migration as well as more fundamental livelihood shifts:

- Shifts from animal husbandry to crop farming in the agricultural livelihood zones;
- Migration within Karamoja to ‘resettlement’ sites or trading centers;
- Following existing patterns, migration to neighboring districts in search of casual labor or other economic opportunities; and
- Establishing new patterns, migration to other parts of Uganda, including to southern cities.

Specific strategies and adaptations vary in their duration and whether or not they are easily reversible. Similarly, some strategies are likely to increase household vulnerability, at least in the short term, whereas others may bring greater resilience over time. To note, outside observers—be they international agencies, academics, national politicians, or members of the local elite—often apply their own views as to whether certain adaptations are positive or negative. Many of these adaptations have to do with household decisions regarding specific members of the household, such as whether a young person should be in school, should migrate to another area, or should engage in a given activity. While some of these judgments are shared by the local population—such as widespread condemnation of theft—others share little correlation to the perceptions or the

experiences of the local population, and may or may not correspond to actual shifts in vulnerability at the household—as opposed to the individual—level. The tension between the needs of the individual and that of the household or community remains one of the key challenges facing both humanitarian and development actors seeking to design interventions for the region.

Regardless of household strategies to bolster food security and improve living status, respondents categorically expressed despair about their current situations and anxiety about the future for themselves and their children. While additional research would be needed to investigate the impact of specific livelihood adaptations on overall well-being—such as a comparative analysis of those who had out-migrated and those who had not, or those who had shifted to agriculture and those who had not—the data from this study indicate that people’s efforts to improve their situations have not, as of yet, met with durable success.

THINKING THROUGH INTERVENTIONS

The factors behind the changes in the supply of milk at the household level in Karamoja are multi-faceted and range from policy decisions to animal epidemics. Efforts taken by individuals, local communities, and regional, national and international actors have at times exacerbated the situation by increasing insecurity, flaring local tensions, undermining the health of animals, and encouraging sedentarization. Furthermore, the nutrition of children is influenced by a great many factors beyond the availability of milk at the household level, including the rest of the diet, rates of infections, and child care practices (which are in turn widely understood to be most influenced by the extent of female education). Efforts to improve the food security of populations in pastoral regions are not new and have been undertaken in a range of emergencies and protracted crises over the decades. While milk is an obvious focal point given its importance in pastoral diets and livelihoods, few publicly available impact assessments of these interventions exist (Sadler et al. 2010). For all of these reasons, there are no clear-cut interventions or fixes to address or compensate for the lack of milk in the diets of young children in Karamoja. This final section of this report discusses both the solutions that people themselves proposed and the range of possible interventions for consideration by national and international actors.

Local perspectives

We asked respondents to explain the factors that they felt were behind the decrease in milk supply at the household level. Respondents then discussed solutions to these specific factors. Variations (and sometimes outright contradictions) existed across the responses and sometimes even within a given study site, but there were also commonalities across the proposed solutions. An important common thread was the association between “lack of milk” and much greater problems. Many members of the study population see the absence of milk as emblematic of much broader concerns, primarily the erosion of their traditional way of life and uncertainty about the future. Many of

the proposed solutions, therefore, reflect this big picture perspective and go well beyond the issue of adequate milk within households.

The most commonly cited solution to the lack of milk was improved security. Many respondents felt that security would be best improved by complete and uniform disarmament. Many others saw making peace between groups as the most sustainable means of achieving better security, and they talked about periods in past generations when peace and prosperity had gone hand in hand. Peace and security were seen as the keys through which people could again own herds, farm fields, and realize a better standard of living. This was discussed in the agricultural zones, such as Iriri:

The most important thing for everyone to do is to advocate for peace. With peace people will start buying animals to get milk, meat and blood. There will be plenty of food from the farms. Increased sorghum production will stabilize peace because many people will be occupied with farming.⁴¹

And in the pastoral and agro-pastoral zones, as voiced by a man in Rengen: “When peace comes, livestock will increase and crop production [will] expand.”⁴²

In some areas, particularly Kotido, the UPDF was viewed as the source of nearly all problems, including insecurity, poor animal health, child under nutrition, and the absence of peace between groups. Some respondents, however, did recognize the role of local community members in contributing to the insecurity and loss of livelihoods. A woman in Iriri said:

The youth, our sons, need to come out of the bush and put down the gun. As a mother, I am a mother to all of them and I say we need our animals back. We need to bring the sons back to the community. Someone needs to talk to them, to sensitize them, the elders can do this. But it will be hard for them. When they return then they can help us produce food in the gardens and keep people here with food in the manyatta.⁴³

It was not only women who pointed fingers at male raiders. A young man in Lokopo said, “The youth should stop raids and instead promote peace among communities.... Animals need to move to areas with enough pasture. Here the youth should concentrate in herding and not raiding others.”⁴⁴

A corollary to improved security was the need for better protection. The overall impression of the UPDF was negative, with complaints about their efficiency in providing protection,⁴⁵ but a few respondents thought additional military presence should be introduced to ensure the complete removal of “the gun.” Others called for local defense units (LDUs) or anti-stock theft units (ASTUs) to be introduced in their area. Contradicting those who wanted complete disarmament, many people did feel that giving guns back to the men in local communities would improve protection. Regardless of the specific mechanisms, improving protection was a common theme across all locations.

Restocking of herds was a popular idea in many areas, although less so in the agricultural zone and in areas prone to repeated raids. Goats were the animal most commonly cited as needed for improved milk production, followed by cows, while oxen were important for cultivation to increase harvest yields. A woman in Iriri said:

*The most important thing to bring more milk to this community is to reintroduce goats. After that we should then get more cows. Goats reproduce faster than cows. We will not have to wait as long as we sometimes do with cows. With more goats we can supply milk to more households than I think we would be able to produce from cows for the same amount of people. But the advantage to having more cows is that we could produce bulls and those bulls can help us in the fields when we need to prepare our land for planting.*⁴⁶

A woman in Lokopo, however, raised the likelihood of raids, particularly for higher value animals: “It will not work to restock cows without security. I think it would be better to restock sheep or goats. But the cows will not remain here. They will be raided.”⁴⁷

Improvements to animal husbandry were central to local ideas for boosting milk production. Recommended solutions in this regard included removing the protected kraals to allow animals freedom of movement, receiving drugs to keep animals healthy, and providing better security for animals while grazing. Respondents in the agricultural zone felt that farming inputs would bolster own production and household livelihoods, ultimately resulting in an improved milk supply. Such implements included seeds, tools, oxen for plowing, and ways to counter crop disease such as *ebuta*.

Education for children came up as an important intervention in several focus group discussions and individual interviews. A man in Lobalangit said: “All children need education. When we educate our children they will help us solve some of the problems we are facing now. An educated person cannot engage in raids.”⁴⁸ A man in Iriri said that education was needed for children because “illiteracy among people promotes insecurity,”⁴⁹ and a woman in Lokopo said “it is illiteracy which is making us suffer as our children never went school but remained fighting for animals which have now got finished!”⁵⁰ While it is difficult to know how deeply such views on education run within communities, it is important to note that these responses come up as local interventions of value.

Respondents in all locations were very clear on the most essential means of improving milk supply: maintain the health and security of their livestock. Even in agricultural areas, people are interested in crop production largely as a means to then acquire a milking herd. This research has shown that men and women prioritize giving milk to young children in times of both prosperity and hardship. Using local knowledge and systems to improve the health and nutritional status of children will therefore require support to animal milk production.

External interventions

Sadler et al. (2010) compiled categories of strategies that donors, organizations and governments have attempted to increase milk supply among herds in pastoral areas. These include the following, in paraphrase, with the

most common form of the interventions listed in parentheses:

- Increase the number of milking animals available to households with few animals (most common as restocking projects).
- Improve the nutrition of lactating animals in seasons when the forage is insufficient or of low quality (usually as supplementary feeding, fodder support, or water point rehabilitation).
- Improve livestock health so as to increase milk supply (veterinary or community animal health worker interventions) (Abebe et al. 2008).
- Introduce or promote different livestock breeds so as to prolong the seasonal availability of milk (providing new or improved breeds and promoting cross breeding).
- Introduce methods of preserving or selling milk in less perishable forms in societies where these are currently unknown.

As mentioned above, information from impact evaluations of these interventions is limited, making it difficult to recommend one intervention over another based on the likelihood of success. The context for a given intervention plays an important role. In Karamoja, the combination of politics, conflict and insecurity create an extremely complex operational environment for any intervention. Consider the list above, for instance, in the context of Karamoja:

- Restocking (or introducing new breeds) would be a potentially major liability in Karamoja due to the chronic insecurity caused by cattle thefts and raids. Respondents in some locations cite insecurity as their reason for moving away from livestock-based production systems: “Even if you give us cows now, raiders will drive them away.”⁵¹ Providing animals in this environment increases threat of attack and raises protection concerns.
- Increasing milk yields by boosting animal nutrition with supplemental feeding has shown promising results in evaluations of two programs, one in Niger (Burns and Suji 2009) and one in Ethiopia (Bekele and

Tsehay 2008). However, providing supplemental feed to livestock while nutritional indicators for human populations remain very low requires a great deal of political sensitivity and donor finesse. Furthermore, such programs require a national policy context in which pastoralism is valued and promoted.

- Introducing new methods for preserving or selling milk might be a viable option once milk production is increased, as data show that there is a strong demand for milk in Karamoja. Data are lacking on the impacts of projects for milk processing and sales, but Sadler et al. note that the Food and Agricultural Organization (FAO) has endorsed the idea of developing markets for the sale and processing of camel milk as a means of income generation. As a growing number of people move into towns or to resettlement locations, those who still have animals may find a ready market for the sale of milk. This sort of intervention would only be cost effective after livestock milk supply has increased.

The tested intervention with perhaps the most promise for Karamoja is improving livestock health through veterinary or CAHW projects. NGOs have conducted qualitative reviews of CAHW projects (Admassu et al. 2005; Dejenu 2004; Nalitorela and Allport 2002; Abebe et al. 2008), but quantitative data on the impacts of such projects remain scarce except for one evaluation of camels in northern Kenya (Simpkin 1985), which showed much improved milk yield for camels receiving comprehensive veterinary care. Importantly, pastoralists themselves are well aware of the impact of animal diseases on milk production, and are quick to point to poor health of their herds as a constraint to adequate milk supply. Such programs are already in place across Karamoja, but respondents report problems in the consistency and reach of treatment. The military policy of protected kraals, insecurity and the various policy and political impediments to livestock mobility have negative repercussions on animal health; hence even if such interventions are comprehensive in nature, it is unknown if they can counter the negative impacts of overcrowded and sedentarization of herds.

The research of Sadler and colleagues pointed to two additional interventions not widely attempted by outside agencies: reducing the costs of food commodities such as grains and cereals in order to improve the terms of trade between milk and such products (i.e., less milk would be exchanged for the same amount of starch), and encouraging mobile (as opposed to sedentary) livestock husbandry to boost milk yields. In the case of Karamoja, the already complex market intervention would be more difficult, as the primary exchange relationship is between natural resources (mainly firewood and charcoal) and milk (and/or cereals). The sale price of these resources would have to be boosted in order to improve the terms of trade, which would not only be nearly impossible, but would—on a theoretical level—lead to further environmental degradation as people sought to take advantage of the higher prices for natural resources.

Sadler et al.'s second intervention that emerges from their research—encouraging mobile livestock husbandry—would likely be strongly endorsed by both livestock owners (for improvements to animal health) and by programmers (for its cheap bottom line). Successful implementation of this recommendation would require a national policy that promotes and values pastoralism, the opening of district borders to allow herders to access their traditional dry season grazing areas, providing mobile security (as opposed to protected kraals) in areas where needed, careful location of any 'resettlement' areas or other agrarian settlements to ensure balanced interests between agricultural groups and herders in the fertile zones, and improved representation of pastoral interests at the local, regional and national political level.

In the meantime: conclusions and key recommendations

This report highlights what is obvious to those who follow the situation in Karamoja: there are no quick fixes or easy solutions to the situation in the region. And this situation—one of chronic poverty, protracted conflict, and decades of marginalization—impacts not only the prospects for economic development or sustainable peace, but also reaches into

households to affect the youngest children. A discussion of milk, therefore, is not simply a discussion of what children eat and what they do not. A discussion of milk is a conversation about processes that extend back in time and reach into the social, economic and political sphere. The absence of milk in households represents the loss of a way of life, anger with political and military systems, and desperation among parents seeking ways to provide for their children. Such losses and desperation lead to decisions that, in some instances, can jeopardize the health and safety of children, such as sending children to other areas in search of new or better economic options or access to health care and education. For international and national actors to address the nutritional impacts of the absence of milk they will have to take on the processes and systems that contribute to the wider problems in the region. To have milk is to have health and well-being. Health and well-being are possible without milk, but are not possible without fixes at multiple levels.

In the meantime, organizations and agencies need to continue with those programs and projects that support local priorities—such as animal health—and also those projects that encourage greater well-being for children. School feeding remains critical in the region, as parents will send children to school so that their children can eat. A certain percentage of these children will stay in school, and a certain percentage of their parents will adopt the views of the respondents who felt that education was a longer term solution to the region's chronic problems. These schools must be accessible for people in local communities (not boarding schools) in order that parents and siblings benefit from the spillover effects of education. They must be staffed by competent teachers who respect the local culture (including the rural culture) and speak the local language.

Programs that support CAHW and veterinary outreach should continue and should be evaluated to learn what models, in the eyes of herders and livestock owners, are most effective and have the greatest impact on animal health and milk production. Linking some of these projects with UPDF initiatives may be appropriate in some areas, but only when

evaluations indicate that the involvement of the military in such schemes does not negatively impact the outcomes prioritized by communities.

We know from the data that people are relying heavily on markets for much of their basic food needs, including milk. This entails (mostly women's) exploitation of natural resources and (mostly women's) trips to towns, barracks or kraals to exchange such items. While interventions to increase the sale price of natural resources are both unfeasible and ill-advised, increasing market supply and market access through support to small-scale traders may help to bring down prices and improve options over the longer term.

Emergency nutritional interventions and food distributions will remain important in certain areas and at certain times of year. Although relief food appeared as only a small percentage of children's diets in the participatory exercises, the discussion of the role of supplemental feeding (and therapeutic feeding in some areas) was prominent among female respondents. Parents are well-aware of the problems not only with under nutrition, but also with the lack of dietary diversity. People long for the days when relief packages were said to include dried fish and milk. While the WFP system today generally does not allow for such diversity, smaller scale initiatives to support local producers and local markets may help people to diversify their diets.

This study sought to understand how changes in livelihoods in Karamoja in recent years have affected the ability of households to provide milk for their children and how households are coping with these changes. The overall message from this work is that milk matters, and people know it. Parents recognize the signs of under nutrition and seek means to address these problems. Milk may be scarce or even nonexistent in many households, but young children are consistently prioritized to receive milk at the expense of consumption by other family members, social norms and exchanges, and important cultural rituals. By working at multiple levels to improve the policy, economic and security environment in the region, external actors should be able to improve both child nutrition and livelihood sustainability of local populations. This will

require political will, continued efforts to promote national policy change, and programming that focuses on longer term and incremental improvements. In the interim, nutritional surveys and targeted interventions for young children and pregnant and lactating women will continue to be required.

ENDNOTES

- 1 Interview with individual woman, mother of nine children, youngest child age four years. Lokopo sub-county, Napak, February 8, 2011.
- 2 For the reports and publications to date from the Milk Matters Ethiopia project, see Sadler and Catley (2009), Sadler et al. (2009), Sadler et al. (2010).
- 3 See Annex 2 of Office of the Prime Minister (2010).
- 4 This was defined as “children too young to go out with animals.” This was the same protocol used in the Ethiopia fieldwork, and was found to usually correlate to children approximately age 5 and under.
- 5 The exact date of the shift from *before* to *now* differed from one community to the next, but the *before* periods all ended within the 2004–2006 window and, in most cases, correlated to the first in the series of drought years.
- 6 We visited different study sites in the two research periods, as we were seeking to understand a breadth of experiences and responses, not to measure change from one season to the next in specific communities. Study sites were in the same sub-counties in September and February.
- 7 The study, conducted in the mid-1960s, does not use the terms pastoralist or agro-pastoralists, but describes the livelihoods as a combination of cattle herding and agriculture: “The cattle and men lead a largely nomadic existence in search of water and grazing, while the women and children and some of the smaller [livestock], together with a few cows, remain at the permanent settlements where small plots of sorghum, beans and maize are cultivated” (3).
- 8 Emergency rates have been shifted upward for pastoralist regions due to their unique growth patterns in order to avoid over-estimating. In addition, there is a movement to shift methods for measuring malnutrition in pastoralist regions from weight-for-height z-scores (WHZ) to mid-upper arm circumference (MUAC). MUAC is thought to better reflect the prevalence of wasting among these populations than WHZ (Mayer 2009; Myatt 2009).
- 9 Interview with women, Irimi sub-county, Napak, September 10, 2010.
- 10 For a more complete discussion of the impacts of protected kraals and the involvement of the military in animal husbandry, see Stites and Akabwai (2009).
- 11 Interview with male elders, Rupa sub-county, Moroto, September 7, 2010.
- 12 When compared by gender of respondents, however, the sale of milk drops to less than one percent in the *now* period as reported by women and shown in Figure 3.
- 13 Interview with women, Rupa sub-county, Moroto, February 14, 2011.
- 14 Interview with women in Lokopo sub-county, Napak, September 13, 2010.

- 15 Interview with women in Iriri sub-county, Napak, September 9, 2010.
- 16 These aspects of the social and political order in regard to the cessation of rituals are beyond the scope of this report, but are discussed elsewhere, including Gray (2000) and Knighton (2005).
- 17 Sikana et al. (1993), Rugadya (2006), and Sadler et al. (2009, 2010) discuss the uses of milk in more depth. In particular they discuss the subtle differences between sharing of milk as part of an ethos of hospitality, versus its more strategic use in maintaining and building social relationships through gifting and sharing.
- 18 Interview with men, Rengen sub-county, Kotido, September 17, 2010.
- 19 Superstition may have also played a role, as one focus group of men reported that “it was a belief that such poor household could [cast] bad omens onto the family if they were denied milk.” Interview with men, Rupa sub-county, Moroto, February 5, 2011.
- 20 Interview with women, Rengen sub-county, Kotido, September 17, 2010.
- 21 Interview with women, Rengen sub-county, Kotido, September 17, 2010 and also cited by women in Nakapelimoru sub-county, Kotido, September 15, 2010.
- 22 Interview with a woman, Nakapelimoru sub-county, Kotido, February 10, 2011.
- 23 Interview with women in Lobalangit sub-county, Kaabong, February 12, 2011.
- 24 Interview with men, Rengen sub-county, Kotido, September 17, 2010.
- 25 Figure 3 presents the same data in a different format.
- 26 Data from February also show a marked increase in the portion of total milk allocated for young children from the *before* to *now* time periods. An important difference from the February data is the amount of milk reserved for other household members, who reportedly receive no milk in the *now* period. We hypothesize that the lack of milk for other household members as reported by respondents in February is likely a reflection of the very low levels of milk in people’s diets in the *dry* season, and a factor of the difficulties in recall.
- 27 Although not included in the sample of young children, it is worth noting that herders would likely consume a higher rate of fresh milk than other children. Herders are able to consume milk directly from their animals during the milking season.
- 28 Note: The proportional piling exercises focusing on changes in the diets of young children were performed by two of the three interviewers, with impacts on total sample sizes as well as equal representation of different livelihood zones in the results. For example, in the September interviews, there are more data available from agro-pastoral sites than from pastoral and agricultural sites.
- 29 Interview with women, Lobalangit sub-county, Kaabong, September 21, 2010.
- 30 Interview with women, Nakapelimoru sub-county, Kotido, September 15, 2010.

- 31 Interview with women, Rengen sub-county, Kotido, September 17, 2010.
- 32 Interview with women, Irii sub-county, Napak, September 9, 2010.
- 33 Interview with individual woman, Rengen sub-county, Kotido, September 17, 2010.
- 34 Interview with individual woman, Lokopo sub-county, Napak, September 11, 2010.
- 35 Interview with women, Lobalangit sub-county, Kaabong, February 12, 2011.
- 36 Interview with two women, Lokopo sub-county, Napak, February 8, 2011.
- 37 Interview with women, Irii sub-county, Napak, February 7, 2011.
- 38 In certain areas, respondents reported that newborns are traditionally given diluted animal milk prior to starting on their mother's breast.
- 39 Interviewer comments in transcript from interview with women, Rupa sub-county, Moroto, February 5, 2011.
- 40 Interview with women, Irii sub-county, Napak, February 7, 2011.
- 41 Interview with individual man, Irii sub-county, Napak, September 10, 2010.
- 42 Interview with individual man, Rengen sub-county, Kotido, September 17, 2010.
- 43 Interview with individual woman, Irii sub-county, Napak, September 9, 2010.
- 44 Interview with individual man, Lokopo sub-county, Napak, September 11, 2010.
- 45 As discussed in other publications, the complaints about the UPDF go well beyond discussions of their role in providing protection, and include charges of theft, battery and assault, detention without cause, beating and intimidation of children, and intimidation of communities. While these aspects were raised repeatedly in our interviews, they are mostly beyond the scope of this report.
- 46 Interview with individual woman, Irii sub-county, Napak, September 10, 2010.
- 47 Interview with individual woman, Lokopo sub-county, Napak, February 8, 2011.
- 48 Interview with individual man, Lobalangit sub-county, Kaabong, February 12, 2011.
- 49 Interview with individual man, Irii sub-county, Napak, September 9, 2010.
- 50 Interview with individual woman, Lokopo sub-county, Napak, September 11, 2010.
- 51 Interview with individual woman, Irii sub-county, Napak, September 9, 2010.

WORKS CITED

- Abebe, D., A. Cullis, A. Catley, Y. Aklilu, G. Mekonnen, and Y. Ghebrechirstos. 2008. Impact of a commercial destocking relief intervention in Moyale district, southern Ethiopia. *Disasters* 32 (2):167-189.
- Admassu, B., S. Nega, T. Haile, B. Abera, A. Hussein, and A. Catley. 2005. Impact assessment of a community-based animal health project in Dollo Ado and Dollo Bay Districts, southern Ethiopia. *Tropical Animal Health and Production* 37 (1):33-48.
- Akabwai, D. and P. Ateyo. 2007. *The Scramble for Cattle, Power and Guns in Karamoja*. Medford, MA: Feinstein International Center, Tufts University.
- Allen, L.H. 1994. Nutritional Influences on Linear Growth: a General Review. *European Journal of Clinical Nutrition* 48 (Suppl. 1):15.
- Bekele, G., and A. Tsehay. 2008. Livelihoods-based Drought Response in Ethiopia: Impact Assessment of Livestock Feed Supplementation. Pastoral Livelihoods Initiative. Addis Ababa: Feinstein International Center, Tufts University and Save the Children USA.
- Burns, J.C., and O.W. Suji. 2009. Impact assessment of the Pastoralist Survival and Recovery Project., Dakoro, Niger. Medford, MA: Feinstein International Center, Tufts University.
- Chotard, S., J.B. Mason, N.P. Oliphant, S. Mebrahtu, and P. Hailey. 2010. Fluctuations in Wasting in Vulnerable Child Populations in the Greater Horn of Africa. *Food and Nutrition Bulletin* 31 (3):13.
- Dancause, Kelsey N. et al. 2010. Beer is the cattle of women: Sorghum beer commercialization and dietary intake of agropastoral families in Karamoja, Uganda. *Social Science & Medicine* 70:8.
- Dejenu, A. 2004. A retrospective study on the impact of community-based animal health delivery system in Shinile zone, Somalia National Regional State of Ethiopia, MSc thesis, Addis Ababa University, Addis Ababa.
- FAC, and FIC. 2011. Paper read at Future of Pastoralism, March 21-23, at Addis Ababa, Ethiopia.
- Galvin, K.A. 1992. Nutritional ecology of pastoralists in dry tropical Africa. *American Journal of Human Biology* 4:13.
- Gray, S. 2000. A Memory of Loss: Ecological Politics, Local History, and the Evolution of Karimojong Violence. *Human Organization* 59 (4):18.
- Gray, S., H.A. Akol and M. Sundal. 2010. Longitudinal Weight Gain of Immunized Infants and Toddlers in Moroto District, Uganda (Karamoja Subregion). *American Journal of Human Biology* 22 (1):13.
- Gray, S., H.A. Akol, and M. Sundal. 2008. Mixed-Longitudinal Growth of Breastfeeding Children in Moroto District, Uganda (Karamoja Subregion). A Loss of Biological Resiliency? *American Journal of Human Biology* 20 (5):11.

- . 2009. Mixed-Longitudinal Growth of Karimojong Girls and Boys in Moroto District, Uganda. *American Journal of Human Biology* 21 (1):12.
- Gulliver, P.H. 1955. *The Family Herds: A Study of Two Pastoral Tribes in East Africa, the Jie and the Turkana*. London: Routledge.
- Hoppe, C., C. Mogaard, and K.F. Michaelsen 2006. Cow's milk and linear growth in industrialized and developing countries. *Annual Reviews in Nutrition* 26:43.
- Knighton, Ben. 2005. *The Vitality of the Karamojong Religion: Dying Tradition or Living Faith?* . Hants, UK: Ashgate Publishing Ltd.
- Levine, S. 2010. What to do about Karamoja -- A Food Security Analysis of Karamoja. Kampala, Uganda: FAO and European Commission.
- Mayer, A.; Myatt, M.; Aissa, M.A.; Salse, N. 2009. New method for assessing acute malnutrition in nomadic pastoralist populations. *Field Exchange* 35:5.
- Mirzeler, Mustafa, and Crawford Young. 2000. Pastoral Politics in the Northeast Periphery in Uganda: AK-47 as Change Agent. *The Journal of Modern African Studies* 38 (3):407-429.
- MOH, UNICEF, WFP. 2008. Summary of Nutrition and Health Assessment in Karamoja Region. Kampala, Uganda: Uganda Ministry of Health, UNICEF, and WFP.
- Myatt, M.; Duffield, A.; Seal, A.; Pasteur, F. 2009. The effect of body shape on weight-for-height and mid-upper arm circumference based case definitions of acute malnutrition in Ethiopia children. *Annals of Human Biology* 36 (1):16.
- Nalitolela, S., and R. Allport. 2002. A participatory approach to assessing the impact of a community-based animal health project with Maasai communities in Tanzania. *PLA Notes* 45:17-22.
- Nathan, M.A., E.M. Fratkin, and E.A. Roth. 1996. Sedentism and Child Health among Rendille Pastoralists of Northern Kenya. *Soc. Sci. Med.* 43 (4):13.
- Ocan, Charles Emunyu. 1992. Pastoral Crisis in Northeastern Uganda: The Changing Significance of Cattle Raids. Kampala: Centre for Basic Research, Working Paper 21.
- Office of the Prime Minister. 2010. Karamoja Action Plan for Food Security (2010-2015) (Development of Karamoja Agricultural and Production Zones). Republic of Uganda.
- Rugadya, Margaret. 2006. Pastoralism and Conservation Studies: Uganda Country Report. Kampala: IUCN: The World Conservation Union.
- Rutishauser, I.H.E. and R.G. Whitehead. 1969. Field evaluation of two biochemical tests which may reflect nutritional status in three areas of Uganda. *Brit. J. Nutrition* 23:13.
- Sadler, K., and A. Catley. 2009. The Role and Value of Milk in the Diets of Somali Pastoralist Children in Liben and Shinile, Ethiopia. Medford, MA: Feinstein International Center, Tufts University.

Sadler, K., C. Kerven, M. Calo, M. Manske, and A. Catley. 2010. The Fat and the Lean: Review of Production and Use of Milk by Pastoralists. *Pastoralism* 1 (2):34.

Sadler, Kate, Carol Kerven, Muriel Calo, Michael Manske, and Andy Catley. 2009. Milk Matters-- A Literature Review of Pastoral Nutrition and Programming Responses. Medford, MA: Feinstein International Center, Tufts University.

Scoones, Ian. 1998. Sustainable Rural Livelihoods: A Framework for Analysis. IDS Working Paper 72. Brighton: IDS.

Shell-Duncan, B. 1995. Impact of seasonal variation in food availability and disease stress on the health status of nomadic Turkana children: A longitudinal analysis of morbidity, immunity, and nutritional status. *American Journal of Human Biology* 7 (3):17.

Sikana, P.M., C. Kerven, and R.H. Behnke. 1993. From Subsistence to Specialised Commodity Production: Commercialisation and Pastoral Dairying in Arica. In *Pastoral Development Network Set 35*, edited by O. D. Institute. London: Overseas Development Institute.

Simpkin, S.P. 1985. The effects of disease as constraints to camel productivity in Northern Kenya, MPhil, University of London, London.

Stites, Elizabeth, and Darlington Akabwai. 2009. Changing Roles, Shifting Risks: Livelihood Impacts of Disarmament in Karamoja, Uganda. Medford, MA: Feinstein International Center, Tufts University.

Stites, Elizabeth, and Lorin Fries. 2010. Foraging and Fighting: Community Perspectives on Natural Resources and Conflict in Southern Karamoja. Medford, MA: Feinstein International Center, Tufts University.

UN. 2011. Uganda Humanitarian Profile. Kampala, Uganda: United Nations.

UNICEF. 2009. Humanitarian Action Report: Uganda in 2009. Kampala, Uganda: UNICEF.

WFP. 2007. Emergency Food Security Assessment of Karamoja Region, March-April 2007. Kampala, Uganda: World Food Programme.





Feinstein
InternationalCenter

Feinstein International Center

Tufts University

200 Boston Ave., Suite 4800

Medford, MA 02155

USA

tel: +1 617.627.3423

fax: +1 617.627.3428

fic.tufts.edu