



How Livestock is Used as a Coping Mechanism with Respect to Food Insecurity among Livestock Keepers of Africa: a Literature Review from a Current Perspective

Working Paper

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Acronyms

Anglican Church of Kenya-Marsabit Development Office	ACK-MDO
Animal Health Programme	AHP
Artificial Insemination	AI
Arid and Semi-Arid Land	ASAL
African Union – InterAfrican Bureau for Animal Resources	AU-IBAR
Community Animal Health Workers	CAHW
Cooperative Assistance and Relief Everywhere	CARE
Centre of Environmental Economics and Policy in Africa	CEEPA
Community Livestock Worker	CLW
Consortium for Southern Africa Food Security Emergency	C-SAFE
Coping Strategies Index	CSI
Department for International Development	DfID
Development Relief	DR
Emergency Operation	EMOP
Early Warning Systems	EWS
Food Agriculture Organization	FAO
Famine Early Warning System Network	FEWS-NET
Food For Peace	FFP
Female Genital Mutilation	FGM
Golden Valley Agricultural Research Trust	GART
Global Livestock - Collaborative Research Support Program	GL-CRSP
Government of Kenya	GOK
Government of the Republic Of Zambia	GRZ
Internally Displaced People	IDP
International Food Policy Research Institute	IFPRI
International Livestock Research Institute	ILRI
Intergovernmental Panel On Climate Change	IPCC
Kenya Land Alliance	KLA
Livestock Enhancement For Pastoralists and Agro-Pastoralists	LEAP
Livestock Early Warning System	LEWS
Livestock Information Network and Knowledge System	LINKS
Lutheran World Relief	LWR
Ministry of Agriculture and Cooperative	MACO
Milk Collection Centers	MCCs
Months of Adequate Household Food Provisioning	MAHFP
Months of Inadequate Household Food Provisioning	MIHFP
Midterm Evaluation	MTE
Non-Governmental Organizations	NGO
Pastoral Risk Management	PARIMA
Pastoralist Livelihood Initiative	PLI
People Living with HIV/AIDS	PLHIV
Private Voluntary Organizations	PVO
Regular Savings and Credit Associations/Accumulating Savings and Credit Associations	RESCA/ASCA
Rotating Savings and Credit Associations	ROSCA
Rift Valley Fever	RVF
Tropical Livestock Units	TLUs
United States Agency for International Development	USAID
United Nations Convention to Combat Desertification	UNCCD
Vulnerability Assessment Committee	VAC

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Executive Summary

This literature review utilized secondary data and information from books, journals, expert interviews, and the internet to answer the main research questions: “Can livestock improve people’s capacity to cope with risk and vulnerability? If so, how has this been done? How can this coping be improved? To focus the review further, the primary topic of this discourse is: *How African livestock keepers use livestock to positively cope with underlying causes of food insecurity such as inadequate livelihood diversification and increased shocks due to climate variability.*

The review endeavors to enhance the donor and development communities’ understanding and awareness of the current status of the livestock sector and the main livestock keepers in Africa, and illustrate how livestock interventions can be used as coping mechanisms to alleviate household food insecurity and improve livelihoods. In the review, a “systems thinking” framework is used to understand the interconnectedness and the dynamics that facilitate and enable livestock to be used among smallholder farmers, agro-pastoralists, and pastoralists to cope with both chronic and acute food insecurity.

In the Food for Peace 2006-2010 Strategy¹, FFP promotes a “development relief” approach, which attempts to link relief and development objectives within a context of uncertainty in which a shock can occur at any time. This uncertainty is further discussed as risk. There are natural, political, economic, social and health risks at all times among all populations. The relationship between risk and vulnerability is a function of coping capacity, or “risk minus coping capacity equals vulnerability.” Vulnerability in this case, relates to the degree to which populations are susceptible to food insecurity. Thus, vulnerability can be thought of as the inability or lack of capacity to manage or to cope with risk in a positive or sustainable manner.

An appropriate response to risk and vulnerability is often to enhance household and community resiliency, and increase livelihood capacity and human capital. There are many ways to accomplish this, including building civil societies, cooperative development, and community social networks. Supporting these efforts can result in the realization of desired program outcomes such as increased resources, productivity, income, consumption, community resiliency, livelihood capacity and human capital, which in turn can result in positive food security outcomes such as adequate food availability, food access, and appropriate food utilization. In order to accomplish these outcomes, households and communities need to cope with vulnerability and manage risk. Coping is a natural reaction in the face of political, health, natural and socioeconomic shocks, although coping may not always be positive or sustainable. In order to build sustainable or positive coping strategies, food security programs must build or reinforce positive coping strategies that improve, strengthen and develop the ability of vulnerable populations to cope with risk, shock, and the underlying causes of food insecurity.

In Africa, livestock is a key factor to pastoralist and smallholder farmer livelihood. Livestock interventions and activities can build and improve sustainable and positive coping strategies. To illustrate how livestock can be used as a coping mechanism in different food security situations, the paper focused on a case study on the Land O'Lakes/Zambia Title II Development Assistance

¹ USAID, DCHA, FFP. “Strategic Plan for 2006-2010.” USAID: Washington, DC, May, 2006.

Program (DAP) and a general outline of pastoralists of eastern Africa. Since Zambia suffers from chronic food insecurity, it is appropriate to document how the development program has used livestock, in this case an in-calf heifer, to improve incomes of program beneficiaries. There were insufficient resources available to conduct a case study of a particular pastoral group. Instead, an outline encompassing the issues surrounding a number of pastoral groups from eastern Africa (a region that have gone through frequent acute food insecurity shocks) was developed instead.

The Zambia case study is based on Land O'Lakes/Zambia's five-year Title II DAP. The program aims to reduce food insecurity among targeted vulnerable populations through a smallholder dairy development program that provides technical assistance to the local dairy sector at both the producer and processor levels. The program distributes productive assets (in-calf heifers) to food insecure households, provides training on various components of dairy production and management, establishes of milk collection centers (MCCs) through which farmers can have a stable market to sell their milk, utilizes an artificial insemination program to improve the productivity of dairy animals, and develops market linkages with dairy processors to increase demand on a national level and ensure a sustainable market for smallholder raw milk. These activities result in increased income for beneficiary farmers, especially during the wet season when milk is in abundance due to the green fodder available during that time. This also means farmers' household members benefit daily from the nutritious milk.

While there are a select number of vulnerable farmers who receive heifers from the Land O'Lakes/Zambia program, many more benefit from the program. As their heifers give birth, the first female calf is "passed-on" to another vulnerable household in the community. There are also many downstream and upstream economic benefits to other community members as the MCC and the market linkage to a processor is established. The community also benefits from providing labor to beneficiary farmers by transporting milk or building milking sheds and animal kraals. Beneficiary farmers are building their capacity to cope with shock and reducing their vulnerability to chronic food insecurity, and in the process they are helping their community to become more resilient to the vagaries of climate cope with chronic food insecurity in rural Zambia, where most households depend almost exclusively on subsistence-based rain-fed agriculture.

The pastoralist outline was conducted to better understand the pastoralist livestock production system and issues surrounding pastoralist livelihood. The main concept is that mobility is the key to pastoral livelihood. However, growth in livestock numbers has not kept up with human population growth due to a number of reasons such as animal disease and death as a result of lack of water/food (drought, flood, and limited grazing land) and neighboring raids/conflict (insecurity in area). This means that pastoralist average livestock per capita ratios have declined and so their ability to manage a mobile pastoral livelihood is becoming less viable with the declined livestock numbers. With decreased mobility, pastoralists become more vulnerable to food insecurity and poverty. As the general frequency and length of pastoralist settlement increases, these populations are less able to cope with climatic shocks such as drought. Normally pastoralists cope with drought by moving their household and animals to better grazing lands. Historically, such practices have been effective when coping with environmental shocks such as drought. These traditional methods have become less effective, particularly during the past 20 years. Pastoralists can no longer adequately cope with frequent shocks resulting from variable climate and volatile political conditions in the region. Subsequently, many pastoralists

may not have viable livelihood diversification options to fall back on. During a shock that results in acute food insecurity, some pastoralists, namely the transient (or temporarily) food insecure, will require more time and resources to ensure full recovery.

Acute food insecurity situations are increasingly becoming chronic in character. The frequency and short periods between droughts, frequent of floods, and conflict situations describe chronic food insecurity events. Failed rains create livelihood crises that require specific interventions at specific times in order for pastoral households to re-establish themselves back to self-sufficiency. In the context of limited livelihood diversification options and climatic, political and market uncertainty, more pastoralists will likely give up their animal-based livelihoods with each successive drought.

Based on this literature review, a Coping Matrix for Dairy and Livestock Intervention (see Appendix D) was created to understand the appropriate mix of interventions depending on which kind of livestock keepers, and food insecurity situation. In some cases, the appropriate time frames are recommended for certain activities, i.e. destocking and restocking. To complement the Coping Matrix, some output indicators and trigger indicators were suggested to assist in the measurement of the interventions (see Appendix E). A Food Security Continuum was also developed to clearly identify the different food insecure groups, “extremely food insecure,” “food insecure,” “vulnerable but viable,” relatively food secure,” and “most food secure” (see Appendix C).

It is hoped that this literature review will inform about appropriate livestock options and interventions to be used to assist vulnerable populations to cope with food insecurity. The review and appendixes can be used by donor and development community to develop more informed and appropriate programs and projects in Africa, especially for populations such as smallholder farmers, agro-pastoralists and pastoralists. The review also has gaps and aims to invoke the donor and development community to seek and document more research and innovative ideas to fully understand and better assist African livestock keepers in their efforts to cope and adapt in a changing social, economic, political and climatic landscape.

1. INTRODUCTION

Livestock is commonly used to enhance coping with vulnerability and food insecurity in the Sahel-Sudano areas of Africa because of the large pastoralist and livestock-keeping population in these regions. Although this is commonly accepted knowledge worldwide, there still is a persistent naiveté about the livestock sector among policy makers, national level government offices, international donors, and development communities. In particular, there is lack of understanding and knowledge about the diversity of livestock keeping societies, how each copes daily, and the various uses of each livestock species.² Therefore it is necessary when defining the nature of coping strategies to assess how livestock continues to play an integral part of livestock keepers' livelihood.

This literature review aims to prioritize the positive coping strategies over negative ones, and is reviewed from a current perspective in the context of a “systems approach”. The primary research questions are: “Can livestock improve people’s capacity to cope with risk and vulnerability? If so, how has this been done?, and How can coping strategies be improved?. To focus the review further, the primary topic of this discourse is: *How African livestock keepers use livestock to positively cope with underlying causes of food insecurity such as ineffective livelihood diversification options and increased shocks due to climate variability.*

Objective

The aim of this literature review is two-fold: 1) enhance the donor and development community’s understanding and awareness of the current status of the livestock sector and the main livestock keepers in Africa, and 2) illustrate how livestock interventions can be used as

² John W. Mellor, “Agricultural growth and poverty reduction-the rapidly increasing role of smallholder livestock,” (J.W. Mellor: Anand, India, 2003) 9.

coping mechanisms to alleviate household food insecurity and improve livelihoods. The latter would be the main objective as the literature clearly shows that livestock ownership can result in a positive impact in the livelihood of pastoralists and smallholder farmers.³ The first five chapters will set the framework, background and definitions that will facilitate an understanding of how livestock programs improve coping among vulnerable populations. Chapter 1 introduces the research objectives and questions that guided the research into its present form. Chapter 2 discusses the literature review's overarching framework: using a systems approach to frame the research topic.⁴ This is seen as the best way to understand livestock systems and the different groups that participate in them (or each). Because of the dynamic nature of these systems, environment and human interactions vary based on the specific agro-ecological zone (or landscape). Chapter 3 provides the contextual background to understand why this issue is important, specifically in terms of identifying vulnerable groups, how they relate to each other, and how they react in times of shocks. Chapter 4 discusses two main underlying causes of food insecurity in Africa, namely inadequate options for livelihood diversification and increased climate variability. Chapter 5 illustrates the linkage between food security and coping strategies within small-scale production systems. A visual representation of suggested dairy and livestock interventions in matrix form will help organize the complex nature of how to support livestock keepers as they cope with vulnerability and risk. This chapter also provides an introduction to negative and positive coping strategies, namely livestock-related coping strategies. These strategies will be discussed in further detail in Chapter 6.

To understand the current livestock programs in Africa, it is important to understand what has been done and recommended in the past. In 1985, the UN Economic Commission for Africa

³ From this point on, "farmer" will mean farmers maintaining mixed farming system where crops and livestock are part of this system.

⁴ See Chapter 2 Introduction for a definition of systems thinking.

produced a report indicating major problems and constraints limiting livestock development in Africa:⁵ These are summarized as follows:

- Lack of understanding of producers' problems (lack of communication with the producers; monitoring and evaluation tools and mechanisms are not built into the programs);
- Poor land tenure policies (publicly owned and communally used without a set of regulations and mechanisms governing users' access);
- Poor livestock marketing and pricing policies (lack of knowledge and information on when to increase/decrease production to get the best price, fixed prices, and prices incongruent with other food items);
- Poor animal disease control and eradication policies (some areas still have a high prevalence of animal diseases, lack of concerted action and coordination of researchers, veterinarians and government agencies and poor definition of real needs); and
- Behavior of the producer harmful for the environment (not consistent with the objectives of the program and barter economy tend to lead to low off-take rates which causes poor diverse diet).

Given these problems and constraints, the funding for livestock development programs was reduced. "It has become apparent that most countries, if not all, have found past development strategies for the livestock sector too expensive since governments made themselves almost wholly responsible for the basic investments and supply of inputs and services at both production and marketing levels."⁶ However, despite this realization, there was a general awareness on the part of the governments, producers, livestock dealers, and bilateral and multilateral funding agencies that something must be done to reverse these negative trends and increase the contribution of the livestock sector to the overall economy in general and to food and agricultural production in particular.⁷

Much has changed in the past two decades and a great deal of progress has been made in livestock development in Africa. Production of livestock products such as milk and meat has

⁶ Ibid 32.

⁷ Ibid.

increased from 1982-94 at an annual rate of 3.1 percent and 5.4 percent, respectively.⁸ While some things remain the same, some problems were not as frequent and widespread as they are today, namely drought and desertification. Thus, continued livestock research and programming are necessary to bring out the positive and beneficial effects of livestock development, especially how dairy and livestock development interventions have been used and can be used to reduce food insecurity among vulnerable populations.

2. LIVESTOCK PRODUCTION SYSTEM

Systems Thinking

Livestock production systems may be best understood from a systems approach. Domesticated animals provide multiple functions with each livestock species playing an integral and interconnected role in livestock keepers' lives. For pastoralists, the majority of their daily activities revolve around their herd. For smallholder farmers and agro-pastoralists, a portion of their lives rely on livestock for animal protein, major household needs, and agricultural input. Systems thinking is a conceptual model where component parts of a system are analyzed within the system and as parts of a whole. Thus, systems are viewed in a holistic manner, rather than through purely reductionist perspective techniques. It promotes gaining insights into the whole by understanding the linkages and interactions between the elements that comprise the system as a whole. Systems thinking recognizes that in complex systems events are separated by distance (geography), people, culture, and time.

⁸ Christopher Delgado, Mark Rosegrant, Henning Steinfeld, Simeon Ehui, and Claude Courbois, "2020 Livestock Revolution: The Next Food Revolution," (IFPRI: Washington, DC, May 1999) 19.

Utilization of systems thinking as an analysis tool assists researchers and practitioners in understanding the development of the system or issue being reviewed. Emphasis is placed on design and root cause analysis by tracing cause and effect events taking the various interconnected entities and subsystems⁹ into consideration. Common visual tools used in this type of analysis are Fishbone and Venn diagrams. For example, poor rains (drought) caused by variable climate effect crop productivity and water availability. Drought effects smallholder farmers' and pastoralists' livelihood, causing them to utilize coping strategies, oftentimes utilizing negative coping strategies more than positive ones. An example of a negative coping strategy is a smallholder farmer sending an older child to reside with relatives potentially exposing him/her to abuse and/or neglect. As a result, the child may become malnourished and/or traumatized. In this simple example, utilizing a systems approach aids in understanding one of many different potential outcomes of a single event. By considering the various possibilities or scenarios, one's knowledge of a situation expands in breadth and consideration; assisting in making informed decisions. Practitioners are better equipped to select the most appropriate form of development assistance; one catered to a particular ethnic group and/or type of livestock keeper and, as is specific to this report, a particular livestock system, at a particular time; and within a particular climate and geographical area.

It is important to recognize that observations in one system may not mean the same thing in another, implying the necessity to focus specifically, not generally, on a particular system as the context in which observations take place. From a detailed perspective, individual system components might be considered as whole sub-systems, or a system could be considered a single element of a larger system. Within the pastoral system, there are many subsystems which correspond to the different pastoral peoples that contribute to the larger system. For example,

⁹ Wikipedia, "Systems thinking," http://en.wikipedia.org/wiki/Systems_thinking (accessed 5/18/06) [1].

small-scale livestock production system includes pastoralists and smallholder farmer. Pastoralists differ in type, such as transhumant, semi- and agro-pastoralist. Pastoralists also differ in kind, such as different ethnic groups (i.e. Gabra, Rendille, Boran, Samburu, Somali and Ariaal), and within each group exists various lineage clans. Thus, entire hierarchies of systems may emerge when system components are broken down and linkages analyzed. Since livestock is the general topic of this paper, it is imperative to discuss the livestock systems in spatial and temporal context as a component within current livestock systems in Africa: namely pastoralism and smallholder farmer/agro-pastoralism.

Livestock Production Systems

There are many ways to categorize livestock production systems as livestock are kept in a variety of social, economic and environmental settings. In most African countries, the livestock sector is understood in two simplistic ways: small-scale and large-scale production systems. Small-scale systems include pastoralism and mixed smallholder farming. Large-scale systems include ranching, large-scale commercial farming, formal cooperative farming and state farming. Large-scale systems imply intensive or concentrated use of livestock for profit, while small-scale systems imply extensive or wide use of livestock in open-range as well as semi-intensive use of livestock as a productive asset. The small-scale livestock system will be the system used in this literature review as pastoralists and mixed smallholder farmers/agro-pastoralists (subsistence and semi-subsistence farmers) are the most vulnerable and food insecure in Africa.

Pastoralist

Pastoralists can be defined as households that gain more than 50 percent of their income from livestock on unimproved pastures, while agro-pastoralists would be households that gain

more than 50 percent from cultivation.¹⁰ While mobile pastoralists rely heavily on dairy and livestock products, agro-pastoralists rely on both livestock and agricultural products. A general rule is that the drier the environment, the more mobile the pastoral systems are. In the drier areas, camels are a key species; requiring little water, can cover a range across large expanses of territory, and require mobility. These dryland areas are found in parts of Somali, Gabra, Rendille, and Turkana territories (see map in Chapter 6, Pastoralist Outline). In these areas access to markets is limited because of pastoralist mobility and remoteness. Pastoral mobility is changing and the distinction between pastoralists and agro-pastoralists is becoming blurred as pastoralists increasingly practice spontaneous sedentarization. As pastoralists' mobility decreases, their access to markets in nearby towns increases. Access to markets will allow households to sell livestock and livestock products easily without significant transportation costs and to purchase grains, medicines and other household items. Most importantly, close proximity to towns enables households to access local markets thereby making sound and informed decisions about their livestock holdings. With increased sedentariness pastoralists' experience in their dietary staples; from predominately livestock products to grain sources.

It must be noted that there are smallholder farmers who practice zero-grazing and rely heavily on dairy livestock as their main income. Zero-grazing refers to keeping the animals in kraals or other types of containment to avoid contact with local or wild animals that may have diseases that could be transferred to the healthy animals, to avoid being impregnated by a local bull with poor genetics, to milk the animal in a clean environment, and to ensure and control the animals' nutrition. This minimizes animals' susceptibility to diseases or illnesses, and facilitates provision of appropriate nutrition for greater volume and higher quality milk production. This type of income generation activity can be successful under certain conditions given farmer long

¹⁰ John Markakis, "Pastoralism on the Margin," (Minority Rights Group International: London, 2004) 14.

term commitment. The Zambia case study in Chapter 6 is about such a zero-grazing concept. On the other hand, while trends show that pastoralists are diversifying income away from livestock, participating in wage labor and petty trade activities, pastoralists may also use dairy production as a temporary activity when rains are poor and access to markets may be facilitated as a result of temporary settlement. This type of activity can assist pastoralists in protecting their assets thereby facilitating herd recovery after a disaster.

Smallholder Farmer and Agro-pastoralist

Smallholder farming in Africa is predominantly carried out by small, autonomous family units with a labor force averaging between one and three adult-equivalents. Cultivated lands average 0.5 to 5 hectares (somewhat larger in drier parts of the Sahel) under an individual land tenure system.¹¹ Similarly, agro-pastoralism is carried out by pastoral families or their descendants who have, to varying degrees, settled and taken up cropping in addition to maintaining livestock (either on farm or transhumant). Often inhabiting dry areas where rain-fed cropping is a high-risk enterprise, agro-pastoralists live under conditions resembling those of the subsistence-oriented smallholder farmer. Subsistence-oriented smallholder farmers generally do not participate significantly in a cash economy. Household assets are mostly limited to non-monetary, self-produced equipment and inputs, land improvement and livestock raised through natural reproduction. Households usually barter to obtain items they are unable to attain through self-production.

Both smallholder farmers and agro-pastoralists rely on rain-fed agriculture to survive. Whereas smallholder farmers tend to keep some livestock in addition to their crops, agro-pastoralists cultivate crops in addition to maintaining their livestock, although it may be in

¹¹ ILRI, "Major Livestock Production Systems in Africa," Chapter 3.3, http://www.ilri.cgiar.org/html/trainingMat/policy_X5547e/x5547e0o.htm#3.3percent20majorpercent20livestockpercent20productionpercent20systemspercent20inpercent20africa (accessed 11/2/06) [1].

smaller quantities. In other words, they both rely on livestock and crop farming. For these reasons and the convenience of discussing these two similar livestock-keeping groups, references to smallholder farmers will include agro-pastoralists. In addition, smallholder farmers and agro-pastoralists generally have more diverse coping strategies than pastoralists because in general they reside in richer resource areas where agriculture is available. They often reside nearer to towns where petty trade and waged employment are more plentiful, and are in close proximity to markets where food can be bought and sold along with other sellable products (such as fuelwood and charcoal during periods of cash need).

3. FOOD SECURITY, VULNERABILITY, COPING, AND LIVESTOCK

In a keynote paper, Food Agriculture Organization (FAO) and International Livestock Research Institute (ILRI) noted that “livestock may contribute to food security through increased output of livestock and non-livestock products and by employment and income generation that may assure access to food.”¹² This means that livestock provides a source of nutrition as well as a means for income generation from the sale and use of livestock and other agricultural products. In Africa, this statement is key to rural livelihoods, where two-thirds of the continent is arid and semi-arid land (ASAL), and individual and household food security depends on access to assets, work and assured income [that is derived from livestock].¹³ Accordingly, if food security is defined as “when all people at all times have both physical and economic access to sufficient

¹² R. Sansoucy, M. A. Jabbar, S. Ehui and H. Fitzhugh, “The contribution of livestock to food security and sustainable development,” Keynote paper in Livestock Development Strategies for Low Income Countries - Proceedings of the joint FAO/ILRI Roundtable on Livestock Development Strategies for Low Income Countries, (FAO and ILRI: Rome and Nairobi, April 1995) [3].

¹³ Ibid.

food to meet their dietary needs for a productive and healthy life,”¹⁴ livestock can make a major contribution.

“Animals are an important source of food, particularly of high-quality protein, minerals, vitamins and micronutrients. The value of dietary animal protein is in excess of its proportion in diets because it contains essential amino acids that are deficient in cereals. Eating even a small amount of animal products corrects amino acid deficiencies in cereal-based human diets, permitting more of the total protein to be utilized because animal proteins are more digestible and metabolized more efficiently than plant proteins.”¹⁵

This is especially important for young children.

USAID/FFP 2006-2010 Strategy

A more systematic way of defining food security is to use dimensions defined by USAID Food for Peace (FFP) Office: availability, access, and utilization.¹⁶ Availability is achieved when sufficient quantities of food are consistently available to all individuals within a country. Access refers to a household’s, including all members of the household, can acquire adequate resources (income or direct production) to obtain appropriate foods for a sufficient diet. Utilization refers to proper biological use of food, requiring a diet providing sufficient energy and essential nutrients, but also potable water and adequate sanitation to ensure sufficient absorption of nutrients. These dimensions relate to a hierarchy for understanding food security, where availability is necessary but not sufficient for access to occur, and both adequate availability and sufficient access are necessary but not completely sufficient for effective food utilization to be realized (see Appendix A). In the current strategy, the emphasis is on the “in” in food insecurity,

¹⁴ USAID, DCHA, FFP, “Strategic Plan for 2006-2010,” (USAID: Washington, DC, May 2006) 10.

¹⁵ Sansoucy et al.

¹⁶ USAID, DCHA, FFP, “Strategic Plan for 2006-2010,” 11.

so that reducing food insecurity among vulnerable populations rather than focusing on increasing the number of food secure people is the strategic objective. In addition, the current USAID FFP strategic framework places emphasis on the risks that exist in people's lives. Risks are threats to life, livelihoods or health (including food insecurity) resulting from a negative condition or shock due to environmental, social, economic, political or biological events (see Appendix B).¹⁷ From this understanding, vulnerability becomes the fourth dimension of addressing food insecurity, and is a central focus for the new FFP strategic plan.

Vulnerability is an important concept introduced by the FFP strategy. It is a condition that results when people are unable to positively cope with risk. Using FFP's working definition:

“In a food security context, people are vulnerable or at risk of food insecurity because of their physiological status, socioeconomic status or physical security; this also refers to people whose ability to cope has been temporarily overcome by a shock. ‘Vulnerability to food insecurity is a forward-looking concept related to people's proneness to future acute loss in their capacity to acquire food.’ The degree of vulnerability depends on the characteristics of the risks and a household's ability to respond to risk.”¹⁸

Specific risks that affect livestock keepers in the eastern and southern Africa include lack of food and water, animal disease, poor access to human health clinics, low and variable livestock prices, threats of conflicts or violence, and poor access to schools.¹⁹ These risks are key factors in rural life and effectively create levels of vulnerability that vary between households and geographic locations. Like risks, vulnerability, is ever present in rural households. The capacity and resiliency of the households to cope with risk is their level of vulnerability.

¹⁷ USAID, DCHA, FFP, “Strategic Plan for 2006-2010,” 22.

¹⁸ USAID, DCHA, FFP, “P.L. 480 Title II program policies and proposal guidelines,” (USAID: Washington, DC, May 2006) iv.

¹⁹ Layne Coppock, “Risk Mapping for Northern Kenya and Southern Ethiopia,” Global Livestock CRSP Research Brief 01-01 (PARIMA), (GL-CRSP: Davis, CA, December 2001) 2.

The Development Relief Approach

The new focus of Food for Peace Title II food security programs is promotion of the Development Relief (DR) approach. This approach links relief and development objectives within contexts of uncertainty in which shocks can occur at anytime and anywhere. In order to respond to uncertainty programming must be flexible and responsive to both acute and chronic vulnerability situations. The approach is based on numerous past experiences of acute food insecurity situations in the countries where high levels of food insecurity have prevailed, such as Ethiopia and Sudan. It also seeks longer-term, development-based programming to protect and enhance the capacity of food insecure groups. The approach supports the FFP overall strategic plan to address the underlying causes of food insecurity in a complimentary manner; recognizing that to address these underlying causes, programs must take into account long-term risks and reasons for chronic vulnerability as well as short-term shocks and their impact on vulnerable, food insecure populations.²⁰ In particular, the DR approach recognizes that:²¹

- It is possible in some contexts to meet acute needs while building a capacity to address the source of vulnerability to food insecurity;
- Relief activities are relevant in pre-shock environments (i.e., mitigation and preparedness) and development activities are relevant in post-shock environments (i.e., capacity building and productivity enhancements);
- Development and relief programming may alternate or coexist in the most vulnerable, food insecure settings;
- Monitoring systems can track vulnerability indicators (generally referred to as “trigger indicators” as they are used to trigger a new activity) to determine when to shift programming emphasis;
- A program needs to be flexible and have the ability to modify interventions when the context calls for change.

While the DR approach has been tried by a number of development agencies, these programs are only now being evaluated. Therefore questions remain concerning the effectiveness of this

²⁰ USAID, DCHA, FFP, “P.L. 480 Title II Program Policies and Proposal Guidelines,”¹⁰.

²¹ Ibid.

approach and the degree to which it bridges the gap between acute and chronic food insecurity situations.

Food Security Groups

There are many ways to categorize and define vulnerable groups. One such way is to describe a group’s assets and how they react during and after a shock (i.e. loss of assets). By measuring a household’s assets one can ‘quantify’ how food secure a household is. The Food Security Continuum in Appendix C describes the characteristics of each group. The Continuum categorizes the general stages of food insecurity and poverty, and the group responses during and after a shock. Although several characteristics are similar group to group, the combination or matrix of activities utilized by each group is unique between each. As can be seen, the continuum moves from the food secure to the food insecure (downward movement). It is a dynamic continuum where rural households, for example, relying on rainfall, can move from group to group throughout the year during and after a shock.

Figure 1 Food Security Continuum

Food Security Levels	Poverty Levels
Most Food Secure	Wealthy
Relatively Food Secure	Middle
Vulnerable but Viable	Vulnerable to Poverty
Food Insecure	Poor
Extremely Food Insecure	Very Poor

The five distinct food security groups are: “extremely food insecure,” “food insecure,” “vulnerable but viable,” “relatively food secure” and “most food secure.” The “extremely food insecure” (very poor) maintain few if any productive assets other than their labor. They may be

landless, leasing/renting marginal or do not own/have access to sufficient land to produce the volume of crops necessary to provide their households (either directly or via any sales or barter). Hence, as a critical livelihood strategy, these households may beg for food and/or work as sharecroppers. Frequently the primary target group for food distribution programs, households in this category are often of poor health and rely on their children's labor for agricultural activities. This group will often include elderly headed households (EHH) or those headed by handicapped, chronically ill²² or widowed women. Such households are commonly supporting grandchildren or young dependents, some of whom may be AIDS orphans.²³ These households have little to lose when faced with a shock as they are already in the lowest economic class. It would take significant effort and resources to move them upward toward a more food secure situation regardless of the presence of a system shock. Interventions focusing on this target group, for example, include education, appropriate technology, conservation farming techniques, and food aid distribution or food-for-work activities.

Households included in the “food insecure” (poor) group possess productive assets which may include limited holdings of ‘smaller’ livestock (goats, sheep, hogs, or chickens). In some cases these households may own rudimentary farm equipment such as a handmade plough. These are subsistence farmers who live harvest to harvest, but often unable to produce enough food, or earn enough cash to feed all household members adequately throughout the year. As in extremely poor households, individuals will seek seasonal in-kind/waged labor. As a result of an environmental shock, this group will usually experience a poor harvest, although households may maintain some assets or resources enabling them to adapt to or cope with food shortages for

²² A person who has had persistent and recurring illness during the last three months that has reduced his/her productivity; usually suffering from HIV/AIDS in high incidence countries or regions..

²³ Zambia Vulnerability Assessment Committee, “Zambia Livelihood Map Rezoning and Baseline Profiling Final Report,” (ZVAC: Lusaka, Zambia, Oct 2004) 11. Refers to a child with one or both parents that have died of AIDS.

longer periods of time. Nevertheless, it is likely, that they will lose some of their productive assets as a result of negative coping strategies involving the sale of assets. During periods of severe or acute food insecurity, heads of household or other productive household members may need to participate in food-for-work activities, beg for food, and/or seek food aid, or other emergency assistance. When food insecurity and vulnerability is acute and short-term it is viewed as being “transitory”. In the absence of safety-net programming or specific asset protection strategies, this transitory food insecurity may further weaken poor households, resulting in the loss of productive assets. When this occurs these households become more vulnerable and thus eventually fall into “extremely food insecure” group as they cross the food security threshold. Yet with the assistance of safety nets, it is often possible for these people to regain low-value and low-input assets lost due to previous shocks.

However, if the ultimate goal is to address the underlying causes of food insecurity, simply building the asset base to previous levels might not be sustainable. If the goal is to sustainably prevent food insecurity, one major objective would be to build a larger and more resilient household asset base; or alternatively to seek ways of creating higher value from existing productive strategies. In some cases, it would be important to develop alternative livelihood strategies where existing coping strategies would not, in the long run, continue to enable household to become food secure. In other cases, creating links between marginal producers and market outlets that provide appropriate and remunerative payment for productive outputs (crops or livestock products) could significantly increase returns on time and resources invested in farm production. The latter strategies often involve non-governmental organizations (NGO), private sector, and donor involvement and investment. They also often depend on

government policy reforms, which more often than not neglect the needs of poor smallholder farmers with respect to agricultural, economic, market, and regulatory policies.

Members of the “vulnerable but viable” (vulnerable to poverty) group are still vulnerable but possess some productive assets on which to rely. Hence they are better able to cope with shock than the “food insecure” or “extremely food insecure” groups. Accordingly, this group may own more shoats (sheep and goats) and pigs as well as several chickens. They may own one to two head of cattle bought from money saved from surplus harvests or traded for a number of small stock animals. These households tend to be better integrated into markets and earn some cash. They have other skills such as handicraft production and dairying activities. They may live closer to town and thus their productive activities and livelihoods are more closely tied to market sales. During a shock, these households experience difficulty coping because of their reliance on their own cereals and livestock production for supplementary income and nutrition. To cope they may sell a few head of livestock to maintain the household, but this tends to be insufficient or unsustainable. As with the “food insecure” group, a shock can send households in this group into the “food insecure” category. These households may experience transitory food insecurity, require relief interventions, and need recovery assistance. The ideal is to ensure the recovery of households experiencing transitory food insecurity as they have the greatest likelihood of recovery. Unfortunately, not all will completely recover to the level of food security and productivity they once attained. Some transitory households will require more time and investment to ensure full recovery. Indeed, it may be preferable to rebuild household assets to levels beyond those previously achieved, or to introduce additional or entirely different livelihood strategies if traditional livelihood options are no longer viable, or do not enable coping under increasingly difficult conditions.

It is important to note that groups below the poverty threshold generally have less than nine months of adequate household food provisioning (MAHFP)²⁴, meaning that the other three months of the year, these groups survive through either some or all of the following activities: decreased consumption, seeking credit, divesting productive assets, engaging more human capital, obtaining informal private transfers, and/or utilizing government and/or NGO support through social production strategies such as provision of food aid. These coping strategies will be discussed in Chapter 5 Introduction to Coping Strategies.

The “relatively food secure” (middle) group have greater assets than the groups mentioned previously. They are above the poverty threshold so they have a capacity to cope with shocks through means other than loss of critical assets. In general, these households tend to have relatively easy access to towns or main roads. This group conducts agricultural activities, but may also hire relatives or neighbors to help prepare the land and harvest the crop. They own a number of livestock which are used to support their agricultural activities, cushion their incomes, and enhance their nutritional intake. During severe shocks it is possible that they will fall below the poverty line and experience transitory food insecurity, yet in most cases this would not be severe and approximate what is experienced by households that are “vulnerable but viable”. Although this group has resources to fall back on, these may become depleted, and as is common, their resources are shared with relatives outside the household and hence their ability to cope will be reduced. As with other groups, it may become necessary for some household members to work as waged laborers in large towns to support the household. Again, not all will

²⁴ This means that at most, these households can only assure that all household members received adequate food for a maximum of nine months out of the year. The number of MAHFP generally varies based on the level of household production, assets, and cash earnings available to purchase food. This can also vary based on the shocks and risks households face during a particular year, and their capacity to cope with them. MAHFP, also known as the “annual food gap” (acknowledging that food insecurity households generally face a “hungry season”) has been deemed an important indicator in the USAID/FFP strategy PMP as it not only helps categorize groups, but measures their capacity to cope with food insecurity.

be able to recover in a reasonable amount of time. As noted above, transitory food insecure households often require time and donor/government intervention in order to adequately recover from shock.

The “most food secure” (rich) group maintains livelihood strategies that are both productive and profitable. These households take opportunities to invest in high input and high income strategies. Households may own a variety of livestock and/or own or invest in one or more shops in or near town. For households in this category agriculture is both a source of food and a business; ranching and small-medium scale commercial farming being two common agricultural activities. Other economic activities household members commonly participate in include: service sector or retail management, livestock trading, and rental property management. As such, these households easily diversify strategies as appropriate and invest in private sector activities enhancing outcomes of livelihood activities they are engaged in. They are food secure throughout the year even during periods of shock. Their productive asset base is large enabling to cope during most crises. Members of this demographic are part of the elite in their home community; although they may live in urban areas and hire people to manage their land and livestock. Some disengage completely from rural agricultural activities and invest solely in industry or earn incomes through private, public, or service sector jobs or businesses in town or large urban centers. While this group may seem “wealthy” in the rural setting, they may not compare equally with their urban counterparts. In the urban setting, this group would likely be equal to the urban lower-middle class. Again, these food security groups are summarized in Appendix C Food Security Continuum.

Food Security Situations

A chronic food insecurity situation implies food insecurity that persists over a long period of time. In these contexts, poverty and food insecurity do not continue to exist by virtue of a singular trigger event that undermines coping. Rather, chronic poverty and food insecurity reflect endemic factors, such as inadequate productivity, high post-harvest losses, poor returns per labor or financial input, inadequate infrastructure, or chronic diseases. “Programming for the chronically food insecure population calls for interventions that are stable, multi-year and determined by a careful analysis of context. Programs should focus on increasing the resiliency and livelihood options of the chronically food insecure to enable them to pull themselves out of poverty.”²⁵ Conversely, transitory food insecurity reflects the changing food security situation of groups that results when a specific shock occurs. In this context some households become more food insecure because they are unable to cope with the effects of the shock. As a result, their food security situation is more tenuous and they become more vulnerable to future shocks, or to the detrimental impacts of the endemic factors that fostered the chronic food insecurity situation.

Acute food insecurity situations can result from shocks that are sudden, slow or complex in nature. Generally, acute food insecurity is a short-term situation where an environmental, social, economic, political or biological shock has occurred. However, it is possible for the impact of a shock to sustain over time, as in the case of wars that generate sizable refugee and/or internally displaced people (IDP) populations. These are generally referred to as “protracted” emergencies. Regardless of their nature, shocks disrupt daily operations and activities of affected populations, making them vulnerable to food insecurity. In some countries (such as Sudan and Afghanistan) where protracted emergency situations exist, recovery takes longer as people are unable to regain their livelihoods because of ongoing insecurity (war) and/or their

²⁵ USAID, DCHA, FFP, “P.L. 480 Title II program policies and proposal guidelines,” 5.

displaced status. The term “protracted emergency situation” relates to the prolonged time frame. Emergencies that involve a combination of natural causes (such as droughts, floods, storms, earthquakes, tsunamis, etc.) and manmade causes (such as war, internally displaced persons, refugees, etc.) are considered complex emergencies. Complex emergencies, are often the most difficult to recover from because providing aid can be challenging and subsequently is often delayed. In these situations, food is generally needed in camps yet the challenge of accessing camps is compounded by regional insecurity and natural constraints (e.g. flooded or impassable roads). Even if camps are established and prepared to feed people, victims themselves may be barred from accessing the camps for the reasons stated above.

Risk, Vulnerability and Coping

As mentioned, apart from the access, availability, and utilization dimensions, there is an overlapping dimension that determines vulnerability to food insecurity--risk. Risk adds a fourth dimension to the food security concept in that there are natural/production, political, economic, social and health risks at all times among all populations. Risk minus coping capacity equals vulnerability, the degree to which populations are susceptible to food insecurity. Vulnerability can be thought of as the inability to manage risk. Chambers and Davies define vulnerability as a high degree of exposure to risk, shocks and stress and proneness to food insecurity.²⁶ However, vulnerability also results from a lack of “resiliency and sensitivity of the livelihood system, where resilience means the ability of the system to absorb change or even utilize change to advantage, while sensitivity refers to the susceptibility of the natural resource base to change [...] human interferences.”²⁷ An appropriate response to vulnerability is often to enhance

²⁶ Chambers and Davies.

²⁷ Ibid 2.

community resiliency, livelihood capacity and human capital by building civil society institutions, cooperative development, self-help groups and community social networks. In doing so, the desired outcomes of increased resources, productivity, income, consumption and human capital will result in food security outcomes such as adequate food availability, food access, and appropriate food utilization. To do this, households and communities need to cope with vulnerability and manage risk. Coping is a natural reaction in the face of political, health, natural and economic shocks. With this understanding, food security programs that are effective in addressing food insecurity among vulnerable populations improve and strengthen the ability of beneficiaries to cope with risk, shock, and the underlying causes of food insecurity.

4. UNDERLYING CAUSES OF FOOD INSECURITY AMONG LIVESTOCK KEEPING PEOPLE

According to Food and Agriculture Organization, from 2001-2003, there were 854 million people in the world who were undernourished, 820 million are from developing countries, and most reside in the rural areas.²⁸ Sub-Saharan Africa accounts for 25 percent of the undernourished people in the developing world (206 million).²⁹

Africa's food insecure households consist largely of pastoralists and smallholder farmers. Their livelihoods are based solely on subsistence or semi-subsistence livestock rearing and farming. They depend upon the vagaries of the weather, particularly annual rainfall, for the survival of their animals and crops, and hence they are affected by variable recurring climate events such as drought and flood. They are also affected by other natural disasters (i.e., severe

²⁸ FAO, "State of the Food Insecurity," (FAO: Rome, 2006) 8.

²⁹ Ibid.

storms, earthquakes, tsunamis, volcanoes, landslides, livestock diseases and major infestations); violent attacks during conflict and civil war; health epidemics such as Avian Influenza and HIV/AIDS; and economic upheavals and/or collapse of market infrastructure. Livelihoods based on farming and livestock, which rely on rainfall, are risky because insufficient or absent rains can make households vulnerable to food insecurity and/or added shocks. Moreover, a lack of diversified livelihood options increases vulnerability by decreasing the number of coping mechanisms (off-farm income sources, etc); leaving pastoralists and farmers without recourse to ensure household food security. If production or income from a single livelihood is inadequate, households will have little else to fall back on.

Pastoralists and smallholder farmers' livelihoods are limited in terms of assets, resources and capacities. The five food security categories mentioned above—"extremely food insecure," "food insecure," "vulnerable but viable," "relatively food secure", and "most food secure"—could be seen from the poverty, asset, and resource point of view as extremely poor, poor, vulnerable to poverty, middle, and wealthy. According to Sen, poverty is best understood as a matter of deprivation³⁰ of necessities of daily living (food, clothing, shelter, and health care), social relationships and need (the ability to participate in society, education and information), and income and wealth (World Bank uses the poverty threshold of \$1/day).³¹ Impoverished households have poor, ineffective livelihoods; the primary mechanism through which people acquire and manage assets to ensure adequate resources and thus to fulfill household requirements. A livelihood entails engaging in productive activities that either provide food or resources directly to household members or creates a source of income enabling the purchase of necessities. The concept of "livelihood" focuses on households because these tend to be the most

³⁰ Amartya Kumar Sen, "Poverty and Famines," (Oxford University Press: Delhi, India, 1999) 22.

³¹ Wikipedia, "Poverty," <http://en.wikipedia.org/wiki/Poverty> (accessed 1/3/07) [1].

basic productive units where members have primary responsibility for one another. Often, this involves adult responsibility for children, but in more generic terms, more-productive members provide or care for less-productive members.

Livelihood Diversification

Subsistence rural livelihoods are limited in scope because populations reliant on pastoralism or smallholder agriculture practices only a few activities to meet household needs, namely the production and sale of crops, livestock, and their products. These livelihood models may be described as subsistence and/or semi-subsistence. Subsistence production is defined as dependence on one main source of income from a productive activity that provides the minimum amount of food for household consumption without generating significant surpluses or cash income which can in turn be used for other types of investments or additional diversification. Semi-subsistence livelihoods involve production and generation of income from sales above and beyond what is required for the household's daily food requirements, which would, in most instances, be fulfilled first. Thus, semi-subsistence production enables investment in productive assets and inputs, and often brings about the capacity to save, creating a safety-net in times of stress. As it becomes possible to invest more in livelihood options, these may become more diversified and returns can increase in value. However, semi-subsistence households are still vulnerable to factors that reduce productivity (i.e., variable climate) and capable of losing productive assets as a result. Thus, while this additional activity increases overall food security through increased income, it still is often not enough to raise households beyond the poverty threshold. However, these households tend to be able to cope more effectively with stress than those involved exclusively in subsistence production.

Although rural populations' livelihoods have often been static because of their relative ability to enable households to cope with shocks such as drought and locust infestation in the past decades, this is changing due to the increasing number and frequency of natural, man-made and complex shocks in the Sahel-Sudano region. As a consequence, simple subsistence and semi-subsistence livelihoods are no longer sufficient or viable options. Pastoralists and smallholder farmers are being pushed to seek alternate means of income generation or household support. The general trend has been to migrate to urban or peri-urban areas to engage in waged labor activities. Many former pastoralists and smallholder farmers are left with no alternative but to take low-paying jobs because they lack vocational skills and/or education.³² Their employment options tend to be limited to work as security guards, construction workers or petty traders.

Livelihood diversification tends to drive the practice of pastoralism. For pastoralists, adapting and coping with shocks is the norm. However, in today's environment pastoralists find themselves unable to cope effectively if at all. As natural and man-made shocks occur in greater frequency and severity, sedentarization or agro-pastoralism has become an adaptive capacity. Pastoralists first adopted this during forced sedentarization programs run by national governments (i.e., in Kenya) beginning in the 1970s. Today pastoralists are pushed and pulled into sedentarization. Increasingly, more are settling as the natural and political environment dictates. However, mobile pastoralism is still a viable option for some pastoral groups, who will continue to practice transhumance because it makes economic and ecological sense. Those who are not able to weather shocks will fall out of mobile pastoralism and take up other livelihood

³² At a recent presentation on livelihood programs in Ethiopia, Suzanne Poland of USAID/Ethiopia noted that vocational training may be the only solution for landless youth. As land redistribution has become legal in Ethiopia (average holdings have fallen to 0.5 hectares), many youths will soon find themselves without land holdings (October 2006).

strategies. This type of alternative livelihood activity is important in terms of sustainability and viability. As low-paid laborers, former pastoralists rarely earn enough to support their households. It is possible for pastoralists to use their knowledge to diversify into livestock-related activities such as milk production and sales or sales of other livestock products through informal markets: livestock trading, skins and hides, butchery and small ruminant rearing. Those with limited resources will rear cheaper and more prolific goats and sheep. From small stock they can increase their resources and income to purchase larger stock. Other alternative income-generating activities that pastoralists have engaged in include: petty trading of charcoal, fuelwood, construction poles, tree gum from *Acacia Senegal*, and beekeeping products such as honey and wax. As pastoralists settle temporarily or permanently, they have the same opportunities as smallholder farmers to diversify their livelihoods. Chapter 6 includes a detailed outline on pastoralists and their coping strategies.

Opportunities exist for smallholder farmers to diversify their livelihoods in ways that improve and strengthen their assets and knowledge base; enabling them to produce and sell more or generate greater income from their products. Hence it is possible for them to rely upon multiple strategies to meet household needs. Often, in contexts where risk factors play a significant role, households may need to maintain a larger resource base in order to ensure survival of all household members. Farmers may take advantage of various livelihood activities when existing agricultural options are insufficient to support their household during and after a shock. When farmers find that agricultural activities are not viable, they will seek non-farm activities such as migration for wage employment, production and sale of handicrafts, petty trading/vending, beekeeping, fishing, beer brewing and piecework.

Livestock used on-farm for multi-purposes can significantly lighten a household's workload and increase efficiency. Beyond the value of livestock products (milk, meat, hides, manure), large livestock such as cattle, buffalo, oxen, donkeys and camels can be used as draft animals; aiding in field cultivation and/or farm to market transportation of food, fodder, or other goods. Buffalo and oxen are the traditional draft animals, although donkeys are capable of draft work. They are, in fact, less costly, trainable, and can work up to 30 years compared to oxen which can only be used for 15 years. Although donkeys are less widely used on African farms, they are becoming more common. See Appendix F for further discussion on use of donkeys as draft animals and a description of other livestock.

Small stock rearing is common in eastern Africa, and is often considered to be exclusive holdings for resource-poor populations such as the landless. Small stock is cheaper and requires less feed and grazing area than cattle, so they are a favorite among food insecure populations. Goats are especially advantageous because they produce milk and reproduce twice per year. They are also easy to prepare for sale (i.e., through "fattening"). As households increase their assets by increasing the size of their shoat (mean both sheep and goats) herd, small ruminants are tradable for larger stock of greater value. In some cases, purchase of cows is appropriate when household has access to land and water and able to produce enough fodder for the animal. In ASAL areas, it is often ecologically more appropriate to purchase camels even though they are more costly, particularly if there is a need to transport goods long distances since they require less water and are heat tolerant.

Multi-purpose animals are used as both a source of animal products and as draft animals. For example, certain crossbred dairy cows can be used as draft animals also in addition to providing milk for household consumption or sale. Although "working cows will [require]

increased dry matter intake and a slightly lower milk yield, they have [a] longer productivity cycle.”³³ On-farm research of such “working cows” in Ethiopia found that after two years, milk yield was similar for working and non-working cows but greater for cows consuming supplemented feed (1986 kgs for working cows, 2206 kg for non-working cows, 3115 kg for supplemented cows, and 1077 kg for non-supplemented cows).³⁴ In the long run, there is economic value in using dairy cows for milk production and traction. “The value of the work more than compensated for the small decline in milk production and longer productive cycle found in supplemented working cows.”³⁵ However, it is important for working cows to get enough feed and mineral intake to meet energy requirements for work, lactation and reproduction, and avoid deleterious body weight loss.

As for livelihood support, farmers may be able to take advantage of the untapped resources inside and outside of their communities. The potential for additional support is possible if sought from the appropriate resources. Some local church or governments provide safety net programs that assist certain vulnerable groups or that facilitate NGO funding and support to aid vulnerable groups the local entities cannot assist. Private businesses outside the community may also be helpful. In the case of dairy development, dairy processors can provide incentives to producers to increase raw milk production, which in turn supports their businesses. Processors may closely with communities to ensure raw milk supply. When mutual benefits between parties are realized, collaboration is logical creating a positive feedback loop of incentives and synergies.

³³ E. Zerbin and C.E.S. Larsen, “Use of Crossbred Dairy-Draught Cows for Optimal Use of On-Farm Resources and Sustainability in the Ethiopian Highlands Mixed Crop-Livestock System,” www.husdyr.kvl.dk/hm/php/tune96/17Larsen.htm (accessed 7/25/05) [1].

³⁴ Ibid [4].

³⁵ Ibid [5].

Impact of Variable Climate

In a recent climate change report by the United Nations Intergovernmental Panel on Climate Change (IPCC), it was stated that “warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global mean sea level.”³⁶ Warmer temperatures mean greater evaporation, changing weather patterns, and more severe droughts. Dry regions are apt to lose still more moisture if temperatures increase, which exacerbating droughts and accelerating the desertification process. Recurring drought is a major problem in sub-Saharan and eastern African countries. Although these countries historically suffer from drought, a different and more severe pattern is emerging. Van Aalst, writing on the relationship between climate change and weather extremes, says that “the frequency and intensity of droughts have increased over the past few decades.”³⁷ Chronically vulnerable and food insecure populations such as pastoralists and smallholder farmers, as well poor governments unable to effectively respond to citizen needs bear the greatest burden of climate change.

Moreover, developing countries typically “have fewer resources for coping with storms, floods, droughts, disease outbreaks, and disruptions to food and water supplies. They are eager for economic development themselves, but may find that this already difficult process has become more difficult because of climate change.”³⁸ For instance, chronically food deficit countries in Africa are finding it increasingly difficult to cope with the effects of climate change such as prolonged and recurrent drought. Commonly, these countries do not have the financial resources to import food to feed shock victims.

³⁶ United Nations Intergovernmental Panel on Climate Change, Working Group I, “Climate Change 2007: The Physical Science Basis Summary for Policymakers,” (IPCC: Geneva, Switzerland, February 2, 2007) 4.

³⁷ Maarten K. van Aalst, “The Impact of Climate Change on The Risk of Natural Disasters,” *Disasters* 30:1, (Overseas Development Institute: Oxford, UK, 2006) 1.

³⁸ *Ibid* 4.

Desertification

Climate change is altering the ecology of the Sahel and Sahara. The constant encroachment of drier climate on sub-humid regions can be seen in time series satellite photos. Over the past three decades the Sahara has been expanding its territory.³⁹ Specifically, in “Africa’s large catchment basins of Niger, Lake Chad and Senegal, total available water has decreased by 40 to 60 percent, and desertification has been worsened by lower average annual rainfall, runoff, and poor soil moisture, especially in northern, eastern and western Africa.”⁴⁰ As ecology changes, livelihood systems of these regions also change. Pasture availability is reduced as the climate becomes warmer and drier. Agricultural lands require greater amounts of water to irrigate crops, causing salt build-up and eventual land degradation. Climate change is not the only factor causing land degradation. Population pressures and government policies also play a part in this irreversible process.

The extreme forms of land degradation, known as desertification, are also attributed to factors whose exact relationship is not as clear cut. Similar to the uncertain and complex causes of climate change, the complex root of desertification is not completely understood. The United Nations Convention to Combat Desertification states that desertification “is not the natural expansion of existing deserts but the degradation of land in arid, semi-arid, and dry sub-humid areas. It is a gradual process of soil productivity loss and the thinning out of the vegetative cover because of human activities and climatic variations such as prolonged droughts and floods.”⁴¹ Although increased population creates a greater demand for food production and hence increased pressure on the land, this alone will not necessarily result in desertification. Poor management

³⁹ Unknown

⁴⁰ Unknown

⁴¹ UNCCD, “Frequently Asked Questions,” <http://www.unccd.int/knowledge/faq.php#answer0> (accessed 1/3/06) [1].

and abandonment of land to the environment will also lead to desertification. However, some blame can be placed on a combination of poor government land use policies, frequent and severe political and/or natural shocks. Poorly conceived policies and ensuing conflicts foster destruction of productive lands by displacing herders and farmers and causing land to be overburdened by heavy concentrations of migrants and internally displaced persons. In addition, pastoral herd movements, and the distribution of pastoral and transhumant groups has become more limited due to agriculturalists and conflict. Some would argue that settled agriculturalists' practices in the past 20 years in the Sudano-Sahel region have exacerbated desertification through overgrazing of the land. The argument is that permanent settlements and their livestock tend to be more destructive of natural resources, than the transhumance practice of moving herds seasonally from water source to water source. Seasonal grazing allows the land to recuperate. However water points in pastoral regions are scarcer than before. It is also important to take into account that the number of conflicts and conflict areas is increasing. In predominately pastoral regions, where transhumance had previously been practiced widely, it is now less widespread because of security problems. As a result of the security situation, many pastoralists are pushed into settling because they lack access to pasture. Thus, pastoral herd movement appears to have been limited by two main factors: lack of security and desertification resulting from over-grazing and climate variability.

Land Use

At last count, 18 African countries were experiencing some form of political instability or conflict that would lead to government inability to regulate land use and environmental policies.⁴² In these countries immediate needs such as government infrastructure stabilization and reform and enforcement of economic policies take precedence. These countries tend to have

⁴² Unknown

weak political and economic systems (as well as high corruption levels). It is difficult to expect economically and structurally poor governments to provide the support needed to adequately sustain and improve their agricultural and livestock sectors.

As mentioned, some governments simply have poor policies on land use and the environment. Some countries lack land use policies altogether. In some cases, countries have land policies that only focus on ownership/tenure. Land use policies should provide clear, rational and coordinated guidance on the use of land and natural resources. Where land use policies in African countries are outdated, nonexistent or unclear, they have actually become harmful to the current pastoral situation. One positive approach to land use policy has been taken by the Kenya Land Alliance (KLA) which has been working with the Government of Kenya (GOK) to develop both a national land policy and a land use policy.⁴³ Both are necessary for pastoralists and smallholder farmers but the land use policy has more immediate implications because of the way land and natural resources are used and managed in Kenya.

Between 1983 and 2001 in Kenya, policies, laws and institutions charged with sustainable utilization of the natural resources were ignored. Corruption and politics allowed individuals and private citizens to destroy forests, wildlife and wetland areas without regard for long-term implications. Despite the awareness and gains at the technical level within the GOK, pollution steadily increased. It is safe to say that “the land use problems facing Kenya today are due to the lack of an appropriate national land use policy.”⁴⁴ Impacts on natural resources are wide and long term. The land is being threatened by desertification thanks to unsustainable land use practices such as over reliance on fuelwood (namely making charcoal) and de-vegetation through shifting cultivation. The soil is slowly being eroded and water sources are being

⁴³ KLA has developed a draft national land policy key issues and recommendations, which is located on their website: <http://www.kenyalandalliance.or.ke/Our%20Publications.htm>.

⁴⁴ Ibid 77.

contaminated by industrial waste and farm pollution. Increased population also puts pressure on the natural resources. In order to build a case for a national land use policy, KLA concluded that “the current trend of deterioration will lead to a gloomy future for Kenya if the status quo is maintained.[...] Striking a balance between satisfying the human livelihood needs and wise use of resources to ensure conservation for future generations is the biggest challenge.”⁴⁵ Hence KLA continues to push their agenda onward.

The relationship between climate variability and food security is uncertain. For instance food access and instability of food supplies may be inadequate for various population sectors.⁴⁶ These critical issues are currently being confronted by developing countries, especially ones in sub-Saharan Africa where dryland agriculture relies predominately on rainfall. The FAO session of the Committee on World Food Security in May 2005 stated that in Africa, “there are 1.1 billion hectares of land with growing period of less than 120 days. Climate change could by 2080 result in an expansion of this area by 5-8 percent, or by about 50-90 million hectares.”⁴⁷ If agricultural growing periods continue to decline, yields will fall and subsequent disruption of future crop cycles will result. More research is needed to understand these complex interactions. Nevertheless, it is clear that strategies to deal with climate change have to consist of a mix of direct responses to the factors above, taking into consideration the complexity of the types of production and livelihood systems as well as the policies that govern them in affected regions.⁴⁸

⁴⁵ Ibid.

⁴⁶ FAO, “31st Session of the Committee on World Food Security: Special Prevention Impact of Climate Change, Pests and Diseases on Food Security and Poverty Reduction,” (FAO: Rome, May 2005) 1.

⁴⁷ Ibid 2.

⁴⁸ Ibid 8.

5. SYSTEMS APPROACH AND COPING IN FOOD INSECURE SITUATIONS

In arid and semi-arid lands, where resource-poor households are dependent on rainfall and productivity of the land (often determined by the degree of aridity or soil fertility), these households are by definition “structurally vulnerable, [implying that] the coping strategies become permanently incorporated into the rural resource-poor households’ normal cycle of activities.”⁴⁹ In other words, all rural households that rely heavily on rainfall, climate, and natural resource use confront seasonality as an inherent feature of their livelihoods. In their review of literature on household coping strategies, Rani and Dodia found that diversifying into non-farm activities and seasonal migration to areas where work is available were two of the most frequent diversification strategies.⁵⁰

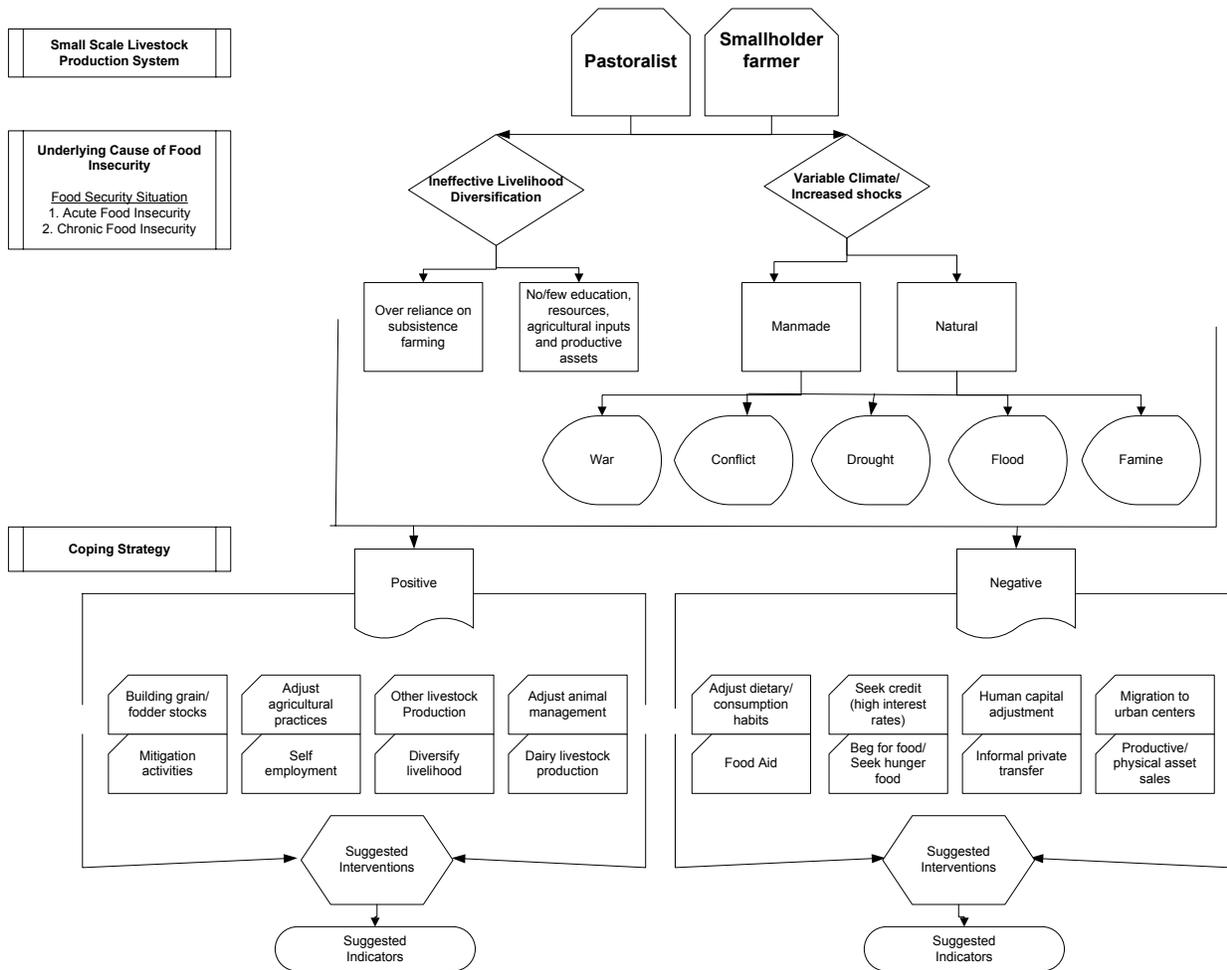
Figure 1 outlines various negative and positive coping strategies that may be utilized to address chronic and acute food insecurity. In Figure 1, when a shock occurs within the small-scale production system, pastoralists and smallholder farmers will initiate coping strategies, and with these strategies there are specific dairy- and livestock-related interventions that strengthen positive coping strategies and interventions that mitigate negative coping strategies.

The diagram is meant to illustrate the types of shocks and pressures that negatively impact small-scale production systems, and possible responses to them. These responses are coping strategies, and they may be either positive or negative. Program interventions can be designed that either strengthen positive coping, or introduce positive coping activities and behaviors where negative coping is taking place. In the case of this particular model, dairy- and livestock-related interventions that enhance positive coping are emphasized.

⁴⁹ Uma Rani and Minu Dodia, “Understanding Household Coping Strategies in Semi-Arid Areas: A Review of Empirical Literature,” (Ahmedabad, India: GIDR, 2000) 1.

⁵⁰ Ibid 14.

Figure 2 Coping Strategies within Small-Scale Livestock Production System



In Appendix D, this concept (diagram) is expanded into a Coping Matrix, detailing suggested interventions for chronic and acute food insecure situations, and suggests indicators to be used to assess the interventions and to test their effectiveness on affected households once implemented. The suggested indicators include indicators that would measure and monitor the interventions listed under the coping strategy (see Appendix E). Trigger indicators are also noted to assist in community early warning systems and to help assess when chronic food insecurity becomes acute as a result of a slow on-set shock. The interventions are further

discussed throughout the paper. Appendix E provides a list of the suggested indicators for reference. The coping strategy approaches are further described below.

Introduction to Coping Strategies

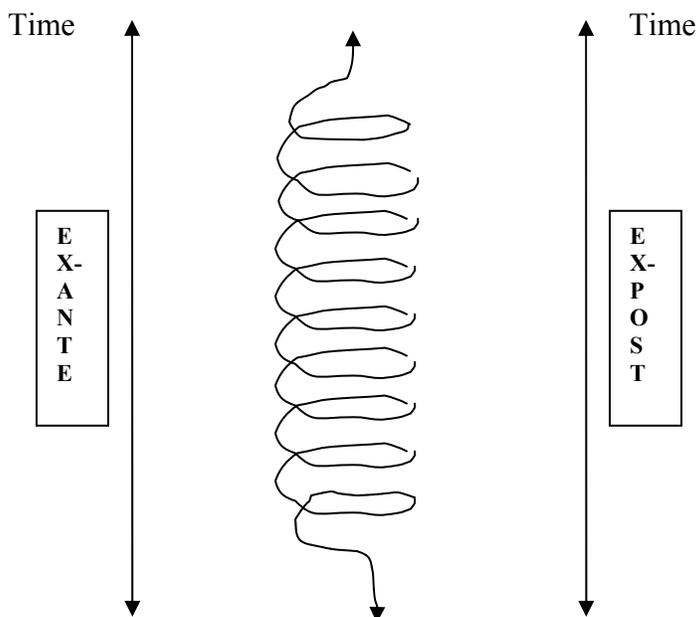
Ex-ante and Ex-post Coping Strategies

There are two main types of coping strategies. The first, ex-ante, involves risk aversion and mitigation; the second, ex-post, involves coping and vulnerability reduction. In some shock-prone areas where shock is a recurrent event, ex-ante and ex-post coping strategies may be similar because emergency situations in many areas may no longer be considered “acute” in the sense that it is out of the ordinary may be seen as being somewhere between acute and chronic food insecurity. This is because these “acute” episodes are frequent and thus cyclical. In many situations, particularly those in which shocks are relatively frequent, it is sometimes hard to tell the difference between chronic and acute food insecurity situations.

In terms of process, a way to visualize this phenomenon is through a Spiral Coping Strategy Continuum (see Figure 2) in which households are both coping with ex-post and (mitigating) ex-ante (against uncertainty and food insecurity) strategies. The coping continuum exhibits a spiral shape in which households either “spiral” down or up as their situation changes; becoming worse or better during times of natural, economic, health or political shock, or recovery. In shock-prone countries and regions, this phenomenon of a “spiraling” coping continuum lengthens based on the amount of time, the number of intervening shocks, and the increasing difficulties experienced by households trying to cope. When multiple shocks recur within short time periods, households must cope with them without having enough time to recover from prior shocks. The length of the spiral coping continuum denotes the amount of

difficulty households must overcome in order to recover. If households do not recover fully before the next shock cycle, this can lead them on a faster, more devastating journey down the spiral. For pastoralists and smallholder farmers, variable climate means frequent droughts, more devastating floods, and a changing ecology leading to drier and shorter agricultural seasons.

Figure 3 Spiral Coping Strategy Continuum



Both types of livelihoods (pastoralists and smallholder farmers) depend on crops and pasture; hence they practice similar household coping strategies. Even without specific “shocks” or periods of acute food insecurity, these households typically employ a combination of coping strategies designed to both cope with on-going risk and reduce vulnerability to future risk. These may involve increasing production and income and/or averting and mitigating anticipated shocks. Socioeconomic determinants and factors also play an important role in determining how, when, and to what extent a coping strategy or combination of coping strategies will be practiced.

As situations become more drastic and severe, more than one strategy will often be utilized. The existing literature identifies the following six traditional household risk-coping strategies (in order).⁵¹

1) Consumption allocation: Households maintain total nutrition intake while still reducing food and other expenditures. They may change the quality of the food consumed while maintaining a certain level of calorie intake. There may be a reduction or elimination of non-food expenditures on such items as agricultural inputs, clothing, health services and luxury goods.

2) Credit: Households use credit to smooth consumption by reallocating future resources to today's consumption. However, the poor have limited access to credit for various reasons such as lack of access to information, high interest rates, lack of assets for collateral and poor government financial policies. Instead most resource poor utilize informal forms of private transfers (see below point # 5).

3) Wealth and productive assets: Households can accumulate financial and physical assets as precautionary savings against unexpected income shortfalls, such as grain in storage, farm equipment, cash holdings, gold, and livestock such as cattle, sheep and goats.

4) Human Resource Allocation: Seasonal migration involves reallocating household member(s) elsewhere to work during certain seasons because of interregional variations in agricultural peaks and slacks.⁵² A more permanent allocation is referred to as "urban flight", whereby remittances are sent home on a regular basis. Also, household members not working can return or enter the work force. For example, when faced with negative income shock, household adult nonworking members re-enter the labor market (casual labor) or solicit children to enter into the work force.⁵³

5) Informal private transfers: Households are able to seek assistance from wealthier relatives either through a gift or loan or by relocating their children to them. This latter practice is a coping device used to offset household income shortfall by having less dependents in the household. On the extreme negative side, households have been known to beg for food and offer sex for food in dire situations.

6) Government and PVO support: The most food insecure households make use of direct food aid distributions either from the government, WFP, or other non-governmental organizations (NGOs). These services are specifically targeted towards vulnerable households as a safety net. In addition, these households can participate in food for work or cash for work programs that assist in smoothing consumption. Food aid could be considered negative or positive. Food aid is a positive coping strategy when it is short-term and targeted to vulnerable populations at appropriate times. On the other hand, food aid is considered a negative coping strategy when it develops into dependency.

⁵¹ Unknown 4-6.

⁵² Ibid 3.

⁵³ Jeffrey B. Nugent, "The Old-Age Security Motive for Fertility," *Population and Development Review*, Vol. 11: 1, (March 1985) 79. In some countries, having many children is a precautionary device to cope with unexpected income shocks.

Negative and Positive Coping Strategies

Another perspective of these six coping strategies is that they have negative implications: eating less and/or consuming poor quality foods compromises household health and nutrition; mortgaging future production for a loan (often at high interest) further marginalizes a household financially; sale of productive assets reduces productive capacity or savings; productive household labor is decreased or lost when members participate in off-farm labor; the well-being of youth, as well as their labor input, is put at risk when they are sent away; and finally the increased potential for over-reliance on food aid.

Ideally, positive coping strategies are preferred over negative ones because they focus on improving household capacity to improve food security situation in a sustainable manner. Ultimately, the aim is to enable households to cope in the face of shocks without spiraling downward or needing assistance to maintain survival. While negative coping strategies are effective in the short run and are often the norm, they tend to be unsustainable and perpetuate food insecurity. Generally, positive coping strategies involve improving, adjusting, and building on existing productive assets and resources. They include, but are not limited to: mitigating activities, adjusting livelihood practices, and diversifying livelihoods. In situations of chronic food insecurity, smallholder farmers confronted by these decisions on a daily basis must utilize one or more of these strategies routinely. One coping strategy employed by farmers in anticipation of the hungry season or a poor agricultural season is to try to synchronize cultivation with wage labor either by migrating or taking advantage of local wage earning opportunities. If local demand for wage labor is low at the time, people will migrate to optimize their wage-earning opportunities.

Some positive coping strategies require that smallholder farmers adjust agricultural practices by varying the extent to which they mix their crop-based production with animal husbandry. One option would be to mix and rotate crops with varying maturity and yields. Another option would be to mix family and hired labor in different ratios depending on the crop and the season, and combine cultivation with other activities as needed. As mitigating activities farmers can combine strategies including:

- Utilize farming conservation techniques to improve existing agricultural activities, such as minimum tillage methods;
- Retain crop residue from harvests for animal fodder;
- Inter-crop nitrogen-fixing crops with main staple crops, plant drought-resistant crops;
- Plant nitrogen-rich crop cover to maximize watered areas and eliminate weeds;
- Plant trees in the form of live fences for fodder for livestock;
- Double the value of dairy cows by using them also as traction animals; and
- Use manure as compost in crop fields and if have surplus supply and financially appropriate, use manure as biogas.

Conservation of water is also important for smallholder farmers and their livestock, and can be facilitated by:

- Cover boreholes and wells to reduce spontaneous evaporation;
- Fix existing water points for effective and efficient function;
- Harvest rainwater for drinking, cooking and cultivating in containers; and
- Practicing effective mini-irrigation techniques to water fields such as gravity-fed irrigation and/or foot-operated treadle pumps.

Farmers with sufficient resources to purchase the required agricultural inputs can also grow cash crops to earn more from the same land and labor.

In situations of acute food insecurity, pastoralists utilize positive coping strategies, involving adjusting animal management practices. As livestock are pastoralists' main, and in most cases only, resource base, herd diversification tends to be the first action taken. Pastoralists may:

- Split a large herd into two or more herds to separately seek pastures in remote areas;

- Maintain a mix of animals that vary by gender, species and age to increase overall herd diversity and resiliency; and
- Cull young and old animals to regulate milk and fodder consumption.

With regards to pastoralists, dairy animals typically stay in the homestead with women and girls, while young men take the non-lactating and stronger male cattle and camels to find pasture outside of the homestead area. Adolescent boys will search for pastures taking the goats and sheep. Pastoralists preserve food following exceptionally productive seasons. For example, milk can be stored as ghee, meat smoked and dried, and animal fat converted into oil. Cattle skins will be tanned and locally sold for grain (usually for small amounts due to the poor hide quality). Similar to smallholder farmers, pastoralists also practice water harvesting during pre-drought periods using traditional containers.⁵⁴ For many pastoralists, settling in medium-sized towns is a coping strategy in the face of poor security from raiding and reduced access to pastures. The need for a steady income may be better satisfied through town-based waged employment. Additional, but growing, strategies include receiving food aid and/or taking up cultivation as a last resort.⁵⁵

Pastoral practices that lead to settlement, crop cultivation, or reduction of livestock holdings can either be seen as positive or negative coping strategies, depending on the context. Over time, as these practices become established, some can be positive adaptations leading to sustainable livelihood improvements. For example, in order for many households to continue mobile pastoralism it may be necessary to temporarily settle in one location until they can rebuild a viable herd size (approximately 3.5-4.5 TLUs per capita) in the absence of other income sources and asset types. In general, pastoralist livelihoods have become diversified, having non-livestock income streams and assets that lower the number of per capita TLUs

⁵⁴ Unknown 50.

⁵⁵ Ibid 48.

required to sustain a mobile livelihood.⁵⁶ The adaptive capability of pastoralists tends to be subtle and may involve some temporary practices that appear counterproductive, but, in the long run, are actually logical and constructive.

However, even seemingly sustainable practices may not suffice due to the magnitude and scale of impact caused by climate change. A participant of a recent e-discussion sponsored by World Initiative for Sustainable Pastoralism (WISP) warned that “climate change impacts will likely evoke unknown problems that cannot be solved with only traditional knowledge and existing coping strategies. Thus, more targeted capacity development is required that addressees both technical – information and knowledge related aspects and governance processes such as participatory planning, investments in social safety nets, and combination of compensatory and incentive measures.”⁵⁷ Therefore, livelihood strategies must be supported by policy review and change, as well as interventions that seek to address underlying causes - not merely the negative affects of food insecurity.

6. CASE STUDY AND OUTLINE

The case study and outline--1) impart dairy livestock experience and lessons learned from a Title II Development Assistance Program and 2) describe the factors that surround pastoralists in the Horn of Africa (within the mobility paradigm)--touch on critical issues effecting these populations that utilize livestock to cope with poverty, vulnerability and food insecurity. These include livelihood diversification, sedentarization, impact from climate variability, uncertain and

⁵⁶ Peter D. Little, J. McPeak, C. Barrett, and P. Kristjanson, “Challenging Stereotypes: The Multiple Dimensions of Poverty in Pastoral Areas of East Africa,” paper presented at ‘Pastoralism and Poverty Reduction in East Africa. A Policy Research Conference, 27-28th June 2006, held at the Safari Park Hotel, (Nairobi: Kenya, 2006) 12.

⁵⁷ Ketu Chachibaia, “WISP E-discussion on Livestock”, contributor to e-discussion sponsored by WISP 1/22/07-2/16/07, [www. iucn.org/wisp/wisp-activities.html](http://www.iucn.org/wisp/wisp-activities.html) (accessed 2/6/07).

changing market conditions, terms of trade, conflict, water management, land tenure, animal health and quarantine, the roles of women and children, and HIV/AIDS.

Case Study: Land O'Lakes/Zambia Title II Food Security Dairy Development Program

Background

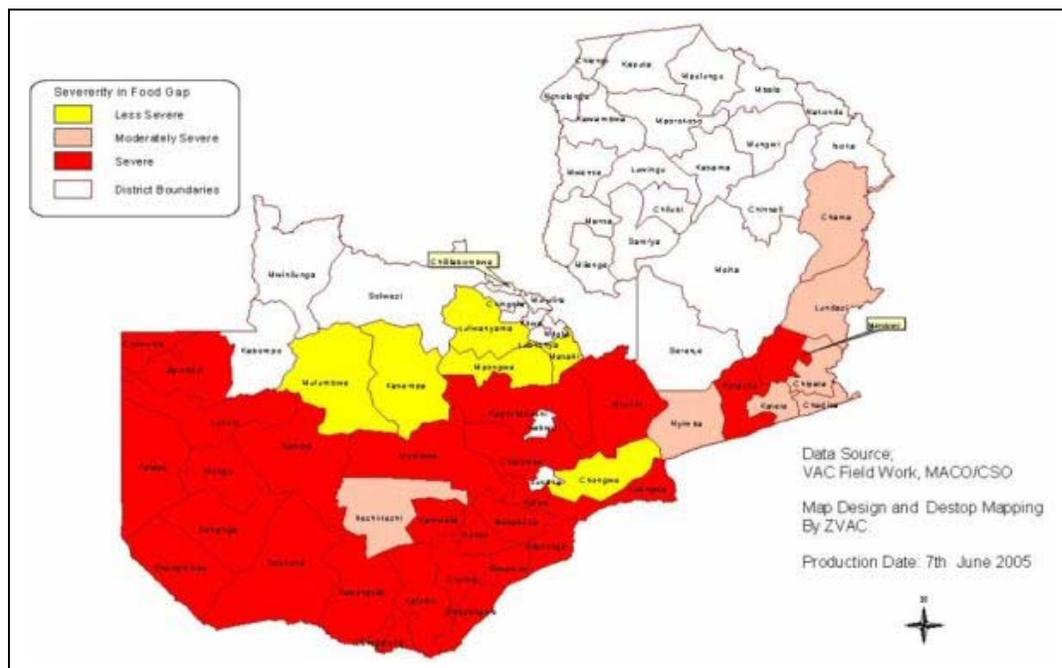
Zambia is a landlocked country in southern sub-Saharan Africa bordering eight countries: Angola, Democratic Republic of the Congo, Malawi, Mozambique, Namibia, Tanzania, and Zimbabwe. Zambia is divided into nine provinces: Southern, Western, Eastern, Copperbelt, Central, Lusaka, Northern, Northwestern and Luapula. The most populated cities are Lusaka and Livingstone. With a total 11.5 million people and a land mass of 740,724 sq km, the population density of Zambia is low (15.5 per sq km).⁵⁸ The country also has abundant water resources comprising seven large lakes and four major rivers. “The combined irrigation potential is 523,000 ha, of which only 46,400 (9 percent) is currently being irrigated, mostly by commercial farmers cultivating sugar, wheat and plantation crops.”⁵⁹ It should be noted that population estimates explicitly take into account the effects of high mortality due to AIDS. In Zambia, more than 70 percent of the population fall below the poverty line; 90 percent of them are women, and most living in poverty reside in rural areas.⁶⁰ However, a high proportion of both rural and urban households are vulnerable to food insecurity.

⁵⁸ CIA, “Zambia,” CIA Fact Book, <http://www.cia.gov/cia/publications/factbook/geos/za.html> (accessed 6/1/06) [2].

⁵⁹ Centre of Environmental Economics and Policy in Africa (CEEPA), “Climate Change and African Agriculture,” Policy Note No. 39, <http://www.ceepa.co.za/docs/POLICY%20NOTE%2039.pdf> (accessed 6/1/06) 1.

⁶⁰ FAO, “HIV/AIDS and Agriculture: Impacts and responses Case Studies from Namibia, Uganda and Zambia,” (FAO: Rome, 2003) 14.

Map 1 Food Security Map of Zambia



Food Security and Livelihood

Zambia is a country with severe chronic food insecurity that also experiences periodic drought and transient acute food insecurity every three to four years. With over 70 percent of the population deriving their livelihoods from the land, food security in Zambia is driven by the agricultural sector, which is the second most important economic activity after the mining industry.⁶¹ Zambia's staple food is predominantly maize, eaten as porridge called *nshima*. Hence most of the land and resources under agriculture are utilized for maize production. Other important crops include; cassava, rice, sorghum and millet. Zambia is considered to have sufficient availability when it has produced enough maize to meet the annual consumption requirements of its people.⁶² Additional crops grown in the country usually complement rather than supplement the availability of maize in that they can either be sold to raise money for

⁶¹ Ministry of Finance and National Planning, "National Economic Report," (MoF: Lusaka, Zambia, 2004).

⁶² Land O'Lakes/Zambia, "Food Security Strategy Paper," (Land O'Lakes/Z: Lusaka, Zambia, January 2006) 3.

purchasing maize or they can be consumed with maize.⁶³ However, even if adequate agricultural production levels are sufficient for assuring food availability at the country level, they do not guarantee that all households will have access to enough food either from their own production or cash purchases, or proper utilization of food ensuring adequate nutrition for all household members.

Access to food is poorest in the rural areas where most food is produced and consumed on the farm. In these areas, smallholder subsistence farmers mainly produce food for household consumption. In the past, the Government of the Republic of Zambia (GRZ) had to import large quantities of maize during drought years to offset the poor harvests. However, drought has not been the only constraint, as food production has been hampered by farmers lacking resources to purchase inputs such as fertilizers and seeds, a lack of labor, and a lack of access to appropriate technologies.⁶⁴ Although farming may be the main income source, farmers tend to have other streams of income that they utilize throughout the year. However, these other income sources, such as farm labor, vegetable cultivation, and petty trading of non-timber forest products are highly seasonal and erratic. In terms of incomes, “real incomes have declined over the last two decades due to inflation while prices of essential goods and services including food have risen.”⁶⁵ Also unemployment increased as a result of government economic restructuring due to its recent transition from a planned economy. This has left many families without a main source of income, further aggravating food insecurity in both rural and urban sectors.

The typical diet relies heavily on maize as the main source of energy and calories consumed daily, and thus food unitization and specifically nutrition tend not to be sufficient due

⁶³ Ibid.

⁶⁴ Ministry of Health, “The National Food and Nutrition Policy,” (Ministry of Health: Lusaka, Zambia, August 1999) 12.

⁶⁵ Ibid.

to poor dietary diversity. While poor micronutrient consumption is a problem, estimated caloric intake has declined throughout the years. In “1970/71 per capita energy intake ranged from 1580 kcal in Northwestern province to 1850 kcal in Copperbelt province, which was below the then FAO recommended daily allowance of 2030 kcal. Ten years later in 1980, the calorie intake was estimated to range from 1185 in Luapula province to 2103 in Lusaka and Central provinces compared to today’s recommended daily allowance of 2300 calories per day.”⁶⁶ Consumption patterns in Zambia are poor as people normally consume only two meals per day. Poor production, lack of variety in the diet and consumption of low-nutrient-dense foods are contributing factors to poor nutrition in Zambia. While GRZ promotes programs such as supplementary feeding, food fortification and supplementation of vitamin A and iron, these initiatives are often not enough to address the consumption levels and nutrient intake of many poor Zambians, especially children whose stunting prevalence is over 46 percent.⁶⁷ Hence, improving agricultural productivity (both in terms of quality and quantity), increasing incomes, and diversifying diets are all critical to improving food security in Zambia.

HIV/AIDS, Women and Orphans

Studies conducted by implementing organizations have found few orphan-headed households. Orphans in this society are almost always taken in by relatives or other adults. However, there is a high number of women-headed households, including elderly women. The FAO noted that women and children make up 70 percent of the agricultural labor force but they have access to few productive resources and are marginalized in decision-making processes at

⁶⁶ Ibid 11.

⁶⁷ USAID, Data Online for Population, Health and Nutrition (DOLPHN), www.phnip.com/dolphn (accessed 2/23/07).

the household and community levels. Thus they are among the most vulnerable of the poor as these productive resources are scarce.⁶⁸

The national HIV prevalence among women 15 to 24 years of age ranges from 17 percent to 25 percent and for men of the same age cohort 6 percent to 10 percent.⁶⁹ “The disease generally results in lower life expectancy, higher infant mortality and increased mortality rates, lower population and growth rates, and changes in the distribution of population by age and sex than would be expected otherwise.”⁷⁰ In particular, “the HIV/AIDS pandemic has orphaned 600,000 children by 2000 and this number is projected to reach 974,000 by 2014.”⁷¹ Fortunately, most orphans are fostered by the extended family, such as grandparents or other relatives. Approximately 6 percent end up living on the streets and less than 1 percent in the orphanages.⁷² As orphans join relatives’ households, the dependency ratio in these households increases. The number of unproductive dependents is high relative to the number of productive adults, and as a consequence these households are vulnerable to food insecurity. The dependency ratio also increases as chronically ill people (usually living with HIV/AIDS) join other households with their families and dependents. In its baseline study for Zambia, the Consortium for Southern Africa Food Emergency (C-SAFE--a consortium of World Vision, CARE and CRS)

⁶⁸ FAO, “HIV/AIDS and Agriculture: Impacts and responses Case Studies from Namibia, Uganda and Zambia,” (FAO; Rome, 2003) 14.

⁶⁹ Ibid.

⁷⁰ CIA, “Zambia,” online CIA Fact Book, <http://www.cia.gov/cia/publications/factbook/geos/za.html> (accessed 1/14/07) [4].

⁷¹ Ibid. Orphans, for the purpose of the study, are defined as children under 18 years of age who have one or both parents deceased. Orphans have been further classified as those who have one parent deceased and the remaining parent lives in the same household, those who have one parent deceased and the remaining parent lives outside of the household, and those who have both parents deceased (double orphans).

⁷² Ibid.

reported a dependency ratio that was 12 percent higher than the classical dependency ratio,⁷³ reflecting a large number of households taking in additional, often dependent family members.

There is a trend in Zambia where the increase in female-headed households can be viewed as the feminization of rural poverty.⁷⁴ Due to discriminatory land tenure practices, a consequence of this trend is female-headed households have less access to land for agricultural production than male-headed households. In a Food and Agriculture Organization (FAO) case study, female-headed households tend to host orphans (59 percent) more than male-headed households (54 percent), taking in younger ones as well.⁷⁵ This means that female-headed households must feed more people with less land. Female-headed households with orphans can cultivate a smaller proportion of their land than their male-headed counterparts, primarily due to a shortage of household labor.⁷⁶

Moreover, female-headed households have smaller productive asset bases because their relatives tend to sequester the family's assets after the husband dies since inheritance is not traditionally passed on to the female of the house, leaving very little if anything for the widow. Widows tend to own less livestock (including small ruminants) than their male counterparts. They also own fewer agricultural implements such as ploughs, carts and other farm equipment, which further reduces their efficiency, and as a result they produce smaller crop yields. The FAO also noted that during the five-year period preceding the FAO survey, "41 percent of the female-headed households with orphans lost all their cattle and 47 percent lost all their pigs. The loss of cattle and pigs was attributed to distress sales and property dispossession following the death of a

⁷³ TANGO International and C-SAFE M&E team, "Zambia Baseline Survey: Report Findings," (TANGO and C-SAFE: Lusaka, September 2003) v.

⁷⁴ FAO (2003).

⁷⁵ FAO (2003) 15.

⁷⁶ Ibid.

spouse.”⁷⁷ It is clear that the AIDS-related deaths of people in productive age groups has led to the increase in households fostering orphans, and thus absorbing the additional burdens caring for these dependents places upon them. This is especially the case for female-headed households because they are caring for dependents with fewer positive or sustainable resources and they are able to utilize fewer coping strategies to re-establish self-sustaining livelihoods.⁷⁸ In Zambia, this is recognized as the feminization of rural poverty.

Box 1 Feminization of Rural Poverty in Zambia⁷⁹

- 77 percent of all people living in female-headed households are poor, compared with 72 percent living in male-headed households.
- 61 percent of female-headed households face food shortages, compared with 52 percent of male-headed households.
- Female-headed households report longer episodes of food shortage.
- 54 percent of children in female-headed households are stunted, compared with 49 percent in male-headed households.

Smallholder Farmers in a Chronic Food Insecurity Situation

As mentioned in Chapter 5, there are negative (unsustainable) and positive (sustainable) coping strategies. Unfortunately, due to Zambia’s natural and economic shocks, namely, erratic and deficit rainfall patterns, livestock disease, flood, corruption and frequent economic policy changes, households are often forced to utilize negative coping strategies on a daily basis with more frequency than they are able to implement positive or sustainable coping strategies. The significant burden of coping with both high levels of food insecurity and HIV/AIDS prevalence tends to force people into utilizing negative or unsustainable strategies that react or respond to these problems rather than prevent them. The continually increasing prevalence of these problems and their combined impacts create a far greater burden together than separately. The

⁷⁷ Ibid 16.

⁷⁸ Ibid 17.

⁷⁹ Ibid 14.

main negative coping strategies in rural Zambia are: decreasing quantity and quality of food consumed and number of meals; utilizing means of earning income that are environmentally damaging such as charcoal making and fuelwood collection; asking for gifts/loans from friends/relatives; and depending on food aid distribution.

In terms of positive coping strategies, as discussed in Chapter 5, there are a few being utilized (in some regions more than others), such as 1) conservation agriculture, including water conservation and appropriate technology tools; 2) community group development such as food security committees, cooperatives, nutrition groups; and 3) dairying.

The following case study is based on the Land O'Lakes Title II program in Zambia. It focuses using dairy livestock to cope with chronic food insecurity, and illustrates how these negative and positive coping strategies interact and impact smallholder farmer livelihoods. While the Land O'Lakes/Zambia program specifically endeavors to reduce food insecurity by increasing incomes through the provision of productive assets, it is one among many programs addressing food insecurity in Zambia. However, the program is special in that it will leave behind a farm-to-market linkage that is reliable and valuable to these farmers' futures.

The Zambia case study is based on a five-year USAID/Food for Peace Title II program that began in March 2004. The program aims to reduce food insecurity among targeted vulnerable populations through a dairy development program, providing technical assistance to the local dairy sector at both the producer and processor levels. The program will contribute to the results of USAID/Food for Peace's Strategic Objective of "Food insecurity among vulnerable populations reduced." The program's entry point of intervention is via farmers' associations or cooperatives, which are either integrated into the program or established by the program. Producer cooperatives and associations offer organized, accessible and manageable structures

that can facilitate outreach in the community. The program consists of three main components: Smallholder Dairy Producer Development, Dairy Industry Development, and a Warehouse Receipts Program.

By the end of FY 06, over 2000 direct beneficiaries participated in one or more of Land O'Lakes/Zambia program activities.⁸⁰ Beneficiaries include: a) smallholder farmers organized as members of milk collection center groups; b) milk collection center staff trained by the program; c) recipients of dairy cattle under the cattle stocking sub-program; d) dairy cattle recipients trained in livestock nutrition, health, and management; e) farmers provided with artificial insemination services; f) recipients of the warehouse receipts program training; and g) management and staff of dairy processors receiving technical assistance and training.

The program is operating in five districts in Southern province, which was one of the areas most severely affected by droughts in 2000/1, 2001/02 and 2004/05. The people of Southern province are predominantly livestock keepers, but many have over the years lost their animals to diseases that plagued the area throughout the 1990s. Land O'Lakes/Zambia works in districts Mazabuka, Monze, Choma, Kalomo and Kazungula, all of which were placed on high food security alert from November 2005 to May 2006. Monze was particularly identified as being one of the neediest areas during the 2004/05 drought⁸¹ (further discussion about Land O'Lakes/Zambia's response on the 2004/05 drought follows below). The program also currently works in three districts (Chingola, Kitwe and Ndola) in the Copperbelt province, which have been negatively affected by the closure of the country's copper mines in the 1990s. In 2006, program activities were also extended to Chibombo district in Central province.

⁸⁰ Note that among program beneficiaries as noted in the Land O'Lakes, Zambia midterm evaluation, the average household size is 10.

⁸¹ FEWSNET, "Zambia Food Security Bulletin," (FEWSNET: Lusaka, Zambia, August 2005).

The activities being implemented by the program to increase income are centered on dairy development. These include: training in various components of dairy production and management, distribution of in-calf dairy animals, establishment of milk collection centers (MCCs) through which farmers can have a stable market to sell their milk, utilization of an artificial insemination program to improve the productivity of dairy animals, and development of market linkages with dairy processors to increase demand on a national level and ensure a sustainable market for smallholder raw milk. Of course, household access to milk and availability of milk at the community level have also increased. During the Mid-Term Evaluation, it was found that 72 percent of children in beneficiary households consumed milk.⁸² When children consume milk, this is beneficial to their health and development. Milk consumption is also very beneficial to working adults.

In order to ensure a secure market for the raw milk produced by the program beneficiaries, Land O'Lakes/Zambia also provides support to dairy processing and marketing. Addressing both ends of dairy—production and processing—through the dairy value chain enables producers to get the best price for their milk and ensures processors a consistent and accessible source in which to obtain raw milk. Specifically, the program provides technical assistance to assist dairy cooperatives/associations to establish and operate Milk Collection Centers. These have been established to assist smallholder farmers to access a stable market and provide an opportunity for them to bulk their raw milk and sell it to local consumers and dairy processors. Land O'Lakes/Zambia also works with dairy processors who purchase milk from MCCs to improve their capacity utilization and new product development, and thus ensure their ability to provide smallholder dairy farmers with a steady market for their milk. In particular,

⁸² Land O'Lakes International Development Division, "Midterm Evaluation Survey Report," (Land O'Lakes IDD: Shoreview, MN, November 22, 2006) 20.

Land O'Lakes/Zambia has facilitated the formalization of purchase agreements between MCCs and dairy processors. In this manner, both the producers and processors benefit because they support each other as part of an integrated dairy value chain. The producers depend on the processors for income and the processors depend on the producers for raw milk. This relationship is mutually important to both parties because the income from the milk sales supports household consumption and needs and the raw milk supplies a growing demand from urban consumers.

*Targeting Methodology*⁸³

The underlying principle of the program targeting mechanism is to ensure that the program works with food insecure and vulnerable households, as mandated by the Food for Peace Office. Equally important is the need to ensure that vulnerable households selected to participate in the program meet the minimum criteria required to ensure that they reap the accruing economic benefits so that participation does not become an additional burden to their vulnerability situation, but instead reduces household food insecurity. To this end, the primary target groups of the program are food insecure farmers whose households are food insecure for six months or more of the year.

Land O'Lakes/Zambia's targeting is done on three levels: geographical, farmer group and individual farmer. The provinces in which the program operates were pre-selected and approved at the start of the program. The provinces where the program currently implements were selected on the basis of their chronic food insecurity, the presence of basic infrastructure to support dairy development particularly processors with significant capacity, and the availability of producer groups that can meet Land O'Lakes/Zambia's selection criteria. Apart from the level of food insecurity, selection of new districts each fiscal year is also determined by factors such as the

⁸³ Land O'Lakes/Zambia, "Food Security Strategy Paper," 6-12.

availability of markets and other infrastructure like road networks and water access. Certain infrastructure must be in place and accessible to producers because the commodity the program promotes (raw milk) is perishable. If their incomes are to increase through milk marketing, producers must have easy access to outlets with cooling tanks – such as milk collection centers, and road access so that bulked milk can be transported to processors. After districts have been selected for the year, based on these criteria, producer groups and farmers are selected.

Because of the amount of labor involved in dairy production, the program usually provides assistance through already-established producer groups that meet the Group Selection Criteria (see Box 2). Another reason the program chose to work with already-established groups was to leverage effort, time and funds in group development. Groups that have been established through other programs have been targeted through the careful and equitable application of targeting criteria. Once districts have been selected, existing groups are identified, and an assessment is undertaken to determine their ability to participate in the program. A group questionnaire based on the Group Selection Criteria (see Box 2 Group Selection Criteria) is then administered to the group's leadership to assess the groups' dynamics and determine whether or not they meet the minimum requirements for participating in the program (which includes 70 percent of group members with less than six months of adequate household food provisioning or food insecure for six months or more).⁸⁴ In addition, Food Security Calendar and Community Wealth Ranking exercises are conducted at group level to determine the extent of the community's food insecurity.

⁸⁴ Land O'Lakes/Zambia, "Food Security Strategy Paper," 10. Seventy percent is a representation of Zambia's national poverty percentage, which is estimated between 68 percent and 75 percent.

Box 2 Group Selection Criteria

1. At least 70 percent of the group members should fall within Food Security target established by the program—less than six months of adequate food provisioning;
2. Located within district Land O'Lakes/Zambia program is being implemented in;
3. Established group of at least 20 farmers, already working with another development/relief agency;
4. At least 30 percent female representation in group, both at participation and decision making levels;
5. Commitment to development through regular meetings and proven active participation in development activities;
6. Willing to learn and prior group activities shows high adoption of technical messages;
7. Access to land;
8. Group should be located within two hours walking distance to the nearest Milk Collection Center;
9. Willingness to become a cooperative or association, if not already one;
10. Willingness to participate in a dairy development project, build cow facilities (milking parlor, crush pen, calf pens) and implement pasture establishment;
11. The community has easy access to clean and reliable source of water; and
12. Willingness to deliver saleable milk to Milk Collection Center.

In efforts to better target vulnerable households, Land O'Lakes/Zambia will prioritize vulnerable households such as: (a) female-headed households, (b) elderly-headed households, (c) people living with HIV/AIDS (PLHIV), and (d) households with high dependency ratios. One overarching objective of the target mechanism is to ensure that men and women participate in project activities and receive benefits on an equitable basis by creating the necessary enabling environment. The program will thus make a deliberate effort to ensure that program services reach a significant number of poor rural women and improve the food security situation of women who are heads of households. Specifically, the following considerations are made:

- Ensure a minimum of 30 percent “active” female representation (including in decision-making roles) in all the producer groups (dairy associations and cooperatives) that the program works with;
- Where possible, the program will work with farmer associations that are predominantly female; and
- The program involves both women and men in interviews, focus groups and surveys when food security data is collected.

As discussed above, the number of households within Zambia with high dependency ratios is increasing, partly due to the large numbers of PLHIV, orphans and others affected by other chronic illnesses that have been taken in by other households. Some reports indicate that

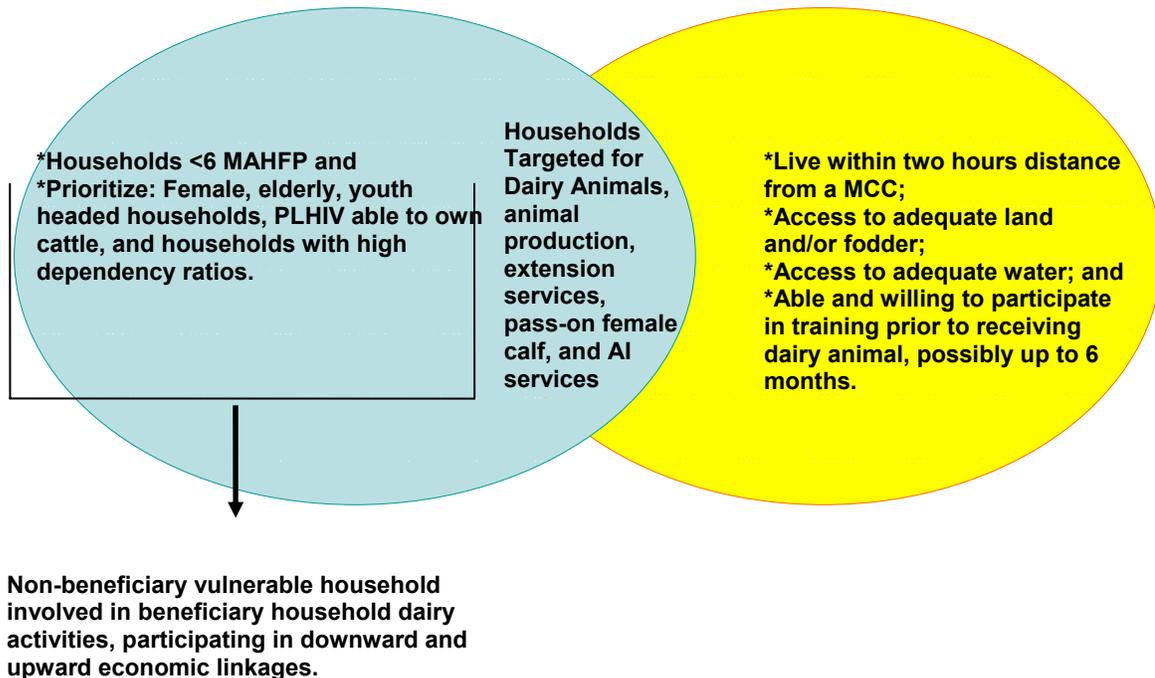
households with the highest dependency ratios are also the most vulnerable because they have to produce more to support more people. Normal levels of production for these households may be adequate to ensure food security prior to the addition of nonproductive newcomers. However, these same households are required to produce more with little or no additional land, labor, or other productive assets. Thus, large households are prioritized in the Land O'Lakes/Zambia targeting criteria.

Since the groups that Land O'Lakes/Zambia integrates into its program were originally established for various purposes (nutrition groups, groups obtaining government services, former development groups, etc.), there is a need to verify individual farmer eligibility after a group has been selected so that only farmers meeting Land O'Lakes/Zambia food security and dairy production criteria are selected as beneficiaries. In order to achieve this level of prioritization, a household selection questionnaire based on the Farmer Selection Criteria (See Box 3 Farmer Selection Criteria) and the above discussion on prioritizing vulnerable households would be administered to all households in the selected groups. Information collected is used to determine household food insecurity and vulnerability status. This will be considered together with the ability of the household to participate in dairy production activities. A visual summary (see Figure 3 Targeting Venn Diagram) of the farmer selection process illustrates this approach where the food security priority overlaps with the dairy production priorities.

Box 3 Farmer Selection Criteria

1. The farmer's household must be food insecure (have less than six months of adequate food provisioning);
2. The farmer must be trainable and willing to adopt new dairy management technologies;
3. The farmer should have (or be willing to build) livestock housing and other necessary facilities;
4. The farmer must have access to land;
5. The farmer's farmstead must be within two hours of an existing or proposed MCC/bulking center;
6. The farmer should not be currently owning cattle but may have previously owned cattle;
7. The farmer must be a member of a group, association or cooperative;
8. The farmer must have the basic resources required to participate in the program, i.e., adequate household labor;
9. The farmer's household must be within the Land O'Lakes/Zambia implementing program area;
10. The farmer must be able and willing to deliver milk to an MCC/bulking center if available;
11. The farmer must have easy access to a clean and reliable source of water;
12. The farmer must be willing to access animal health care;
13. The farmer must be willing to use the proceeds to address his/her household's food security;
14. The farmer must be willing to pass on the first female calf to the next recipient on the waiting list. These same selection criteria apply to recipients of the pass-on calves; and
15. The farmer must show clear involvement of the entire household in his/her farm activities.

Figure 4 Targeting Venn Diagram



Other Vulnerable Households

The program realizes that not every member of a participating community can be involved in dairy activities due to limited funding and Title II program objectives that target vulnerable populations. Hence the smallholder dairy farmer program will be limited to a specific number of vulnerable households within selected groups who meet the program's targeting criteria (detailed above). In addition, it is important to recognize that when a farmer receives a heifer and begins dairy farming this also has a multiplier effect. Apart from the milk being produced and sold, the first female calf the heifer bears is passed on to another vulnerable household in the community (selection based on the Farmer Section Criteria). This "pass-on" activity enables more vulnerable households to directly benefit from the program's efforts. This pass-on concept is customary and practiced in traditional livestock rearing societies as a loan/gift to a poorer neighbor or relative, and by such development agencies as Heifer Project International. Land O'Lakes/Zambia's experience so far with pass-on has been that it enables the program to reach more households in a community, foster community rapport, and develop a strong milk supply base for sustaining market linkages.

Nonbeneficiary Vulnerable Households

The program also endeavors to extend program benefits to nonparticipating households (indirect beneficiaries). Efforts are also made to encourage beneficiaries to target other vulnerable households in the community that are not part of the program for a number of reasons (i.e., program resources are not sufficient to reach all households in a community, households did not meet all of Land O'Lakes/Zambia's selection criteria, or the household did not belong to the selected group at the time). These community members are encouraged to offer services to program beneficiaries (i.e., fodder collection, delivering milk, and construction of dairying

facilities) to earn income. The objective of this activity is to induce broader impact beyond direct beneficiaries from finite program resources thereby improving the food security situation for more people within the community. This idea is derived from the premise that even at the rural smallholder level the dairy and livestock interventions offer many economic opportunities (backward and forward linkages) that can be harnessed by people who are not directly involved in program activities. For example, a poor nonbeneficiary whose crop was ruined by the 2004/05 drought sold his crop residue to his neighbor, a program beneficiary for some money. Here the beneficiary farmer benefited from the ready feed for his animal, which will produce milk for his family and bring income from the milk sale. The nonbeneficiary also benefits by getting money from the transaction, which he takes to the river to buy fresh fish. He sells them near the road and buys two 50-kg bags of maize. He gives one bag to his family and trades the other for more fish. He continues in this manner throughout the drought, enabling him to feed and provide necessities for his family.

Cooperative Development

In addition to small farmer dairy production, the program provides needed cooperative development. Cooperatives are a group or groups of people who share a common interest in meeting economic, social, and cultural needs and aspirations. Cooperatives link producers to the market, provide needed services to producers, bring efficiencies within the value chain, and maximize returns to members.⁸⁵ There are seven key organizational capacities that should be considered: Governance, Management Resources, Human Resources, Financial Resources, Service Delivery, and External Resources, and Sustainability.⁸⁶ Cooperative development is a complex process that requires the “recognition of change, agreement, organization, commitment,

⁸⁵ Land O’Lakes/Tanzania, “Best Practices: Smallholder Dairy Cooperative Development,” (Land O’Lakes/T)1.

⁸⁶ USAID, “Measuring Institutional Capacity,” TIPS No. 15 (USAID, Washington, DC, 2000) 11.

and financial responsibility.”⁸⁷ For example, Land O'Lakes/Tanzania program was able to provide some best practices for smallholder dairy cooperative development:⁸⁸

- Take a market driven approach to dairy cooperative development.
- Assess cooperative law and regulations to understand their impacts o building private sector dairy cooperatives.
- Encourage good on-farm dairy practices (i.e. clean milk production, optimize farmers’ resources and regular vet services)
- Initiate/support primary dairy cooperative projects that serve their members as farming businesses
- Facilitate bottom-up cooperation in primary societies in the formation of secondary level organizations to link members to markets and achieve efficiencies and economic scale
- Build member trust through its relevance to producers and by open/transparent operations
- Help cooperative leadership create a vision and plan, and sets the cooperatives own agenda
- Respect culture and gender roles for cooperation in the dairy value chain to economically uplift and empower smallholder farmers.
- Help structure cooperatives so that they can raise capital from members by linking more services to shares and price incentives (i.e. reward better farmers to maintain loyalty and set example t other member).

In Zambia, cooperatives are regulated under the Ministry of Agriculture and Cooperative (MACO), because they tend to be agriculturally-oriented. On the other hand, associations are under the Ministry of Commerce and can be boarder than cooperatives. The Land O'Lakes/Zambia program develops producer groups that eventually form dairy cooperatives or associations. However, most groups form cooperatives because the program works closely with the Ministry of Agriculture and Cooperative. The program’s farmer groups are formed from previous entities or directly with Land O’Lakes/Zambia’s support. Using the target mechanism described above, the selected groups receive training and extension services for six to eight months before a select number of beneficiary farmers receive in-calf heifers. Beneficiary groups

⁸⁷ Land O’Lakes/Uganda, “Cooperative Development Stages,” (Land O’Lakes/U) 1.

⁸⁸ Land O’Lakes/Tanzania 1-7.

are trained in cooperative development, such as cooperative board and manager roles and responsibilities; organizing as a formal structure; developing rules, regulations and bylaws to guide in the operation of the cooperative; and promoting community involvement of members' dairy and livestock activities. Some beneficiary farmers will also be trained in basic computer operating skills and business concepts such as record keeping, business plan development, and acquisition of land. The program plans to train a select number of beneficiary farmers as local Community Livestock Workers (CLW) to provide various services to the community in the long run, such as capacity building, AI services, disease/illness identification, drug provision, and simple vet treatment.

In addition, the MCC board and management leaders will also be trained to identify demand-driven economic goods and services required for the efficient operation of dairy activities at both the farmer and group levels. They will also be trained in transparent and accountable transactions and practices. They will learn to analyze accounting and performance data that will be compiled and stored by GART or another private entity to ensure transparent and accurate data entry. Using a benchmarking system, each MCC will see how they measure up to their peers in the program, region and province-wise. The focus of the cooperative development will be to instill in farmers business value in dairy, and build business knowledge and capacity, leaving behind viable resources and market linkages for the MCC and individual farmers. This business mind-set can be achieved using business development services (BDS) concept, where necessary services and training for small dairy enterprise is in one central location, like a one-stop-shopping center concept. By developing MCCs, and CLWs in the community means that Land O'Lakes/Zambia will leave behind the needed knowledge, services,

and management practices to build capacity, develop dairy enterprises, and other related enterprises.

Performance monitoring of the cooperatives (MCCs) will be conducted monthly to ensure compliance with their mandate (memorandum of understanding) using a multi-purpose assessment tool that monitors performance, including budget, production enhancement, production quality, and market development details.⁸⁹ Using predetermined threshold indicators specific to the area, Land O'Lakes/Zambia Field Coordinator will determine where in the cooperative continuum each MCC belong. The cooperative continuum ranges from 0-4, with 0 = not applicable, 1=poor (needs major improvement), 2=functional (but needs improvement), 3=not good, not bad (functions with guidance), and 4=good (functions without guidance); there are nine cooperative development components: member awareness, record keeping, financial management, decision making, board strength, management strength, annual general meeting audit, and member recruitment. The cooperative continuum is a tool that can help visually grade each MCC using corresponding color with the rating. In this way, the Field Coordinator can quickly tell which MCC needs more work and in what area. In addition, as it is also shared among all the MCCs' board and management as a benchmarking activity, thus comparing each among their peers to elicit accountable and transparent practices.

⁸⁹ Land O'Lakes/Z adapted the tool from Land O'Lakes/Uganda performance monitoring tool. Land O'Lakes/Z is in the process of fully adapting the tool to *Zambian* context.

Midterm Evaluation Lessons Learned

Land O'Lakes/Zambia conducted a Midterm Evaluation (MTE) during the summer of 2006 with the help of a consultant, headquarters M&E specialist, ICB team⁹⁰ and key Land O'Lakes/Zambia staff members. The MTE Final Report was prepared by the consultant and was successfully completed in November. The MTE's objective was to document and assess the program progress to date. The key questions answered in the final evaluation report were:

- What aspects of the program are working well and what aspects are not working well?
- To what degree did the program contribute to food security improvement?

In addition to the Final Report, a separate report that analyzed the data from the survey taken during the MTE measured all program indicators, including food consumption indicators used to measure household food access – the key dimension of food security targeted by the program. The survey focused on the beneficiary population, providing a snapshot of the program's progress.

The MTE found the overall advantage of the Land O'Lakes/Zambia program was that it was able to implement developmental activities in areas with high levels of chronic food insecurity in Zambia where food insecure people have long depended on distributed food aid. For example, many poor smallholder farmers anticipate receiving food aid in the event of a shock. While many households require this aid, other households would benefit from interventions that build assets and capacities, and provide incentives to cope with future external

⁹⁰ The Land O'Lakes Title II Institutional Capacity Building grant program, in addition to paying for technical innovations in the arena of livestock and coping – an objective of which this paper is a fulfillment, provides technical assistance to the Land O'Lakes Zambia Title II program, particularly in the arena of monitoring and evaluation (M&E). The staff hired by the ICB program (ICB team) played a significant role in providing assistance during the MTE as the Land O'Lakes Zambia staff had never been involved with the evaluation of a Title II program.

shocks. If those who are able to develop their own capacity and resilience are not provided the opportunity to do so, they may fall into a dependency situation that places them in a vicious cycle, keeping them in poverty. Sometimes, food aid is inappropriately targeted to these people as other sorts of resources may not be available to address these particular requirements. The Land O'Lakes/Zambia program recognized this challenge as they endeavored to work with farmers in areas where food aid was widely distributed in the past. The program found that these kinds of farmers have difficulties improving their livelihoods because they lack the assets to invest in diversification, or lack knowledge regarding livelihood improvement. As farmers participate in the Land O' Lakes/Zambia program they develop the capacity and resilience to improve their chronic food insecurity as a result of their reliable income stream. In addition, the program was able to make strides into achieving the objective of "Increased income of smallholder farmers. There were six main findings from the MTE survey that is of interest to note:⁹¹

1. Increased average annual income

Average annual income increased approximately 24 percent from the start of program interventions. This income increase is in line with the improvements noted in the beneficiaries' ability to purchase food with their income. Most importantly, the increase in income enables the households to purchase food during the hungry season when food from their own production runs out. Farmers who have participated in the program longer, are expected to have a greater income increase than farmers who joined the program more recently.

2. Decrease in the average number of Months of Inadequate Household Food Provisioning⁹²

The average number of Months of Inadequate Household Food Provisioning (MIHFP) was reported to be 3.8 months, which reflected a 1.8 month decrease from 5.6 months at the baseline. The months of December, January and February were the worst months when households suffered a shortage of food (the hungry season). On the other hand, months when households tended to have adequate food supplies were April, May, June, July, and August, which coincide with the harvest season.

⁹¹ Adapted from: Land O'Lakes International Development Division (2006) 1-3 & 29.

⁹² MIHFP is the number of months in a year that a household did not have enough food to meet its family needs.

3. Purchase of staple foods from household incomes during the hungry season

Main sources of staple foods during the months of shortage were from household incomes and own production. Fifty-nine percent of households that had at least one Month of Inadequate Household Food Provisioning purchased their staple foods using their income. The second-most-used source is from households' own production, and 50 percent of households used this source. This shows that when households have a shortage of food provisioning, they mainly use either their incomes or own production to provide enough food for the household. This implies that the program food insecure beneficiary households are able to use their dairy income to meet food needs during the hungry season. As farmers' incomes increase, their access to food also increases. They can purchase more agricultural inputs to cultivate maize and other crops and purchase more food to supplement household consumption. In part, this can be attributed to program beneficiaries no longer needing to earn cash income by working as casual laborers for other farmers. Instead they can concentrate their efforts on their own crop-field because of the assured income from dairy sales.

4. Interventions create jobs for other vulnerable households in the community

As a direct result of these interventions, many of community members not participating directly in the Land O'Lakes program were hired to support dairy activities. Twenty-nine percent of program households were generating temporary workdays for the community during the last 12 months. Out of 399 respondents, 247 temporary male workers and 28 temporary female workers (10 percent) were hired, for a total of 275 workers. Most workers were hired to provide veterinary service and to construct milking parlors.

On a permanent basis, 161 workers were hired by 399 sampled farmers, representing an indirect beneficiary level of close to 852 individuals when estimated at the program level. These workers received an average of around US\$ 30 per month.⁹³ Although this puts the workers at just \$1 per day, it still represents a substantial income increase for households living on under a \$1 per day. It should also be noted that most smallholder farmers have more than one income stream, and also rely on their own production.

5. Appropriate Use of Dairy Income

The MTE also found that the extra income from dairy sales are mainly used to pay for (in order of percent of households): farm inputs such as medicines for animals, agricultural inputs, and farm implements (71 percent), all of which are necessary to maintain and develop dairy activities; schools fees (63 percent); and household groceries (50 percent) that include such necessities as salt, sugar, soap and cooking oil.

⁹³ An exchange rate of ZMK 3,600 = US\$ 1 was used for the month prior to the survey; and ZMK 4,500 = US\$ 1 was used as the approximate rate for last year.

6. Households consuming milk, a nutritious beverage

Apart from improving food security through increased incomes—and thus increased access to food—the program also has a direct impact on individual nutrition through the consumption of milk by household members, especially children. Households reported consuming on average 3 liters per day, which translates into approximately 300 ml of milk per household member per day given the average household size reported by the MTE survey of ten members. The nutritional content of milk is such that both children and adults benefit from various nutrients such as calcium, niacin, vitamin B12 and potassium, which are important for growth and development.

One main finding of the MTE that stands out is that “dairy production can make an important contribution to reduced food insecurity for vulnerable (yet viable) farmers.”⁹⁴ The consultant noted that although dairy is a complicated and demanding business to manage, this enterprise is especially attractive as a model for food security improvement for capable farmers because of the direct and indirect multiple income sources dairy production generates. In addition to cash income from milk, dairy cows also provide milk for home consumption and manure that can be used to fertilize vegetable gardens and staple food crops. Over the long run, significant income can also be earned from culled cow and calf sales (disposal of unwanted male cows and older cows). These other benefits are, in fact, sometimes more valuable than cash income from milk.

While the MTE finds that dairy development can be an effective tool for achieving reduced food insecurity among a fairly wide group of vulnerable individuals, there can also be no doubt this would also be much easier to achieve in a country where more of the basic marketing infrastructure and other support services needed for smallholder dairy is already in place. Under

⁹⁴ John Keyser, “Land O’Lakes/Zambia Title II Development Activity Program Midterm Review,” (Land O’Lakes IDD: Shoreview, MN, November 22, 2006) viii-ix. These are the main findings and recommendations that stand out from the MTE.

these conditions, Title II assistance would be better able to focus exclusively on helping vulnerable individuals to establish viable dairy enterprise units.

Land O'Lakes/Zambia's Response to 2004/05 Drought

During the 2004/05 agricultural season, Zambia experienced drought in two thirds of the country; Southern, Central, and Western provinces were badly affected by erratic rainfall.⁹⁵ “By February and March 2005, most of these areas had received little and/or no rainfall at a time when most crops were at a critical stage of development and when moisture was needed most.”⁹⁶ In response, the Vulnerability Assessment Committee (VAC), a consortium of government, NGOs and United Nations organizations, conducted an assessment in April/May 2005. The assessment concluded that there was chronic food insecurity in the areas visited, caused mainly by crop and livestock diseases, and the consumption of crops by wild animals. These areas are known to experience periodic climatic shocks such as erratic rainfall and floods. Other frequent concerns are poor crop marketing and input distribution, and limited water sources, especially for livestock.

In response to the partial drought, the C-SAFE partners and Land O'Lakes/Zambia developed an integrated development relief (DR) approach to address short-term food insecurity in the southern Province. The development relief approach is well suited for undertaking such an integrated emergency response intervention in this region, because relief and development needs (recovery) are not separate but coexisting activities. The C-SAFE partners implemented a development relief program in Zambia from 2003 to 2006 and Land O'Lakes/Zambia have been implementing a development program in the same area since 2004, both addressing to the needs

⁹⁵ Zambia Vulnerability Assessment Committee, “2005 Vulnerability and Needs Assessment,” (ZVAC: Lusaka, Zambia, June 2005) vii.

⁹⁶ FEWS NET, “Zambia: Food Security Update,”

<http://www.fews.net/centers/innerSections.aspx?f=zm&m=1001641&pageID=monthliesDoc> (accessed 6/1/06) [3].

of those who have been left in a state of transitory food insecurity by drought, and for those who find themselves in a state of chronic food insecurity. Unfortunately, the 2004/05 drought came before many vulnerable households had built up sufficient assets to avoid falling into the trap of asset depletion and reduced dietary intake. Many households began a downward spiral of food insecurity and vulnerability.

The Emergency Livelihoods Recovery and Nutrition Monitoring in Zambia developed by C-SAFE partners, Land O'Lakes, and others had two objectives: 1) vulnerable households in targeted districts have diversified livelihoods and increased asset base; and 2) nutrition monitoring under C-SAFE expanded to a wider (more districts) and deeper (community level) extent. Land O'Lakes/Zambia was involved in the first objective, providing productive assets and appropriate training to vulnerable households to build resiliency to cope with climatic shocks.

Accordingly Land O'Lakes/Zambia was involved in providing dairy animals to vulnerable beneficiaries as part of this development relief effort. This was included as part of the DR package because not only were dairy cows used as draft animals in an effort to increase crop yields via timely planting, but they also were used to maintain and possibly increase household incomes as smallholder farmers produced and marketed milk through existing MCCs nearby. Prior to providing dairy cows, Land O'Lakes/Zambia trained farmers to ensure households would be able to maintain, care for and feed the animals throughout the year (during both the dry and wet seasons). Training on fodder production using conservation farming technologies, such as pasture establishment, was essential to the survival of dairy animals, especially during the drought. To this end, an extension officer was hired and an implementing partner extension officer (of Golden Valley Agricultural Research Trust [GART]) was utilized to facilitate the

training. Weekly trainings helped build farmers' confidence to make decisions about their livelihoods. Farmers analyzed their situation and made decisions regarding their crop yield. Beneficiaries increased their knowledge and understanding regarding the veterinary services needed for their animals and they were able to maximize the productivity of their land to ensure household food consumption while also producing fodder for animals.

Using the same targeting criteria as the Title II program, Land O'Lakes/Zambia selected beneficiary groups from existing and/or former C-SAFE nutrition groups for the short-term OFDA project. These groups were formed with a common goal, to improve their community's nutritional intake, so they are keen to increase their productivity and incomes to improve their food consumption. However, many of them lacked cohesion and group synergy. Leadership and group dynamics training was also carried out to ensure group cohesiveness and effectiveness. A group's leadership can determine the progress of the group. Leaders can encourage and cajole the group to meet the end goal, which is a difficult concept to convey to subsistence or semi-subsistence farmers.⁹⁷ Group dynamics also makes a difference in that cohesive, well-developed groups proceed further than others where in-fighting slowed the training schedule and learning process.

Appropriate technology and equipment for cultivating fodder in rain-fed areas was also introduced, such as conservation farming, minimum tillage Magoye rippers, and shaka hoes (heavier and narrower hand hoes used to dig water conservation basins). For example, water harvesting encouraged farmers to dig shallow holes in the fields that formed wet basins when watered or when it rained, allowing the pasture to get sufficient water in the indentations. This method resulted in three to five weeks' earlier pasture maturation, which saves water and labor.

⁹⁷ Good leadership implies accountability, transparency, and conveying a vision where a group should head. Those who have spent some time in urban centers tend to have a better understanding of these qualities.

Although the majority of individuals who attend the trainings are heifer-recipient beneficiaries, some non-recipient beneficiaries came to the training as well to take advantage of the training. The local community where the milk is sold also benefits in that the availability of milk adds to the diet.

While farmers were also made aware of the expected commitments and benefits of dairying as a source of livelihood and its impact on food security, it is not easy to change people's attitude about farming and livestock management. The biggest challenge was changing farmers' attitudes so that they view pasture as crop, and encouraging them to cultivate pasture crops such as velvet beans as fodder for their animals, to utilize special agricultural equipment and techniques to increase productivity. Hence group leadership and dynamics are important to the adoption of training messages and ultimately to the success of the program.

After 18 months, beneficiaries were enthusiastic about their productive assets. They attended weekly meetings with notebooks in hand. They were committed dairy farmers who religiously milked and sold their milk locally and then to the nearest MCC. The beneficiaries from the OFDA project were able to fold into Land O'Lakes/Zambia's Title II program with ease, to continue building their confidence, business knowledge and dairy expertise. The main lessons learned were many, and they will be used to help improve upon existing and future programs in Zambia. The main lessons learned were: 1) changing people's attitude is not easy, it takes time; 2) it is important to have good leadership and cohesive group; 3) although the intervention is the same, all groups should not be expected to have the same outcome; 4) messages and interventions that can be implemented on a shorter time-frame work better in relief contexts. As most droughts in southern Africa are "slow onset" emergencies, with longer funding lead times, better pre-planning is possible.

Conclusion

Zambia is a country with high chronic food insecurity, where caloric intake has been declining since the 1970s and the malnutrition rate of children under five years old is 46 percent, according to USAID's DOLPHN database.⁹⁸ Poor production, lack of dietary diversity and low nutrient-dense food consumption contribute to the food insecurity of the population, especially vulnerable households headed by women and the elderly who tend to host chronically ill persons, and large households with high dependency ratios. While a lack of assets and resources make these households vulnerable, it is their inability to cope and re-establish themselves after a shock that makes them chronically food insecure, and hence unable to move beyond the "extreme food insecure" and "food insecure" categories.

However, with a number of key interventions focused on building resiliency and productive assets, vulnerable groups can start to improve their food security status beyond the level of subsistence or the food security threshold. In this way households can earn extra income, pay for schools fees, save money, or invest in strategies that will help them mitigate the impact of future shocks. Specifically, this case study illustrates how livestock has been used as an intervention to increase food security among vulnerable populations. With a rigorous targeting mechanism used to identify vulnerable farmers who meet both food insecurity and dairy production criteria, the program is able to target the right kind of people to benefit from its interventions. Intensive training and extension services in dairy production, animal husbandry, cooperative development, and basic business concepts are integral to introduction of livestock as an intervention that can be introduced to vulnerable households. Training and extension services

⁹⁸ USAID, DOLPHIN, *ibid.*

are important to farmers wanting to ensure the survival of heifers and needing to produce a higher quality and quantity of milk. Beneficiary households receive about six months of training before they receive an in-calf heifer, pass-on calf or artificial insemination (AI) services. AI services increase the genetic availability of improved cows in the community. Improved heifers and cows means increased milk production and quality. In addition the program provides artificial insemination (AI) services and develops market linkages to ensure reliable market for milk sale.

The Land O'Lakes/Zambia Title II program achieved great strides throughout the first three years. Main findings from the Midterm Evaluation survey indicated that average incomes increased 24 percent since the start of the program, on average members of beneficiary households are consuming 300 ml of milk daily, and the number of MIHFP decreased 1.8 months since the beginning of the program. The key to this success is that it takes more than one intervention to increase smallholder farmers' income. A number of activities were necessary to create a reliable income stream for beneficiary households. With the provision of heifers, training and extension services, milk collection centers, and market linkages that the program provided and developed, these farmers will likely be able to cope with future shocks without outside assistance including food aid rations. However, livestock may not be appropriate as a coping mechanism in all countries, in all situations or with all kinds of people. In the Zambia context, Land O'Lakes has been able to demonstrate how it is possible to work with asset poor households on dairy livestock development activities.

Outline: Pastoralists of Northern Kenya and Southern Ethiopia⁹⁹

Background and Context

In eastern Africa, pastoralists are the most effected by food insecurity due to the nature of their mobile livelihood. This is a general outline to better understanding the pastoral situation as a “system” within the larger “system” of small-scale livestock production systems. Examining pastoral groups in this way will help prioritize the issues they face, and how they respond to and weather the different phases of cyclical acute food insecurity. Mobile pastoralism is economic and ecological opportunism at its optimum in certain agro-ecological zones.¹⁰⁰ Although pastoralists are accustomed to droughts in general, some are unable or not effectively able to cope in light of the current extreme climate pattern, namely more frequent droughts and shorter agricultural seasons. Hence pastoralists find themselves coping and slowly adapting to these changes.

Mobility is a coping strategy that has been successful throughout much of human history as an adaptive tool that serves several aspects of livestock production simultaneously.¹⁰¹ This mobile pastoral paradigm is the best way to describe and understand current pastoralism in Africa even though the current way in which these systems operate differs significantly from the ways they appear to have operated in the past. Mobile pastoral systems appear to be more economically efficient than both sedentary systems and commercial ranching because mobility

⁹⁹ Given the limited resources available with which to complete this research, it has not been possible to conduct a field study relative to a particular group for a specific case study. Thus, a general approach to the subject is presented here. As resources come up, we will look to the future to provide opportunities for a more specific and focused case study

¹⁰⁰ Mobile pastoralism refers to two kinds of pastoralism: nomadic and transhumant. Nomadic pastoralism is where the households move with the herd/flock. Transhumant pastoralism is where only herders move with the stock. Because there is no pure nomadic pastoralism in Africa anymore, mobile pastoralism refers to transhumant pastoralism.

¹⁰¹ Peter Little, phone interview and follow-up discussions, March 2006.

¹⁰¹ Maryam Niamey-Fuller, “Managing Mobility in African Rangelands,” in Proceedings of the International Symposium on Property Rights, Risk and Livestock Development in Sub-Saharan Africa, ed. N. McCarthy, B. Swallow, M. Kirk, and P. Hazell, (IFPRI: Washington, DC, 1999) 103.

takes advantage of low-cost fodder at minimal labor costs, as well as increased resistance of animals to disease due to the ability to move animals away from disease vectors and other infected animals.¹⁰² While mobility may avoid animals from getting disease in certain areas, mobile animals can also pick-up and transfer disease to other places on the herding route. However, this is unlikely because most herders are informed of what areas to avoid via an informal communication network system and cumulative historic knowledge about those areas. Another benefit of mobility is its deliberate use as a way of contributing to pasture sustainability and improvement.¹⁰³

Current mobile pastoral systems include settled pastoralists who send their animals out to pasture during regular seasonal movements of livestock between well-defined pasture areas (dry to wet season or low land to highland). This practice of full-time to part-time transhumance is common for pastoralists, and these strategies are currently options that can be utilized to address various situations. All of these systems have several elements in common.¹⁰⁴

- They rely on common property (pastures, forests and natural waters), assuming no individual ownership of land.
- They normally occupy arid lands with less than 400 mm of annual rainfall.
- There is an assumption that mobility is managed by herders, rather than by fencing.

Pastoral Groups

Pastoral areas are distinct and well-known to pastoral groups, yet are unmarked except by the customary claim that pastoralists have for living on those lands for many generations. The areas under study are in northern Kenya and southern Ethiopia because of the high concentration of pastoral groups in these areas. Table 1 below indicates the main pastoral groups, pastoral areas

¹⁰² Ibid.

¹⁰³ Ibid 106.

¹⁰⁴ Ibid 102-103.

and the main types of livestock they usually keep. Map 2 below also illustrates the general location of where these pastoral groups are located in the study region.

Table 1 Main Pastoral Groups

	Ethnic Group	Country/Area Distribution ¹⁰⁵	Main Livestock ¹⁰⁶
	Ariaal	N Kenya, Marsabit District, west of Marsabit town	Cattle and camels and goats
	Boran	S Ethiopia in Oromia Regional State; N Kenya west of Moyale	Cattle some goats and camels in drier areas
	Dassenetch	NW Kenya, east of Lake Turkana	Cattle some goats and camels
	Gabra	NW Kenya, east of Lake Turkana	Camels and goats some cattle in better watered areas (very mobile)
	Pokot	Turkana District, southern end of Lake Turkana	Cattle and goats some camels and sheep
	Rendille	N Kenya, Marsabit District, north of Marsabit town	camels and goats some cattle (very mobile)
	Samburu	N Kenya, Marsabit District, south of Marsabit town	Cattle and sheep some camels in goats in lowlands
	Somali	NE Kenya (east of Moyale town, Gedo and Jubba regions), SW Ethiopia, and S Somalia,	Camels, sheep, and goats and some cattle in certain areas
	Turkana	Turkana District, west of Lake Turkana	Goats, cattle, camels some sheep

The Gabra and Rendille are highly mobile groups who specialize in camels, goats, and sheep and share cultural practices and clan history. The Boran, Samburu and Ariaal specialize in cattle production in higher rainfall areas. The Rendille and Samburu are linked by history of cooperation. The Boran, Gabra, Garre, Somali and Rendille speak Cushitic languages and the Samburu and Turkana speak Nilotic languages.

¹⁰⁵ Elliot Fratkin, Kathleen A. Galvin and Eric Abella Roth, ed., African pastoralist systems: an integrated approach, (Lynne Rienner Publishers: Boulder, 1994) [map].

¹⁰⁶ Peter Little, phone interview and follow-up discussions, March 2006. This is a general idea of the dominate livestock that these particular pastoral groups keep. There are sections within each ethnic group that may specialize in one species and another section on another species because many of these groups have territories that cover both very dry lowland areas suitable for camels and better watered/higher rainfall areas suitable for cattle (Turkana, Boran, Afar, Samburu, and others would be included in this).

The Somali people occupy Somalia and the entire part of southeastern Ethiopia. The main Somali groups include the Marehan, Degodia and Garre. This is an area where there was a serious drought in 2005 and it extends from the Gedo and Jubba regions in southern Somalia to northeastern Kenya. The approximate territorial boundary between Boran (who live in the Oromia Regional State in Ethiopia) and Somali pastoralists of southern Ethiopia is Moyale town. The Somali cover the area to the east of Moyale and the Boran to the west.

The map below indicates the main pastoral area of southern Ethiopia and northern Kenya. Many pastoral communities are located in this relatively small area. It is interesting to note that the Burji live around Marsabit town and Moyale town but they are not pastoral. Also important to note is that the Somali territory in Kenya extends east of Moyale and Archer's Post all the way to the Kenya/Somalia border. The area under study receives an average rainfall of 250 to 1000 mm annually. However, even within this small area, there are certain locations that are drier than others. The further north, on the map, the drier, and the more the mobile pastoral livelihood is practiced.

Because of the low rainfall these areas receive, they are also some of the most food insecure areas in the world. Pastoralists' food insecurity during droughts is well known and documented, but in general they are actually chronically under-nourished compared to international standards. The pastoral groups that live in these areas rely on milk as their main staple. Some groups depend on milk more than others. "Fratkin estimated that 66 percent of total Arianal per capital caloric consumption was derived (in 1985) in milk, whereas cereals provided 11 percent of total energy. For the pastoral Rendille, milk may have provided up to 75 percent of

dietary energy, in the early 1980s.”¹⁰⁷ Galvin and Nestel surmised that the Turkana subsistence-oriented economy is dependent on a diversity of livestock for milk, especially camels, which are prolific milk producers.¹⁰⁸ In terms of caloric intake, Turkana energy intake was 1340 kcal per person per day (mean intake for the Turkana women and children only was 1009 kcal/day).¹⁰⁹ Seasonal differences in caloric intake were also noticed in the Galvin and Nestel study. During the dry season the Turkana’s intake was 1308 kcal/person/day (979 kcal excluding men), whereas the wet season energy intake was 1434 kcal/person/day (1103 kcal excluding men)¹¹⁰. While overall, pastoralist groups are food insecure, generally they are able to adapt to consuming fewer calories as part of their livelihood strategy. Often these groups cope better with episodic food insecurity than populations accustomed to higher levels of caloric and nutrient intake. Nonetheless, this does not protect them from a high incidence of severe acute malnutrition during major droughts when pastoral herd sizes are significantly depleted.

¹⁰⁷ Kathleen A. Galvin, D. Layne Coppock, Paul W. Leslie, “Diet, Nutrition, and the Pastoral Strategy,” in African Pastoralist Systems: An Integrated Approach, ed. Elliot Fratkin, Kathleen A. Galvin and Eric Abella Roth, (Lynne Rienner: Boulder, 1994) 122.

¹⁰⁸ Ibid.

¹⁰⁹ Galvin et al 123.

¹¹⁰ Ibid.

Map 2 Pastoralists of Africa¹¹¹



¹¹¹ Fratkin et al (1994) ibid.

In terms of food insecure areas, the Somali region and neighboring Somali parts of northeastern Kenya, southeastern Ethiopia and southern Somalia are severely affected because livestock per capita figures remain low and conflict is prevalent. These regions are generally remote from grain markets and grain supplies are unreliable and expensive, which makes them especially vulnerable. In the Somali regions there are also few non-farm employment opportunities to help supplement pastoral incomes even though there have been significant livestock losses in these areas and significant levels of food insecurity.

Pastoralists are a genuinely vulnerable population because many now are operating near the lower end of the herd/wealth threshold of viability. During a major drought, animal disease outbreaks and/or conflicts can push these pastoral groups quickly into poverty and food insecurity. Of course there is a lot of heterogeneity among pastoralists: rich, poor, and middle wealth herders. Those who are rich really are not nearly as vulnerable as those who have herds near the threshold of viability.

Nonetheless, the average per capita herd holdings have declined considerably in the past 20 years. Pastoralists are vulnerable because they confront risk factors including very significant climatic, market, security, and food security risks, yet have few social safety nets in the event of a crisis such as severe drought. What customary social safety nets exist (local redistribution mechanisms and livestock exchanges) is largely inadequate to deal with the widespread losses associated with the most severe recent disasters. As pastoralists tend not to have access to education and often lack skills that would make them employable, their prospects on the labor market are minimal. They tend to enter the labor market at the lower end, working in the lowest-paying semi-skilled and unskilled jobs.

Pastoral mobility paradigm

Currently, the most common type of mobile pastoral system involves: (1) base settlements where part of the family stays, and (2) satellite herd camps (called *fora* in much of northern Kenya and southern Ethiopia) that move around and generally consist of adolescent boys and young men in search of green pasture. The satellite camps can consist of animals from up to 7-8 families who share herding tasks. At certain times of the year (especially during rainy seasons when water and pasture are plentiful) the satellite herd camps return to the base settlement and stay with the household while animals water and graze nearby. Depending on where pastures and water are available (and security is not a problem) the satellite camps may either move to the same general areas in the dry season, or move to different areas. The base homestead may move small distances (4-5 km) every 4 years or so.¹¹² Their homes are on communal lands under the control of a lineage, clan, or the ethnic group itself. These are not private lands, and families would not be considered the private owners of the lands where they construct their main homesteads.

It is within this paradigm that current pastoral communities operate. Pastoralism has evolved around livestock nuances that utilize mobility as the most effective way to manage uncertainty and risk. However, the current paradigm separates the mobility of animals from that of people because the pull of modern amenities such as schools, markets and social services can not be ignored. “Even if the people settle, however, it does not mean that the animals should.”¹¹³ Pastoralists fully realize that their transhumance is slowly being eroded due to the current realities of droughts, floods, conflicts, and uncertain and changing market conditions. Yet, they also realize that mobility is the most efficient and effective method of survival in these arid and

¹¹² Peter Little, phone interview and follow-up discussions, March 2006.

¹¹³ Niamey-Fuller 121.

semi-arid lands. The complexity of the pastoral livelihood results from the process of adapting to uncertain times. Many issues and factors need to be considered to fully understand pastoralism and its nuances.

Introduction to Issues Surrounding Pastoralists

Ineffective Livelihood Diversification

Push and pull factors lead pastoralists to make use of various livelihood diversification strategies. This often includes involvement in alternative income generating activities. When shocks reduce herd size, pastoralists either are forced to implement other livelihood options (push factors) or are motivated by more lucrative productive options (pull factors). Current trends show that livestock holdings have decreased and the percentage of pastoralists practicing non-pastoral income strategies has increased to meet consumption needs and mitigate against expected shocks since the 1970s. Therefore, diversification is a relatively recent phenomenon going back to 1970s when there were many sedentarization programs in certain parts of Africa. From 1980 to the late 1980s in Ethiopia, a comparison of the Orma data showed that dependence on livestock income had already decreased considerably, from about 75 to 51 percent of household incomes for some herders.¹¹⁴ However, diversification is also a cyclical process where pastoralists may return to mobile pastoralism after gaining enough money to restock their herd size.¹¹⁵ For example, “a male herder may engage in wage employment to earn income for bridewealth and later on move back into full-time pastoralism.”¹¹⁶

¹¹⁴ Peter D. Little, Kevin Smith, Barbara A. Cellarius, D. Layne Coppock, and Christopher B. Barrett, “Avoiding Disaster: Diversification and Risk Management among East African Herders,” *Development and Change* 32 (Blackwell Publishers: Oxford, UK, 2001) 409.

¹¹⁵ Ibid 403.

¹¹⁶ Ibid.

These push and pull factors depend on the conditional, opportunity and local response variables that lead pastoralists to decide on diversification and the choice of diversification strategies.¹¹⁷ Conditional variables are factors that address system-level events such as external income transfers (i.e. food aid), human population density, per capita livestock holdings and distribution, and availability of rangelands. Opportunity variables refer to the types of diversification opportunities available. Local response variables can constrain or facilitate responses. These include measurements of gender, wealth, age and so on.¹¹⁸

According to Little et al (2001), pastoral diversification is defined as any non-pastoral income earning activity, excluding selling of milk and livestock at the “herd gate”, or herd diversification strategies. This definition includes:¹¹⁹

- Any form of informal trading occupation (i.e. selling milk, firewood, animals or other products);
- Wage employment, both local and outside the area, including working as a hired herder, farm worker, or migrant laborer;
- Retail shop activities (for richer pastoralists);
- Rental property ownership and sales (for richer pastoralists);
- Gathering and selling wild products; and
- Farming (both for subsistence and cash incomes).

Generally, poor pastoralists are pushed to diversify because they no longer have enough animals upon which to survive.¹²⁰ Because they have fewer animals, they seek other ways to generate income to meet consumption needs without having to resort to selling their animals, especially during a crisis, i.e. a drought. They tend to find agriculture worthwhile to support their household. In these environments, households often find it easier and faster to recover from drought if they are involved in crop production than if they attempt to rebuild their herds to

¹¹⁷ Ibid 406.

¹¹⁸ Ibid 406.

¹¹⁹ Ibid.

¹²⁰ Ibid 411.

former levels, which can take up to a few years.¹²¹ Being near towns, poor pastoralists also see the benefits of food aid, health, education and other social facilities.

Little et al (2001) notes that diversification among pastoralists has increased since 1980, but that different categories of herders, namely rich vs. poor and male vs. female, have responded differently. The poorest herders have tended to take up unskilled and petty trade, while the wealthiest herders have commonly engaged in trading, business, and skilled (higher income) waged labor. “The process of diversification affects the richest and poorest herders, leaving ‘middle’ wealth herders relatively out of the pattern.”¹²² As for middle wealth herders, they are less likely to diversify than either the poor or wealthy. Livelihood diversification is a strategy followed by the richest herders because they have resources to diversify into high income earning activities (pull factors). This strategy is also followed by the poorest herders, because they have few resources, and are forced (pushed) to diversify to survive. The roles of men and women also bifurcate when pastoralists diversify. Wealthy women gravitate to earning income earnings from selling livestock products such as milk and ghee. On the other hand, men predominately take up shop ownership, run retail businesses and migrate in search of waged labor. Poor women tend to be associated with petty trade such as selling milk, vegetables, and handicrafts; informal alcohol brewing; and local waged employment. Poor pastoral men become involved in activities such as waged labor, selling animals, and selling construction poles.¹²³

Wealthier pastoralists are pulled out of pastoralism, perhaps only partly, seeking to expand their assets and income, securing food and reinvesting in animals in the process. They may diversify into business activities such as shop keeping, constructing and renting building

¹²¹ Ibid.

¹²² Ibid 422.

¹²³ Ibid.

space as a way to sell fewer animals.”¹²⁴ Also an underlying factor is security, which was a push factor mentioned above. The security situation pushes all pastoralists in the area to be closer to the towns for protection purposes. More specifically, poor herders are pushed into sedentarization when severe political or natural shocks reduce their livestock holdings below 3.5 tropical livestock units (TLUs) per capita for herders who rely solely on livestock for a livelihood, making them vulnerable to food insecurity (see Box 1 for definition of TLUs). According to Little et al (2006), specialized pastoral producers require herds size around 3.5-4.5 TLU per person to maintain pastoral viability in the absence of other income sources and asset types, above which herds are likely to increase and below which herds are likely to disappear.¹²⁵ However, in reality most pastoralists in the region have non-livestock income streams and assets, which lower the number of per capita TLUs required to sustain a pastoral livelihood.¹²⁶

In terms of long-term sustainability, probably the most negative and damaging coping strategy has been charcoal production and/or large scale fuel wood sales. These have occurred in many of the rangeland and agricultural areas, and have resulted in widespread environmental degradation. Another negative consequence due to sedentarization and diversification is that herders who have moved closer to settlements to have access to food aid and services as a coping measure often suffer more than other pastoralists in the more remote range areas where water and pastures are better. Thus, they may forfeit their long-term livelihoods for short-term relief.

¹²⁴ Ibid.

¹²⁵ Peter, D. Little et al, “Challenging Stereotypes: The Multiple Dimensions of Poverty in Pastoral Areas of East Africa,” 39.

¹²⁶ Ibid 12.

Box 4 Tropical Livestock Units

TLUs ratios approximate weight, subsistence (food) and market value of different animals. They are universally used in the following manner:

- 1 TLU=1 head of cattle (oxen, bull, cow, calf heifer)
- .5 TLU=1 horse/donkey/mule
- 1.4 TLU=1 camel
- .1 TLU=1 sheep/goat
- 0.05 TLU=1 chicken

Sedentarization and Non-Pastoral Income Diversification

Considerable controversy surrounds pastoral sedentarization programs. Most of these were associated with attempts to encourage herders to pursue an alternative livelihood in the 1970s—in northern Kenya as part of irrigation projects among settled agriculturalists (Marsabit, Turkana and Isiolo Districts). These sedentarization schemes were expensive per participant, did little to reduce food insecurity because water supplies were often irregular and affected by droughts, created considerable environmental problems because they concentrated human populations with great demands on the surrounding resources (trees, water, soils), and only the poorest pastoralists remained since better-off herders, moved back to the range areas once they rebuilt their herd size.

Because of poverty and increased food insecurity, a considerable amount of spontaneous sedentarization occurs, which is the main reason why small towns are quickly growing in these areas. However, for the very poorest, stockless pastoralists (“former pastoralists”) actions and programs need to be implemented. These would entail ‘skills training’ for jobs (baking, tailoring, driving, carpentry, welding, etc.), education programs, credit to start small-scale town-based enterprises, and other non-pastoral activities. It would be unwise and very expensive to

encourage many of the poorest to return to a pastoral livelihood, since they lack the labor for herding and minimal herd holdings of 3.5 TLUs per capita to rebuild a viable herd size.

Impact from Climate Variability

While it is more or less accepted that climate change is occurring based on findings of the recent 2007 United Nations climate change report,¹²⁷ the scientific (quantitative) impact on arid and semi-arid lands (ASAL) requires further research. However, there is a large body of literature on the qualitative impact of climate variability on ASAL. The general understanding is that impact of any slight change in rainfall is great; in other words, people living in these arid and semi-arid lands are vulnerable to any changes in rainfall.¹²⁸ Drought is becoming the norm in Africa, especially the Horn of Africa. “Eight major droughts have occurred on the African continent in the last four decades: 1965/66, 1972/74, 1981/84, 1986/87, 1991/92, 1994/95, 1999/2001 and 2005/06.”¹²⁹ At the same time, more and more pastoralists are settling around the peri-urban areas of local cities and towns because of loss of livestock and greater economic opportunities as well as due to the subsequent conflict situation in southern Ethiopia and northern Kenya.

Over the past 25 years most pastoral groups have become poorer in per capita livestock holdings.¹³⁰ Average per capita livestock holdings among many pastoral groups have decreased by as much as 40-50 percent since the 1980s.¹³¹ Growth in livestock numbers has not kept up with human population growth. This means that pastoralist average livestock per capita ratios have declined and so their ability to manage a mobile pastoral livelihood is becoming less viable

¹²⁷ UN IPCC, “Climate Change 2007: Physical Science Basis: Summary for Policy Makers,” <http://www.ipcc.ch/SPM2feb07.pdf> (accessed 2/8/07).

¹²⁸ Peter Little, phone interview and follow-up discussions, March 2006.

¹²⁹ Alive/LEAD, “Session 1-Discussion Keynote Paper,” (FAO: Rome, October 2006) 1.

¹³⁰ Delgado (1999).

¹³¹ Ibid

with the declined livestock numbers. Because mobility is the key to pastoral livelihood, the less mobile people are, the more vulnerable they are to food insecurity and poverty. So as pastoralists settle, they are less able to cope with climatic shocks such as drought, which they normally would cope with by moving their household and animals to better pastures.

In terms of agro-climatic and agro-ecological conditions, 500-600 ml is the approximate minimum volume of rainfall required for crop cultivation. Vegetation relies on rain which in the Horn of Africa varies spatially and temporally.¹³² Having said this, the effectiveness of rainfall may have impacted how well and how much rain is absorbed into the water table (for both drought and flood). Increased loss of vegetation cover and deforestation determines the effectiveness of rainfall and how it is absorbed in the ground. With the growth of human settlements and the cutting of trees and bush species for fuelwood and charcoal production, vegetative cover is increasingly sparse in many pastoral areas, so that water runoff and erosion from rainfall is increasingly prevalent, especially around concentrated human settlements. Indeed, one of the major trends that have occurred in the pastoral areas is the rapid growth in the number and size of small towns and the heavy degradation of vegetation and tree resources around them. The population growth of some small towns like Yabello, Marsabit, Garissa and Maralal has grown by more than 5 per cent annually since 1990, which is more than twice the demographic growth rate of most pastoral groups during the same period.¹³³

Floods have occurred during the long or short rains, October-December or April-May months. Floods have a negative impact on people and animals. They displace and take human and animal lives, and risk to disease is also great as a result of the flood (both to animals and

¹³² Kathleen A. Galvin, Philip K. Thornton, Randall B. Boone and Jennifer Sunderland, "Climate variability and Impacts on East African Livestock Herders," <http://www.nrel.colostate.edu/projects/scale/irc%20galvin.doc> (accessed 2/12/07) 1.

¹³³ Peter Little, phone interview and follow-up discussions, March 2006.

humans). In the past ten years there have been four major floods, including. This includes one that started in October 2006 due to the mild El Niño phenomenon. There were floods also in 1997/98, April/May 2003 and April/May 2004.

In the 2006 flood, the most affected provinces in Kenya have been Northeastern and Coastal provinces, although some floods have also affected Nyanza and Western provinces as well as Nairobi.¹³⁴ In Ethiopia, floods hit the Somali region, especially the Gode, Afder, Liben and Korahe zones. In Somalia, floods of the Juba and Shabelle rivers have displaced people in the surrounding areas. The 2006 floods continue to affect thousands of lives, now more due to the risk of Rift Valley Fever (RVF), which is spreading into neighboring regions. An outbreak of the contagious RVF disease was officially reported in Garissa, Ijara and Tana River in December 2006. “There is currently fear that the disease might spread and cause more damage before the dry spell fully sets in.”¹³⁵ The RVF affects livestock and humans, causing acute fever and hemorrhaging that can result in death. The virus is commonly associated with unusually long periods of rainfall leading to abnormally high mosquito populations. “The RVF virus primary affects livestock, and outbreaks can rapidly result in large numbers of animals exhibiting clinical disease (this situation is referred to as an ‘epizootic’). The presence of an RVF epizootic can lead to an epidemic among humans who are exposed to diseased animals.”¹³⁶ However, approximately 1 percent humans become infected with RVF die of the disease compared to significantly higher mortality for infected animals. The most severe impact is observed in pregnant livestock infected with RVF, which results in abortion of virtually 100 percent of

¹³⁴ UN System, Standing Committee on Nutrition, “Nutrition Information in Crisis Situations – Kenya,” NICS 11, November 2006, http://www.unsystem.org/scn/publications/RNIS/countries/kenya_all.htm (accessed 2/16/07) [1].

¹³⁵ FEWS-NET, “Brief Report on the Impact of Rift Valley Fever in the Horn of Africa,” (FEWS-NEW: Nairobi, January 16, 2007) 1.

¹³⁶ Ibid.

fetuses.¹³⁷ Due to the occurrence of the disease, a quarantine ban restricting movement of livestock and livestock product trade was imposed in the affected areas. The ban will have wide-reaching negative implications for pastoralists and smallholder farmers in northern Kenya and southern Somalia, namely inability to purchase cereals and other essential household goods from the sales of livestock and livestock products.

In terms of coping strategies, during drought and disaster, pastoralists are doing what they can to diversify their livelihoods, such as sending older children or relatives to work in the city as well as settling down and cropping because they find it effective to meet grain needs, especially when grain prices are volatile. However, this option is not available in all areas. More discussion on pastoral responses to drought follows below.

Uncertain and changing market conditions

Increased demand for livestock and livestock products such as indicated in IFPRI's Livestock Revolution, has not had a major impact on pastoralist livelihoods. At least there is no aggregate impact except in small pockets.¹³⁸ For example, there has been a recent growth in chilled meat exports from rangelands of Ethiopia and a few pastoral areas of Kenya, but it is too early to see what amount will be exported and what kinds of benefits it will generate for herders. Much of this has mainly involved exports of sheep and goat meat, where exporters prefer young, small stock, (around 18 kg each), that are aged 18-24 months. There is a strong market for goats and sheep in the Middle East, the key importer, Saudi Arabia, has recently lifted the five-year ban on imports from several Horn of Africa countries. Because both small stock and cattle are

¹³⁷ CDC, "Rift Valley Fever Fact Sheet,"

http://www.cdc.gov/ncidod/dvrd/spb/mnpages/dispages/Fact_Sheets/Rift%20Valley%20Fever%20Fact%20Sheet.pdf (accessed 2/16/07) [2].

¹³⁸ Peter Little, phone interview and follow-up discussions, March 2006.

kept for breeding and milking purposes, most herds are heavily female (75 percent or more).¹³⁹ This herd structure limits their ability to sell large numbers of male animals, which are the animals preferred in the export and ‘high-end’ domestic trade.

Pastoralists sell their animals to traders and the traders sell them at large terminal markets, such as Addis Ababa, Mombasa, and Nairobi, where demand for livestock products is high. About 75 percent of the trade from pastoral areas is destined for these large markets, while the remainder is for sale in local towns and regional centers, and for breeding and rebuilding herds. In the domestic market chains of both Kenya and Ethiopia, animals initially are sold to traders operating in the rural areas or in small-medium-sized markets. The traders then trek the animals within country or across international borders to large ‘bulking’ markets, such as those in Garissa or Moyale, where they are sold again and trucked to the terminal markets to be slaughtered. Critical medium-sized urban markets in Kenya are Nakuru, Meru, and Nanyuki. Large Kenyan traders prefer Nairobi and Mombassa markets because the price and demand for livestock products are better.

In order for these trade systems to operate, pastoralists need to trek the animals to small and medium towns. Hence it is common for pastoral households to group together in order to combine herds for communal trekking for trading purposes. Pastoral communities trust designated herders to pay them for animals sold based on the selling price and the value of the animals. Generally most pastoralists tend to think they are not getting good prices, but they know that prices are generally better than the past years.

However, there is another option pastoralists use in selling their livestock. Auctions, which were introduced in Kenya, are becoming more popular in small-medium towns. They are popular because the price is transparent, and will generally be better than that obtained through

¹³⁹ Peter Little, phone interview and follow-up discussions, March 2006.

negotiation with a trader. Direct negotiation with traders does not favor pastoralists because they do not have the most current market price quotes. This assumes auctions are transparent, well managed and regulated. However, they too can be operated in a corrupt manner if all the traders agree to “peg the price” (i.e., collude), which happens more often than not. Nonetheless, pastoralists do better in auctions than in dyadic trading (one on one trading with trader and pastoralist). Generally, pastoralists get cash payments at the time of sale unless they sell to smaller traders who later sell in Nairobi, and then remit payments to the owner one week after selling the stock.

Pastoralists are driven to sell their animals due to:

- Cash needs for food and consumption goods
- School and boarding fees to pay for children’s education in cities/town
- Health related needs
- Veterinary and drugs needs

Pastoralists tend to sell more livestock during the onset of drought, especially when milk decreases and food insecurity sets in. However, McPeak noted in his research that livestock sales are highest during periods of high herd growth when pasture is most available during the wet season.¹⁴⁰ This makes sense since there are more animals during this time, but these sales tend to be limited mainly to fast reproducing goats and sheep. Moreover, herders sell animals to regulate herd size (predominately small stock) as part of herd management coping strategy. Also, small ruminant sales are often planned commercial activities, and are offset by relatively rapid rates of reproduction. These do not have the same impact on the household assets base as large livestock sales.

There is also a small secondary market where commercial herds are raised for fattening in peri-urban areas. Private traders buy immature cattle from pastoralists, put them in pastures near

¹⁴⁰ Peter Little, phone interview and follow-up discussions, March 2006.

the city, and then sell them after they have matured to the appropriate size. There is an international market that is growing as increased urban populations demand more meat and livestock products. Ninety percent of international livestock exports from the Horn of Africa derive from Somalia and the Sudan; and 30-40 percent of the small stock exported out of northern Somalia originates from Ethiopia.¹⁴¹

Terms of trade: Livestock and Grain Prices

Livestock and grain prices have an inverse relationship. Prices for livestock and grain, which is the main purchase item of herders, fluctuate during drought because of supply and demand factors as well as transportation realities. Because pastoralists of northern Kenya and southern Ethiopia reside in remote areas, they are spatially disadvantaged both in terms of the livestock and grain trade. They are great distances from the large terminal livestock markets as well as from the main cereal producing areas. As a result, they often receive the lowest prices in the livestock market chain while paying the highest prices for grains. During droughts the terms of trade especially work against them. In some cases the amount of grain that can be purchased by the sale of an animal can decline by as much two to three-fold. This pattern means that in order to purchase the same amount of grain to feed his/her family a herder must sell 2-3 times as many animals when droughts occur.

Because of the distance, transaction costs tied to transportation are important factors in the unfavorable terms of trade. For example, livestock border trading involves about 20 people including the seller, and each person gets paid out of the livestock sales.¹⁴² As a result, the seller

¹⁴¹ Peter Little, phone interview and follow-up discussions, March 2006.

¹⁴² Peter D. Little, "Working across borders: methodological and policy challenges of cross-border livestock trade in the Horn of Africa," in *Pastoral Livestock marketing in Eastern Africa: Research and Policy Challenges*, ed. John McPeak and Peter D. Little, (ITDG Publications: London, 2006) 175. Some of the 20 people involved in the cross-border trade include: seller (herder), trekkers, loaders and off-loaders (for trucks), brokers, middlemen, hired herders, sales markers (those who mark animals with the buyer's brand or initials), truck drivers, lorry boys (who travel on trucks with the animals), and so on.

receives a substantially lower sale price because of relatively high marketing costs, especially those associated with transportation. In normal years, pastoralists receive only about 45-50 percent of the value of the final sale price, i.e., the price the animal brings in the terminal markets. During drought years, pastoralists would receive less value from the livestock sale because poor terms of trade in the market at the time. Grain prices are high because of transport costs (being far from terminal and food markets). Likewise, livestock do not fetch a high price because of transportation costs included in the sale of the livestock. If pastoralists were able to trek animals into a terminal market, they would get a better price. However, they are faced with the need to sell immediately or they will need to lease holding grounds, which is extremely costly, and often not cost efficient, particularly given the need to feed and water animals and maintain their health until sold. The cost may be less if a number of herders from the same community pool their resources and contribute to the endeavor.

Conflict

The Horn of Africa is well known for its insecurity and high potential for conflict. The areas that are most insecure are in northern Kenya (including the northeast) and eastern Ethiopia particularly in the Ogaden desert regions bordering on Somalia. This insecurity increases risks to livelihoods in many ways, with the most obvious being the loss of animals due to raiding and theft and the loss of grazing areas due to conflict and insecurity. It was estimated that about 55 percent of grazing lands were not utilized by pastoralists in Marsabit District because of insecurity in the 1980s.¹⁴³ Hence about 50 percent of Marsabit pastoralists live in close proximity to towns because of insecurity and opportunities to sell labor and access to food aid. In Turkana District, a very similar pattern exists because of insecurity and decreased mobility among pastoralists. Another by-product of conflict is that it disrupts markets, creating unbalanced terms

¹⁴³ Peter Little, phone interview and follow-up discussions, March 2006.

of trade in the local market and thus making it difficult for the pastoralists to purchase cereals and sell their livestock at a reasonable price. Markets can be disrupted to the point where they collapse altogether, and this hurts all who seek to engage in trading animals within the vicinity.

Conflict can be caused by disputes around ownership of water and land rights. While these regions may be affected by civil unrest, they are also plagued with pastoral groups living in a small region trying to access limited natural resources for the use of their animals and households. Traditional grazing pattern and rules no longer prevent pastoral groups from taking over the boreholes or pasture lands of neighboring or competing groups because government-appointed administrators out rank the elder council. This direct competition with the traditional system results in uncertainty regarding the validity of, and enforcement of, customary rights. As East African governments increasingly decentralize in marginal pastoral areas and the power of both the elders and local government officials becomes weaker in these areas, this creates ideal conditions for the opportunistic takeover of critical resources. As a result, pastoral groups take advantage of the “open” space, but they often find themselves in heated conflicts over who controls access to these critical resource areas.

An enabling environment for policy change is needed, particularly one that is focused on pastoral food security and crisis recovery strategies. A national policy framework is needed, for example, that recognizes that pastoralists contribute to approximately 15-20 percent of the Kenyan GDP, but get back only two percent of that same GDP in terms of services.¹⁴⁴ This clearly demonstrates the degree to which pastoralists are marginalized as a result of GOK decentralization policies. Yet, the most important policy question remains unanswered: What is the critical policy environment that is needed to improve and enhance pastoral livelihood

¹⁴⁴ Peter Little, phone interview and follow-up discussions, March 2006.

strategies? An approach to this question is to gain a more comprehensive understanding of national policies that relate most directly to pastoralists:

- What are the market policies of Kenya and Ethiopia, and how do they impact pastoralists?
- Why are grain and livestock prices so high?
- What is the capacity for strategic food storage in Kenya, Ethiopia, and even Somalia, and how quickly and effectively can local officials respond to food shortages?
- How stringent are the animal disease and quarantine policies?

Unfortunately, in-depth discussion of these issues is outside the scope of this general outline, which will provide an introduction into these issues. The bibliography at the end may also be helpful in further understanding these policy issues.

Water management

As would be expected in dry areas, conflicts often center on access to key water and pasture resources, especially during the dry season. If a group controls access to water resources this gives it 'de facto' access to the surrounding pastures as well, because without access to water, use of the surrounding range areas is not possible. In the past, governments and donors often financed large borehole (water) projects without adequate attention to how these would affect relationships between different pastoral groups. With the opening of a borehole, neighboring groups that normally did not use an area were attracted because of the availability of water. This often sparked conflict and those groups who were better armed usually gained control of the water point.

At the same time, there are good examples of community-managed water projects (boreholes and wells) in Wajir, Kenya and in the Boran areas of southern Ethiopia (where large well complexes have been locally managed for hundreds of years). The key is to ensure empowerment of the management committee and traditional water officers (in the case of the

Boran) to enforce watering rules and maintenance requirements. In cases of fuel-driven boreholes, managers should be able to charge user fees to pay for fuel costs.

Box 5 How a Water Management Committee Works

The committee develops a watering schedule that is limited to members of the community (or in a drought outsiders may be allowed to use the water point with the committees/traditional water officer's permission). Given this schedule, the herd owners know on what days of the week they can water their animals. The committee will charge the herder a per animal fee to cover the costs of paying the borehole operator or well officer, and the user is responsible for contributing labor to maintain the trough where the animals are watered. If users do not contribute labor to maintenance, then the committee will charge them a fee so that the management committee can hire labor to do the work. In the case of boreholes, herders may be responsible to paying for the costs of fuel, or may need to contribute their own fuel to operate the borehole. Regardless of the rules, the most important goal of the management committee is to enforce water rights. With support from and in consultation with local elders, the committee/officer needs to be empowered to keep people from outside the community from using the water point.

However, the committee's job is not without challenges:

- Conflicts arise when powerful groups of herders arrive (often armed) and try to use the water point, paying little attention to local rules.
- Accessibility and affordability of fuel to run the borehole equipment will vary.
- Boreholes often require parts that can only be obtained from a city or a great distance away in order to keep running. Thus, access to parts is a problem and these can be very expensive. Breakdowns of boreholes are frequent and collecting funds for spare parts can be a problem.
- Governments often try to intervene and regulate these local water management committees, but this can actually destroy the basis for their existence. The most successful well complexes in southern Ethiopia function with no government or NGO/donor involvement at all (and many have been operating for centuries).
- Another problem with donor funded water projects is that they use technologies that are very difficult for communities to maintain. They often require the hire of an outside mechanic that would generally need to come from Nairobi or Addis to repair the system. They often use technologies that require spare parts that cannot be sourced locally, but instead must be imported. These problems can prevent a borehole from functioning for several months or even years.

Water management interventions are important for pastoralists to ensure the maintenance of good health in the area and to lower the number of conflicts over water resources. Intervention

options include: (1) deepening existing pans by dredging up silt, (2) rehabilitating water sources (boreholes, wells and/or pans), and (3) chlorinating wells and building new water points (boreholes, wells and/or pans). Water points are a pastoralist paradise because the water helps reduce livestock deaths that result from tsetse fly bites. When a tsetse fly bites a thirsty animal, the resistance mechanism in the animal is weak and therefore it easily succumbs to death more quickly and easily as compared to a non-thirsty animal. While water - and well - committees ensure appropriate water management, they can also ensure safe water use. Ideally, committees should be given training on safe water use, on hygiene and sanitation, on avoidance of contamination, on prevention of cholera and other water-borne diseases, and on hygiene promotion techniques. Women should make up at least one-third of the committee. Real improvement of the hygiene and sanitation situation of the community may require construction of latrines and provision of training to community members on better hygiene and sanitary practices.

Land Tenure

While pastoralists have a lot to gain from securing land tenure in their respective country, land is a factor over which pastoralists have no control. “Land in Ethiopia, Tanzania and Uganda is collectively, that is, state owned, and land that is not privately owned in Kenya is held by the state in trust.”¹⁴⁵ Markakis also noted that none of these systems accommodates, let alone recognizes, pastoral rights over unimproved, unsettled land and the waters that cross it.¹⁴⁶ In the days of Structural Adjustment programs, these governments were under pressure to privatize land “to create an “enabling environment for investment.”¹⁴⁷ In suit, Ethiopia (1975), Uganda (1998), and Tanzania (1999) modified their land policy and/or developed land acts. For Kenya,

¹⁴⁵ Markakis 21.

¹⁴⁶ Ibid.

¹⁴⁷ Ibid.

the problem lies in that fact that “land tenure is based on English property law, which does not recognize the communal system as understood and practiced by pastoralists.” Since most of the low-lands are Trust Lands, they are administered by local district councils, but the real power lies in the state executive hierarchy, the President of the Republic, who can allocate Trust Land at will.¹⁴⁸ Markakis relates that, “there is an obvious unwillingness by the states in eastern Africa and the Horn to grant this right unequivocally and permanently. Nor are they likely to do so in the future. Pastoralists are small minorities who claim vast areas of land in states where the peasant majority is mortally threatened by land shortages. Land is the main resource, and the state is not going to surrender control over it.”¹⁴⁹

While some form of land policy or act is present in most of eastern Africa, women’s rights to land is not addressed until later and with much pressure from local and international organizations. Some of these countries changed their land policy but not without hesitation. “In Ethiopia, the peasant associations established by the Land Reform Policy (1975) administer agricultural land distribution. They are required to apportion land equally among households, whether headed by men or women.”¹⁵⁰ Unfortunately, in the privatization of ranches in Kenya, women were not given land. Markakis repeatedly notes that “what matters is not the system of land tenure, but the provisions it makes for extensive use of land by pastoralist.”¹⁵¹ So the struggle for pastoral land rights and women’s rights continues.

Meanwhile conflicts of a different nature continue to beleaguer the region, intra-community violence. Using Hussein’s definition on conflicts, which refers to many forms of

¹⁴⁸ Ibid 22.

¹⁴⁹ Ibid.

¹⁵⁰ Ibid.

¹⁵¹ Ibid.

interaction that are qualitatively different,¹⁵² the conflict between pastoralist and smallholder farmer is the more important one in Kenya and Ethiopia. To a lesser extent, the political conflicts from neighboring states have been known to affect the pastoral regions in the study region, limiting the distance and areas where pastoralists can graze. But generally conflict in this area has been between communities not necessary between communities and the state.

The conflicts between pastoralists and smallholder farmers tend to be related to access to water and land, which is central to changes that have and have not occurred within local tenure systems. In both Ethiopia and Kenya the power to regulate and manage local access to water and pastures was removed from local customary institutions and vested in state administrations. This policy created considerable uncertainty over who actually controlled access to resources, including the capacity to sanction offenders. As a result, larger and more powerful pastoral groups were able to take control. This has often created local conflicts in the area. In many remote pastoral areas where government presence is minimal, local pastoral communities have little recourse but to either work out resource-sharing agreements among themselves, or by default allow better armed groups to use the water and pastures that they require. Another option which has not been tried on a large scale is to hire the private sector to manage the water and pastures.

A land tenure workshop with pastoral representatives in Arusha, Tanzania in 1988 provided the following recommendations:¹⁵³

- The documentation and explanation of customary land-rights, in particular with regard to women;
- The registration of pastoral land-rights;

¹⁵² Karim Hussein, "Conflict between farmers and herders in the semi-arid Sahel and East Africa: A Review," Pastoral Land Tenure Series No. 10, (IIED: London, 1998) 30.

¹⁵³ Charles Lane and Jeremy Swift, "East African Pastoralism: Common Land, Common Problem," Issues Paper No. 8 (IIED: London, 1989), <http://www.iied.org/pubs/display.php?l=919&n=878&o=7257IIED&w=NR> (accessed 2/15/07).

- The summarization of national statutory laws affecting pastoral land tenure;
- The exploration of ways of reconciling and integrating customary and statutory tenure;
- The provision of legal aid to fight test cases and the support of legal aid camps or clinics in pastoral areas; and
- The incorporation of legal themes into adult education and literacy programs for pastoralists.

Cullis usefully sums up the crux of land tenure problem for pastoralists:¹⁵⁴

Land pressure poses possibly the greatest strategic threat to the long-term viability of the pastoral life-style, as vast tracts of grazing land have been appropriated by government, private ranchers, conservationists, sedentary farmers (for commercial farms and irrigation schemes) or lost to encroachment by small-scale farmer (many of who are themselves squeezed off higher potential land elsewhere through population pressure and land-grabbing).

See also above discussion on Kenya Land Alliance example in developing a land policy and land use policy in Chapter 4.

Fodder

Pastoralists rarely purchase fodder because they prefer to grow their own. If they do not have access to fodder, they will collect shrubs and cut branches from trees to supplement cattle consumption needs. Often they will feed sorghum and maize stalks to their cattle if they produce crops and will allow animals to graze harvested fields for fodder. On the other hand, smallholder farmers who grow crops do sell their harvested crop stalks as fodder as well as lease out their harvested fields to livestock owners as a place to graze their animals. During droughts pastoralists will cut tree branches and gather grasses and shrubs from lake shores and river valleys in order to feed their animals. They normally do not buy fodder for their animals unless they are partially sedentarized and near a market town. They would grow fodder if they can

¹⁵⁴ Adrian Cullis, "Taking the Bull by the Horns: NGOs and Pastoralists in Coalition," (ODI: London, 1992) 2.

access fodder seed, if it is economically beneficial to them, and if there is sufficient land, water and labor to do so. On rare occasions wealthier herders may buy some feed supplement for large market cattle (bulls) during a drought.

However, fodder can play a significant role for pastoralists even though it is not widely grown or purchased. In times of disaster, having fodder stored or distributed by humanitarian agencies or the government may be the key to saving the remaining livestock. Collecting and saving fodder in a storage shed can be useful for both pastoralists and smallholder farmers. Mobility should not be a constraint to saving fodder because pastoralists have base homesteads where the women and children reside. These homesteads may be temporary but fodder can be stored and transported. As mentioned, fodder can be collected as leaves/branches from trees and pods from trees such as baobabs and acacia (i.e. ana trees, *faidherbia albidas*).¹⁵⁵ As more pastoralists are taking up agriculture, inter-cropping legumes with the main crop is beneficial in many ways. It can provide available fodder for animals when fodder is scarce; it can cover crops to minimize evapotranspiration; and it can provide nitrogen to the soil.

In drier regions where rainfall ranges from 150 to 400 mm/year, spineless cactus (*opuntia spp*) can be grown and used as fodder. Spineless cactus has been used for several years on a very large scale in arid and semi-arid areas of North Africa. In a FAO project in Tunisia, about 500 000 ha have been planted for rangeland improvement and erosion control. “Roots are widely spread on the elevated land part and penetrate deeply in the soil to ensure stability of the terraces. In addition, cut-and-carried pads (cactus leaves) provide feed resources during drought spells.”¹⁵⁶

¹⁵⁵ Joseph Aobakwe Difoloko, *faidherbia albidas*, “<http://www.plantzafrica.com/plantefg/faidalb.htm> (accessed 2/19/06). Baobabs are nitrogen-fixing trees. Ana trees have extensive root system so they are good for erosion prevention. Seeds from Ana trees can be boiled and eaten, but first the skin has to be removed. Also the pods may be dried and ground into flour, which is edible for human consumption.

¹⁵⁶ FAO, “*Opuntia spp*: An Efficient tool to combat desertification,” Technical Advisory Notes: IFAD Agricultural Technologies for Rural Poverty Alleviation, <http://www.ifad.org/lrkm/tans/7.htm> (accessed 2/12/07) [1].

Hence for pastoralists, fodder can be collected and stored in mobile sheds, while smallholder farmers can build storage sheds to save their fodder. See below Emergency section for an example of a program that provided feed concentrate to pastoralists to help them save their livestock.

Animal Health and Quarantine

Pastoralists will do what they can to save their animals because they rely on livestock and livestock products to survive. Livestock are both an investment and a form of savings. As a form of savings, the value of animals tends to be based on their relative degree of productivity. For instance, a male breeding bull is highly valuable for reproductive purposes, while a female breeding cow is very valuable as a source of milk. Animals to be used as investments are brought in as additions to the herd, and tend to be male cows for “fattening” and eventual slaughter and/or trading, especially during times of need and distress. In East Africa, maintaining large herds is popular and prestigious, and indicates the wealth status of the herder. However, it is more important that the livestock sales help ensure herders ability to purchase cereals, which is especially important during a drought when both pasture and milk are limited. Hence animal health is vital to pastoral livelihoods, and pastoralists equate animal well-being with their own well-being. Therefore, most pastoralists are willing to pay a high price for veterinary drugs to address their animal’s health problems. For example, the sale of one sheep to buy medicine to treat a sick camel has often been stated as a fair price for medicine.¹⁵⁷

According to DFID’S Animal Health Programme (AHP), the top five animal health problems are:¹⁵⁸

¹⁵⁷ Andy Catley, “Pastoralists, Paravets and Privatization: Experiences in the Sanaag Region of Somaliland,” Pastoral Development Network Series 39 (ODI: London, January 1996) 6.

¹⁵⁸ Livestock Production Programme and Animal Health Programme, “Program News,” in Livestock Talk Issue 5, (NR International, Ltd.: Kent, UK, October 2001) 7.

- Neonatal mortality
- Intestinal helminthiasis (helminthosis)
- Foot and mouth disease
- Ecto-parasites
- Reproductive disorders

These sets of diseases and illnesses are slightly different during a drought due to poor nutrition and lack of water. Thus, during these times, critical infectious diseases include rinderpest, contagious bovine pleural pneumonia, and foot and mouth. In addition, “trypanosomiasis risk often rises due to increased tsetse challenge, as do dermatophilosis with herd concentration, and weakened animals become more vulnerable to internal and external parasite challenge, which may rise sharply with post-drought rains.”¹⁵⁹ Hence animal health interventions need to be broad-based and cost-effective. “Past experience indicates that this cannot be achieved by government alone, although public veterinary services continue to have a pivotal role in setting policies for sustainable animal health services, coordinating training programs, monitoring disease epidemiology, planning intervention strategies and in monitoring their implementation and outcomes.”¹⁶⁰ Past experience has shown that community animal health workers (CAHW) may not achieve this goal either, as problems with transparency, accountability and payment plagued such programs as well. The private sector or a combination of services with CAHWs may be more effective in delivery of clinical, preventative services to livestock keepers.¹⁶¹ See also Box 3 below for an example of a paravet program privatizing pharmacies to address these problems.

Quarantine is an issue because the length and conditions vary from country to country depending on their animal disease control regulations. Kenya is notorious as it continues to

¹⁵⁹ FAO, “Drought Related Livestock Intervention,” (FAO: Rome, November 2001) 12.

¹⁶⁰ Ibid 26-27.

¹⁶¹ Ibid 27.

practice an antiquated system that was developed during the colonial period. Animal disease outbreaks are common and the Kenyan government, following colonial precedent, uses quarantines regularly to keep diseases from the ASAL from infecting highland dairy herds in the south.¹⁶² But the quarantines are also explicitly barriers to trade. Highlands ranchers interested in reducing competition from pastoralist suppliers have sometimes promoted quarantines for this fundamentally protectionist reason. By reducing the number of livestock market participants, quarantines may also create high price variability among the remaining market demand and supply.¹⁶³ Quarantine consequences are generally greatest on male livestock and on cattle, as these animals are more commonly sold for slaughter in terminal markets than females (commonly retained for milking or breeding), camels, or smaller stock, that are more typically slaughtered locally.¹⁶⁴ Little et al (2003) concluded that the imposition of quarantines has a sharp negative effect on expected producer prices in pastoral areas. Thus, Kenya's approach to animal disease control favors wealthier highland ranchers and consumers at the expense of poorer dryland herders. In other words, the costs involved in quarantine operations in northern rangelands, i.e., holding and testing which can take up to 3 months and tie up scarce capital for traders (who generally lack access to more than transactional credit) are borne disproportionately by the region's pastoralists.¹⁶⁵ More realistic and practical quarantine policies are needed, but unless there is strong demand and support from the field to push for policy changes, there may be little opportunity to reform these policies.

¹⁶² Peter D. Little et al, "Livestock Pricing in the Northern Kenyan Rangelands," Journal of African Economies 12:2 (Centre for the Study of African Economies, 2003) 129.

¹⁶³ Ibid 150.

¹⁶⁴ Ibid 150-151.

¹⁶⁵ Ibid 135 and 151.

Women, Children and Livestock

The main diet of pastoral peoples consists largely of livestock products, primarily in the form of milk. Hence keeping female livestock is important for this reason. But seasonal fluctuations of rainfall greatly affect the availability of milk, particularly during the dry season when it becomes scarce. During these times, Ariaal women (for example) consume greater amounts of maize meal, tea and sugar, which are obtained primarily through the sale of cattle and their skins. Blood from camels and meat from slaughtered small stock are largely reserved for male consumption.¹⁶⁶ Pastoral women's livelihoods are centered on their dairy livestock and small stock, which are often left behind for them to care for during the dry season. Children take part in helping out as well. Boys often herd milking camels close to the community and girls care for small stock, unless it becomes too dry, in which case the small stock are moved to distant grazing camps.¹⁶⁷ In most pastoral households women control milk production, sales, and distribution within the household, so they also benefit if and when there is an integrated pastoral livelihood program. Not only do the women benefit in terms of having control over income, but their children benefit as a result of better household food security.

However, as pastoral women settle, their work changes. Settled pastoral women with substantial access to dairy livestock do better than those that do not, because milk sales are a source of income and thus food for these households. Likewise, cultivating gardens and selling produce enable women to earn money and access food for the household. According to Little, pastoral dairy trade in southern Somalia is often a peri-urban phenomenon and usually tied to

¹⁶⁶ Masako Fujita, Eric Abella Roth, Martha A. Nathan, Elliot Fratkin, "Sedentarization and Seasonality: maternal Dietary and Health Consequences in Ariaal and Rendille Communities in Northern Kenya," in *As Pastoralists Settle*, ed. Elliot Fratkin and Eric Abella Roth, (Kluwer Academic/Plenum Publishers: New York, NY, 2005) 214-15.

¹⁶⁷ Ibid 214.

urban markets where consumption is concentrated.¹⁶⁸ Since milk is a perishable food item, the distance from the source to the market town should ideally be less than two hours. Women produce milk and agricultural products that they sell in towns, and thus maintain control over the income from these products. For example, pastoral sedentarization in parts of Marsabit district shows that women can achieve more independence as a result of some involvement in diversification (especially crop production and dairying). Among pastoralist cultures in this region, dairying tends to be highly “gendered, with women assuming important roles at most levels in the production and distribution chain”.¹⁶⁹ More than 95 percent of traders are female. At the same time, the dairy market system is highly dynamic for the following reasons: 1) it is seasonal; 2) it is competitive; and 3) there are no large-scale traders or any wholesaling.¹⁷⁰ Despite the seasonality, camels’ milk is available year round because it can be stored for a longer period than cow’s milk.

Another example where women have succeeded in dairy enterprise is in the Tufts University/African Union – InterAfrican Bureau for Animal Resources (AU-IBAR) 18-month pilot on mini-dairy processing enterprises in northeastern Kenya and southern Ethiopia. The project focused on former pastoral women (internally displaced due to the El Niño and recurring tribal conflicts) establishing five mini-dairy processing facilities and hygiene milk marketing outlets. The women used minibuses to transport the milk from the outskirts of town and process it in kiosks in Garissa and Wajir in Kenya and in Moyale, Yabello and Negelle in Ethiopia. There is high demand for hygienic milk in these towns because milk quality is poor. Non-sterile

¹⁶⁸ Peter D. Little, “Maidens and Milk Markets: The Sociology of Dairy Marketing in southern Somalia,” in African Pastoralists Systems: An Integrated Approach, ed. Elliot Fratkin, Kathleen A. Galvin and Eric Abella Roth. (Lynne Rienner Publishers: Boulder, 1994) 166.

¹⁶⁹ Ibid 165.

¹⁷⁰ Ibid 168.

milk containers are used, and milk is boiled in plastic bags.¹⁷¹ Demand in these town ranges from 5,000 liters to 12,000 liters (Yabello and Garissa).¹⁷² The women produce the following dairy products: pasteurized milk, mala (fermented milk), and ghee. Although an assessment is not available, some pastoral experts have verbally indicated that participants seem to be successful in establishing viable mini-dairy processing enterprises.

In addition, as pastoral women settle, they tend to consume more high calorie and low protein foods such as maize meal, fat and sugar.¹⁷³ However, settled pastoral women have access to better quality water and diverse nutritious foods such as green leafy vegetables (i.e., kale) and beans. This implies that sedentary agriculture can provide new opportunities for pastoralist, particularly for poor families with few animals.¹⁷⁴ As noted earlier, poor families without a sufficient number of animals to support a mobile pastoral livelihood often settle and take up agriculture to supplement their livelihoods and household food consumption. At the same time, too much reliance on a single cereal - namely maize - will decrease nutritional status unless accompanied by a steady supply of protein and micronutrients. “Beans and greens are crucial to these settled groups for protein and micronutrients, and their availability is directly affected by household wealth in farm size and productivity as well as season.”¹⁷⁵ Longitudinal studies on this have not been done, yet the antidotal evidence indicates that sedentarization is a complex process that varies from group to group and by economic status.

¹⁷¹ Tufts University, Feinstein International Famine Centre and AU/IBAR, “Mini-Dairy Processing Enterprises in Pastoral Areas,” (AU/IBAR: Nairobi, Kenya, 2005) 4.

¹⁷² Ibid 15-16.

¹⁷³ Fujita 220.

¹⁷⁴ Ibid 230.

¹⁷⁵ Ibid.

As for children's nutritional status, data shows that child health declines when pastoral families settle.¹⁷⁶ A two-year study on health and morbidity among Rendille pastoralist children in northern Kenya by Nathan et al revealed that nomadic pastoralist children suffered significantly less illness as a result of diarrhea and respiratory disease than did children living in towns.¹⁷⁷ In the same study, Roth et al found large differences in the growth patterns among children in pastoral and sedentary communities. There is a greater incidence of stunting and underweight status among children in sedentary communities than among pastoralist children.¹⁷⁸ They also found that children in sedentary communities are heavier, which may be due to increased maize meal consumption. Also, childhood illnesses differ between the two groups. Sedentarized groups tend to have higher rates of bilharzia, parasitic infections, malaria, and anemia, particularly among groups living close to rivers. Meanwhile, pastoral groups tend to be afflicted with tuberculosis, brucellosis, syphilis, trachoma, and child mortality.¹⁷⁹

A common phenomenon in these areas is fostering of children, especially in times of crisis. As a coping mechanism, it is a form of human resource transfer, and usually involves sending children to live with a relative or wealthy household to help smooth household consumption. For example, the Turkana have three kinds of fostering: 1) Adoption (adakar), which involves the jural transfer of kinship identity, including parental identification; 2) Fostering (erikit), which involves permanent or temporary transfer of child rearing responsibilities to a woman other than the biological mother; and 3) Borrowing (akilep), which

¹⁷⁶ Eric Abella Roth, Martha A. Nathan, Elliot Fratkin, "The Effects of Pastoral Sedentarization on Children's Growth and Nutrition among Ariaal and Rendille in Northern Kenya," in *As Pastoralists Settle* ed. Elliot Fratkin and Eric Abella Roth, (Kluwer Academic/Plenum Publishers: New York, NY, 2005) 183.

¹⁷⁷ Martha A. Nathan, Eric Abella Roth, Elliot Fratkin, David Wiseman and Joan Harris, "Health and Morbidity among Rendille Pastoralist Children: Effects of Sedentarization," in *As Pastoralists Settle* ed. Elliot Fratkin and Eric Abella Roth, (Kluwer Academic/Plenum Publishers: New York, NY, 2005) 204.

¹⁷⁸ Roth et al 183.

¹⁷⁹ Nathan et al 194.

involves temporarily loaning a child to a non-relative, usually to assist with herding animals.¹⁸⁰ In her study on child fostering, Shell-Duncan found that there were no significant food allocation differences between fostered and non-fostered children, and they were treated more or less equally. If there were differences in health status, they were small and not detectable in the analysis.¹⁸¹ The terms of fostering varied, for example, the Turkana encourage premarital births in which children live with the maternal grandmother, even if the couple marries later. In this way, the child helps out and keeps the grandmother company. Since this is a long-standing tradition among the Turkana, child fostering has become an adaptation in this case, allowing for a transfer of labor where it is short and a smoothing of income levels.

Pastoralists and HIV/AIDS

HIV/AIDS is increasingly a pastoral problem that needs particular attention because growing numbers of pastoralists are settling in towns and peri-urban areas. Although official infection rates are not high among pastoral communities, this probably does not provide a complete picture of all infections. Infections are bound to go unreported because pastoralists do not tend to get tested due largely to cultural barriers. HIV/AIDS education, awareness and support services in pastoral areas are limited or non-existent. Hence the true HIV/AIDS prevalence among pastoralists is not known. A study of Kenyan pastoralists found that there are a lack of facilities that would enable a better understanding and a more effective response to HIV/AIDS. As a result, pastoralists have lower than average awareness.¹⁸²

¹⁸⁰ Bettina K. Shell-Duncan, "Child Fostering Among Nomadic Turkana Pastoralists: Demographic and Health Consequences," in *African pastoralist systems: an integrated approach*, ed. Elliot Fratkin, Kathleen A. Galvin and Eric Abella Roth, (Lynne Rienner Publishers: Boulder, 1994) 152-53.

¹⁸¹ Ibid 162.

¹⁸² Intermediate Technology Development Group (now known as Practical Action), "Impact of HIV/AIDS in Pastoral Communities in Kenya: Study Findings and Recommendations," (ITDG Publications: Nairobi, 2004) 8.

HIV/AIDS prevalence is likely to be lower in Somalia because of the religious prohibitions, culturally enforced less risky sexual behavior and the relatively high mobility within pastoral communities. Southern Ethiopia and northern Kenya have serious problems because there are more settled pastoralists in these areas. As pastoralists diversify into non-farm/pastoral activities, and migrate to cities to seek employment the HIV/AIDS prevalence increases. This happens more commonly around larger towns than smaller ones.

It is especially important to increase awareness and education in the small-medium-sized towns that mobile pastoralists frequent to purchase cereals and sell livestock. As prevalence increases, a town's capacity to care for those affected by the disease could easily be overwhelmed, resulting in a collapse of the health infrastructure, rendering health facilities useless to existing patients. When mobile pastoralists return to their homesteads, they can pass the virus to their wives. Women are also at a higher risk due to cultural practices involving marriage to multiple wives, wife inheritance, and unsanitary tools used during female genital mutilation (FGM).

Households hosting people living with HIV/AIDS (PLHIV) are highly vulnerable to food insecurity because cash will be needed for the care and support of sick people and unfortunately for funeral costs. The women and children who remain in a household when a male head of household dies must depend on the few (if any) assets, resources, and skills that remain available to them. A new phenomenon within pastoral communities is the emergence of child-headed households resulting from the death of both parents as a result of AIDS. At the same time, child-headed households have also emerged within pastoral communities due to abandonment and the collapse of the family network that provides a safety-net for children.¹⁸³ In other parts of Africa,

¹⁸³ Unknown

this phenomenon is also on the increase, but among pastoral communities it is a new development that requires further study.

Pastoralists in Acute Food Insecurity Situation

While it is important for implementers and policy makers to gain a better understanding of pastoralists through the mobility paradigm, it is also important to understand the cyclical and complex nature of acute shock (particularly drought), and how pastoralists cope with it. This will enable a better understanding of how best to intervene accordingly to the phases of a drought emergency.

According to Toulmin, there are four drought phases: Risk Preparedness, Emergency Alert, Emergency and Rehabilitation.¹⁸⁴ These are time sensitive and inter-related in that a disaster can be mitigated if activities are effective and appropriate, and targeted in a timely manner to the right people. The activity options listed in Table 3 (below) will be most effective when the first signs of stress are detected early. Using Early Warning Systems such as FEWS-NET or regional livestock systems such as LEWS can greatly help determine the phase of the drought, its affects on livestock and human conditions, and in turn the appropriate interventions to implement. Each phase will also try to provide the appropriate intervention for the different food insecure groups according to the Food Security Continuum in Appendix C.

¹⁸⁴ Camillia Toulmin, “Tracking Through Drought: Options for Destocking and Restocking,” in *Living with Uncertainty New Directions for Pastoral Development in Africa*, ed. Ian Scoones, (International Institute for Environment and Development: London, 1994).

Table 2 Phases of the Drought Cycle and Options of Activities¹⁸⁵

Phase	Activity
Risk Preparedness	Longer term policies for resilience:
	<ul style="list-style-type: none"> • Set up local early warning systems • Strengthen water resources • Improve animal nutrition and health (develop grazing camps, save fodder, access to veterinarian services, including vaccines and AI) • Rural finance
Emergency Alert	Mitigation activities:
	<ul style="list-style-type: none"> • Livestock marketing interventions (early purchase for local consumption) • Access to transported feed and water • Improve animal nutrition and health (access to grazing camps, access to fodder, veterinarian services, including vaccines)
Emergency	Relief activities:
	<ul style="list-style-type: none"> • Livestock marketing intervention (emergency purchase for commercial purposes) • Food aid, cash aid and food for work activities; fodder and water provision for animals • Adjust animal management (herd diversification, save breeding stock and young females)
Rehabilitation	Rehabilitation activities:
	<ul style="list-style-type: none"> • Improving market conditions and creating enabling environment (better market infrastructure, land use policy, land policy) • Restocking livestock (as appropriate) • Provide income generating activities (livelihood diversification options)

Risk Preparedness

The risk preparedness phase refers to a “situation when herders are under no immediate stress as no signs of immediate drought are prevailing.”¹⁸⁶ Since droughts are anticipated to come, this phase is devoted to the pursuit of risk preparedness strategies, such as control of the health status of animals, creation of emergency grazing and strategic fodder reserves involving fodder storage and water conservation.¹⁸⁷ Water management and preservation of water resources are important for maintaining the health of both herds and humans. Ensuring that water for animals is kept separate and does not contaminate water for humans can significantly reduce mortality among pastoralists. Children and ill persons are most susceptible to water borne diseases that emanate from poor water supplies as well as contamination. At this phase, none of

¹⁸⁵ Toulmin (1994). The activity options have been modified from original.

¹⁸⁶ Nikola Rass, “Policies and strategies addressing the vulnerability of pastoralists in Sub-Saharan Africa,” Contribution to e-conference by Land Coalition International and FAO, www.dgroups.org/groups/fao/pastoralists/index.cfm (accessed 2/15/06) 6.

¹⁸⁷ Ibid.

the food security groups (i.e. households with various herd sizes) are in danger of food insecurity, but preparedness will cushion any shock that does occur. To ensure that these communities are prepared for shock, it is important at this time for communities to maintain and utilize local early warning systems, and some form of safety net program for the chronically poor and food insecure households.

Most early warning systems (EWS) are national and regional ones such as the Turkana Early Warning System and the USAID Famine Early Warning System Network (FEWS-NET). These kinds of EWS generally consist of a weather-based system whereby the past weather patterns and cropping season are analyzed to predict future rainfall, and how it would affect crop yield, human mortality, and food security situation. In the case of FEWS-NET there are normally four phases of alert: no alert, watch, warning, and emergency. The system informs decision makers, donors, and to a lesser extent, farmers/pastoralists, of imminent emergency via the phases of alert. More recently two livestock related systems, Livestock Early Warning System (LEWS) and Livestock Information Network and Knowledge System (LINKS), were developed to support herders and decision makers in minimizing the impact of natural disasters on pastoralists in the Greater Horn of Africa using weather and forage patterns, and local marketing information.

Some criticisms of the national and regional EWS and other drought/famine warning systems for pastoral areas are that they tend to be donor-driven and heavily dependent on donor support. Also they are not the magic bullet for detecting droughts. The Norwegian and British-funded famine early warning system in Turkana, Kenya had great success in predicting the severity and impacts of a drought during the 1990-91 drought. However the response performed much less successfully in 1992, by which time the drought had persisted and intensified,

accompanied by a marked increase in livestock raiding, which the system was not specifically designed to deal with.¹⁸⁸ In other words a well designed EWS is not enough, it. It is necessary to take into consideration the political and social context of the area at the time. Also late responses can be a result of time lags between the early warning signal and action to be taken.

However, current development relief trends encourage communities to develop their own EWS that informs and provides initial instructions and services before, during and after a shock. Local community EWS can simply involve plans to evacuate to safer areas while the flood runs its course during short term shocks. EWS can also be more elaborate and focused on medium to long term activities that build community capacity through development of a community action plan to detect signs of drought. A plan of action can be developed to mitigate the community's shock-prone tendencies. Some signs (trigger points) for detecting impending shocks could be:¹⁸⁹

- Delayed start in rainy seasons
- Dry spells around the beginning of the rainy season
- Short rainy seasons
- No rain during critical stages in rainy seasons
- Reduced availability of water and pasture
- Increased trekking distances to access water and pasture
- Increased price of staple food during and shortly after season harvest period (indicate poor harvest)
- Increased sale of non-timber forest products (i.e. pods, wild foods) before and after harvest
- Increased stock sales and lower prices after harvest
- Migration of individuals to towns and larger farms soon after harvest¹⁹⁰
- Deterioration of livestock body conditions and livestock mortality
- Increased incidence of livestock and human diseases
- Decreased weight for height (wasting) and mortality among humans
- Selling of productive female livestock in the market
- Destocked small stock to for household consumption or for sale

¹⁸⁸ Florian Sommer, "Pastoralism, drought early warning and response," (ODI: London, 1998) 30.

¹⁸⁹ List is not exhaustive. Most of these signs of impending shock were found in various FEWS-NET reports and papers on their website: www.fews.net.

¹⁹⁰ Zambia Vulnerability Assessment Committee, "Zambia Livelihood Map Rezoning and Baseline Profiling Final Report," (ZVAC: Lusaka, Zambia, October 2004).

Community safety net schemes can also save the more valuable animals such as dairy cows and stud bulls during droughts. For example, mortality can be decreased through designation of emergency grazing areas or formation of cattle camps. Communities can also develop grain or fodder banks to store grain and fodder for vulnerable households during crises. While most households save extra grain and fodder for their personal use for the dry season, this could possibly be more effectively conducted at a community level. Bulking or aggregation of food resources in one central location allows the community to support more households. These banks require some technical assistance from NGOs or government agencies because pest control and storage techniques are important to maintaining the bank's quality and quantity. Also, as with the management of any communal resource, security and shared management decision-making can pose major challenges. Safety net programs should ideally be decided on at the community level with some NGO and government agency support and/or supervision. Other safety net schemes include but would not be limited to the following:

- Construction and/or rehabilitation of water points as appropriate through strategic drenching, and pans and dams to provide immediate relief
- Helping to establish fodder bulking sites
- Rehabilitation of livestock market infrastructure (such as livestock auction yards, hides and skins collection centers).
- Vaccination of herds, starting with the breeding stock.

Although pastoralists are willing to pay for full vet services, they do not have a lot of cash on hand because their savings are the animals, and they possess even less cash during periods of shock. Pastoralists do not save in banks but they do use other means of informal savings. Given good rains, grazing land and water, reliable labor, and access to the market, pastoralists may prefer to increase their herd size rather than deposit their savings in banks.¹⁹¹

¹⁹¹ Marguerite S. Robinson, "The Micro Finance Revolution: Sustainable Finance for the Poor Lessons from Indonesia, (World Bank: Washington, DC, 2001) 234.

Because low-income households in developing countries save informally in a variety of forms, it is difficult to distinguish between savings and investment. “In some cases, savings and investment can be clearly differentiated—for example, people save in cash, grain, and small animals in order to manage irregular income streams. But poor savers also say that they save in cash or grain to buy gold, that they save in gold to buy land, and that they save land to buy better land.”¹⁹² Poor households can save cash and/or grain to purchase small stock to be sold later and trade them in for larger livestock such as cows. They can then sell the cows for a lump sum of money that can be used for children’s education, pilgrimages, preparing for old age, etc. While smallholder farmers do not care for more than a few large animals because paying for vet services, medical care and other inputs make the animals relatively less cost effective as a savings mechanism.¹⁹³

However pastoralists have managed to mitigate these disadvantages through mobility. This is a testament that the best investment in ASAL areas is livestock. The advantage of keeping as many animals as possible is that they will not be affected as much by the reduction of the herd size during periods of shock. But usually outweigh the costs of paying for veterinary care, etc. Unfortunately, certain shocks are worse and longer than others and particularly over the past years, herd sizes have been reduced due to frequent successive natural disasters such as droughts and floods. Hence some form of rural finance, may be appropriate, particularly for the more settled pastoralists who have been affected by these disasters, including rotating savings and credit associations (ROSCA) and regular (non-revolving) savings and credit associations/accumulating savings and credit associations (RESCA/ASCA), mutual aid societies, and self-help groups.

¹⁹² Ibid 235.

¹⁹³ Ibid 236.

In ROSCAs all members are both savers and borrowers; in RESCAs/ASCAs all members are savers but not all are necessarily borrowers. ROSCAs consist of members contributing and loaning to each other one person at a time, as the contributions they bring to every meeting are immediately loaned to one other member. The RESCAs are savings that grow over time, while loans are taken and repaid at regular intervals. “For low-income people these groups can permit reasonably secure savings and facilitate regular savings habits.”¹⁹⁴ Other informal savings and credit activities also exist, such as post office banking and establishing microcredit services with existing moneylenders. Finally there is greater success if a multi-sectoral approach is adopted. “As formal financial service providers move into these areas [, such as small-medium-sized towns], they will need to network with other sectors to boost their own chances of success as they promote [pastoral] livelihoods.”¹⁹⁵ For further readings in this subject, refer to the bibliography.

Box 6 Pitfalls of ROSCAs ¹⁹⁶

- The incentive for members who receive the pot earlier in the cycle to default on their later contributions is high.
- The incentives of the member who receives the pot last to contribute to the pot are not clear.
- Enforcement is a serious concern.
- Some groups fail due to cheating.
- Often members lack money to contribute.

Saving grain and fodder, and investing in livestock during the risk preparedness stage is important for sustaining pastoralist and smallholder farmer livelihood. Harvested grain supply household with staple food; fodder stored throughout the year can support animals during the dry

¹⁹⁴ Ibid 241.

¹⁹⁵ Grace Sebageni, Steven Kaggwa and Leonard Mutesasira, “Where there is no banker – financial systems in remote Uganda,” http://www.ids.ac.uk/impact/publications/joint_publications/Where%20There%20Is%20No%20Banker%20%20in%20Rural%20Uganda%20-%20Sebageni%20et%20al.pdf (accessed 4/2/07) 29.

¹⁹⁶ Siwan Anderson, Jean-Marie Baland, and Karl Ove Moene, “Enforcement and Organizational Design in Informal Saving Groups,” BREAD Working Paper No. 74, (Bureau for Research in Economic Analysis of Development, June 2004) 3.

season; and livestock augments household's non-food and nutritional needs via cash from livestock sale and milk from dairy animals.

Emergency Alert

The emergency alert phase involves anticipating the deterioration in terms of trade for pastoralists. Accordingly, available forage may be collected and stored safely for future use. As the onset of the drought begins, livestock prices fall and cereal prices rise. Pastoralists will eventually lose a major portion of their livestock holdings due to mortality (in response to lack of water and fodder), and will then be forced to sell more livestock as the terms of trade turn against them as a result of droughts or other shocks. "Market interventions seek to stabilize livestock prices and aim to induce an early off-take of livestock before they become emaciated and die."¹⁹⁷ Hence voluntary market-based destocking at this stage is recommended. Voluntary market destocking programs have been carried out during emergencies in the past 5-6 years in both northern Kenya and southern Somalia. The idea is to allow herders to capture some of the value of their animals before they perish due to drought, and to slaughter and redistribute the meat to poor pastoralists via NGO distribution networks. For this to happen, the herders need to know when to destock. Timing is key in this type of voluntary destocking scheme.

There are a number of NGOs implementing destocking programs in this region such as Save the Children, Mercy Corps, and CARE under the Pastoralist Livelihood Initiative (PLI). In the CARE program, the main activity is to destock animals and distribute the meat to vulnerable pastoral households. This kind of activity does provide much-needed protein to these households, but there have been implementation challenges, such as targeting appropriate beneficiaries for meat distribution and for destocking. In addition, there are monitoring gaps. For example, we do not know who gets the meat because it is normally men who bring animals in to be slaughtered.

¹⁹⁷ Ibid 240.

Some pastoralists find it difficult to take all that meat back without additional transportation or funds. There has also been conflict within communities as the size of meat rations received may not have been sufficient to feed whole households. To address some of these issues, it has been recommended instead that animals be trucked into the terminal market to enter normal market channels rather than being purchased for meat distribution. Hence remaining animals were trucked with NGO funds to the terminal market where they are sold. In this way, the herders received cash to purchase cereals, veterinary drugs and other non-food items.

Another way that NGOs go about destocking is to organize auctions for animal sales that benefit herders. Small town auctions are better for the herders because they eliminate some of the middlemen and reduce costs such as those associated with transporting animals to terminal markets to be sold. At the same time, they ensure relatively good prices are paid for the animals. Auctions also disseminate price information more broadly, which provides herders with the information they need to sell to the highest bidder. However, auction yards and facilities need to be maintained. In Kenya, auctions and their facilities are run by local county councils. The county council charges a tax to both sellers and buyers at an auction, which is one reason why some herders/traders prefer to operate outside of auctions.

While these auctions act like adhoc markets, they may also present barriers to participation. Auctions must be legally transparent. Yet, in some parts of Kenya auctions and auction officials have been found to be corrupt. For instance, county council officials have been known to only allow local traders to participate and keep outside traders away (through informal threats, etc.). Traders have been known to work together with auction officials to establish 'basement' prices, thus colluding on a ceiling price, and not offering prices above a certain level. This type of collusion only seems to occur in small auctions where the number of traders is

limited. A few other general “concerns that could potentially undermine future destocking programs include trader infiltration into the destocking system to sell commercial animals, mass meat distribution, resistance to destocking and meat distribution on religious and ethical grounds, and fear of herd decimation when large-scale destocking programs are initiated”.¹⁹⁸

To support destocking initiatives, some NGOs/PVOs have provided transport subsidies to herders trekking animals to designated destocking towns. They have also trucked water and fodder to trekking animals as incentives for herders to increase the number of off-take animals, or they have worked with livestock traders to transport animals from more remote places. They have also installed mobile markets in smaller towns to improve herders’ market access.

Adhoc mobile markets operate according to a similar concept. These are installed in local towns on a given day notified by radio and word of mouth. Similar to formal auctions, they serve to ensure that herders obtain a better price than would be offered by middlemen, but they are informal and located in small towns. These adhoc mobile markets try to get closer to herders and animals at a time and place where animals retain their value. Once animals are trekked to larger towns, they will have lost significant body weight, and thus value. This type of market has worked well during all times of the year, as it provides herders the option to destock, and ensures they have the information they need to make an informed decision.

Emergency

During the emergency phase, livestock purchases should not be seen as a market intervention, but rather as a relief intervention, although the sales will fulfill commercial objectives. These urgent sales supply herders with much needed income to support their households. The idea during this phase is to make best use of the situation by salvaging dying

¹⁹⁸ Hussein A. Mahmoud, “Evaluation of the Emergency Destocking Drought Response in Garissa,” draft (CARE-Kenya: Nairobi, 2005) 3.

animals and in turn providing supplemental income and possibly meat protein from slaughtered animals to food insecure households. Of course water, food aid in the form of direct distribution, food-for-work or cash-for-work will be necessary to ensure proper nutrition and even to secure lives, especially if cereal prices are high in the area. It is recognized that ensuring flexibility in offering cash or food for work options is important, as sometimes cereal prices are not affected by the drought. Hence cash may be more useful than food aid in that it will enable people to fulfill other non-food needs.

According to the Food Security Continuum in Appendix C and in the discussion above in Chapter 2, “extremely poor” groups, who are destitute and have no assets, require food aid support to survive during severe shocks such as droughts. However, people who are “extremely poor” often do not feel the affects of droughts because they are already living in abject poverty and food insecurity. Poor people, who nonetheless possess some assets such as goats and/or sheep, are able to survive. However, they do not have enough animals to be mobile and viable so they also rely on waged labor and petty trading to supplement their food needs. During an emergency, this group tends to fall under the food insecurity threshold during a drought, and some of them may be considered as being part of the “transitory vulnerable” group. However, if they are not able to fully recover from asset assets losses, they will become part of the “extremely poor group”. Interventions that address the needs of these two poor groups often require significant resources in the form of food aid, community building initiatives, and safety net programs. For example, in the 2003-2005 drought in northeastern Kenya there was not enough food aid to reach the majority of the population that was severely affected by the drought, The World Food Programme initiated an emergency operation (EMOP) in October 2004 after the Government of Kenya declared a disaster in July 2004. The GOK also had a

parallel emergency food intervention in the Mandera District, which involved food distribution and feeding for displaced pastoralists and malnourished children. The FEWS-NET report indicated that only an estimated 25-34 percent of the population in Mandera District received relief food as part of this intervention.¹⁹⁹

Another group could be classified as “vulnerable to poverty”. Members of this group may possess more animals, but they are not as resilient during a drought because they reside near the poverty threshold and are considered to be part of the transitory vulnerable group if they fall below the poverty threshold. During a drought this will very often happen to members of this group because they will have sold some animal stock to smooth income and consumption needs or lost them due to livestock diseases. As members of this group slowly recover, they will find themselves pushed to settle closer to towns as their mobile livelihood is not viable with significantly less than 3.5 TLUs per capita. Similar to the “poor” group, the “vulnerable to poverty” group will often become more involved in diversification activities such as waged employment, petty trading, cropping and obtaining food aid as coping strategies. Therefore, interventions targeted to this group are important because they are the households most likely to become viable, because they have the capacity to graduate from poverty into the “middle” category. The alternative is chronic poverty as a result of asset loss and likely on-going dependence on food aid and other forms of relief assistance.

The “middle” and “rich” groups are able to survive droughts with little difficulty, particularly the “rich” group. Unfortunately, a proportion of the middle group may not be in a position to fully recover from the effects of a severe drought, particularly if they fall below the poverty line and into the “vulnerable to poverty” group and become part of the transitory

¹⁹⁹ FEWS-NET, “Mandera District-Rapid Food Security Assessment,” January 9-11, 2006, www.fews.net/special/index.aspx?pageID=specialDoc&g=1000904 (accessed 2/24/06) 7.

vulnerable population. Interventions for this portion of the middle group would include activities that build and improve productive assets so that people can rely on these capacities to re-establish their livelihood when the rains return. The rich group does not need any interventions since they are able to cope with drought due to their significant assets holdings: namely land, animals and productive equipment. Of course, they can be tapped to support their fellow clan members through restocking programs, as they may provide loans and hire labor or foster a child. As noted above, fostering is common in some pastoral groups (see discussion above regarding Turkana fostering). Fostering is considered a form of household capital transfer where the child works for the host household, usually a richer relative, either permanently or temporarily. The host family is indebted to the biological family and is expected to reciprocate in the future by complying with requests for animals, goods such as tobacco or maize meal.²⁰⁰ “This system of reciprocity serves to create an alliance that assists in handling crises such as stock depletion or labor shortage during times of drought or epidemics, or increase labor demand from splitting apart herds.”²⁰¹

During emergencies, few interventions that can be conducted effectively, other than animal immunization, destocking and saving as many human lives as possible through direct food aid distribution. At the same time, animals can also receive direct feed distributions. This was tried by the Anglican Church of Kenya-Marsabit Development Office (ACK-MDO) with help from Lutheran World Relief (LWR) in 1997, OFDA in 1997/98 and Christian Aid in 2000. In the first two cases, direct supplementary feed was provided to pastoralists in Marsabit District during the 1997 drought and then the 1998 floods caused by El Niño. The feed concentrates that LWR and OFDA provided were reserved for the poorest livestock keepers who did not have

²⁰⁰ Shell-Duncan 153.

²⁰¹ Ibid.

enough resources to send their animals to distant grazing locations nor to purchase feed for their animals.²⁰² In an effort to address these same needs, Christian Aid funded monitoring of their restocked recipients and provided each household with a bag of meal to save their remaining animals.²⁰³ In 2001, OFDA requested a follow-up on communities and recipients assisted by these interventions. The findings of the assessment were that the feeds:²⁰⁴

- Ensured the survival of most animals fed
- Increased daily milk production from between ¼ and 1 ½ liters per animal and
- Improved animals' condition,

But

- Made animals thirsty faster [due to the salt in the feed] and
- Was difficult to transport feed to distant camps.

The assessment also recommended that supplementary feed and restocking can be effectively combined during and post-drought for both the minimization of livestock losses and economic procurement of animals for restocking.²⁰⁵

Rehabilitation

The rehabilitation phase, also known as the recovery phase, is often indicated when the rains arrive after a drought. During this phase, there are three main recommended intervention activities: (1) improve market conditions and create an enabling environment, (2) restock, and (3) provide alternative income generation opportunities. Improving market conditions entails supporting and strengthening market systems so that they work in favor of pastoralists. This can involve linking a group of sedentarized pastoralists to processors of dairy, meat or hides/skins so as to improve the terms of trade. Other interventions could include improving the quality of livestock products so that they fetch higher prices. Cattle prices could be boosted by facilitating

²⁰² David Adolph, "An Assessment of Recent OFDA Intervention in Marsabit District, Northern Kenya," (ACK-MDO: Marsabit, Kenya, November 2001) 4.

²⁰³ Ibid.

²⁰⁴ Ibid 2.

²⁰⁵ Ibid.

negotiations with herders and terminal market buyers, or eliminating some middlemen. Recovery interventions are similar to those utilized during the preparation phase, where the emphasis is on building pastoralists' resiliency to future droughts or other shocks.

Improving market conditions should include providing herders with easy access to market information and with a convenient location where it will be easy for them to sell their animals for a good price. Basically herders do not have access to livestock prices. They neither know what other herders are receiving for their animals in the market where they are selling them, nor how much would the animals they are selling fetch if sold at the terminal market. If herders had access to this information, this it could greatly improve their bargaining tactics and negotiations. It could give them an advantage in negotiations and would ultimately improve their livestock-grain terms of trade. As mentioned above, auctions and adhoc mobile markets are appropriate interventions, allowing herders greater access to livestock price information and providing them with a convenient place in which to sell their animals. These interventions help eliminate middlemen, and savings are realized in better prices offered during these events. Moreover, these market interventions involve the establishment of a holding place that helps herders to obtain better prices because they are not forced to sell right away. Herders trekking the animals into small/medium markets, tend to benefit from keeping animals in a low-cost holding area because it helps them in their negotiations. In the Livestock Enhancement for Pastoralists and Agro-Pastoralists (LEAP) program, ACIDI/VOCA installed holding areas for pastoralists' livestock near the market center. This enabled herders to bargain for higher prices from traders since they did not have to sell their animals right away to the first trader with the best offer on the day they arrive.²⁰⁶ Overall, these market interventions seek to change the dynamics of the herder and trader transactions so that the herders and traders have the same level of

²⁰⁶ Elisabeth Farmer, interview at ACIDI/VOCA (Washington, DC, July 19, 2006) [1].

understanding when it comes to livestock prices and values. This ultimately provides the herder with the opportunity to negotiate for a better and higher price.

An important element in creating an enabling environment is eliminating market inefficiencies.²⁰⁷ Improving the functioning of the market and the well-being of agricultural producers makes sense because this would sustainably improve the marketing conditions. When an enabling environment is present, the market inefficiencies and bottlenecks would tend to be eliminated, opening up reliable avenues for trading of livestock and livestock products. There are a couple of specific notable interventions that are important at this level such as: development or revision of government livestock market policy and encouragement of government collaboration with international research institutes (such as IRLI, IFPRI, GL-CRSP, PARIMA and LEWS/LINKS) and local and international NGOs/PVOs who are on the ground implementing interventions. The work of NGOs/PVOs would be facilitated by increased direction and leadership from governments particularly in the areas of improved livestock marketing conditions, and animal health and quarantine policies.

Animal health and quarantine policies are national issues that should not be ignored. There is a great deal that governments can do in these arenas to support efficient market conditions. As noted previously, most pastoralists are willing to pay high prices for veterinary drugs to address their animal's health problems. Many animal health interventions have involved mobile paravets because pastoralists live in remote areas and do not regularly come into town. When pastoralists do enter towns, it may be too late to treat sick animals. Mobile paravets are trained to treat the common illnesses and diseases, such as ticks, mastitis, foot and mouth

²⁰⁷ Unknown

Box 7 Para veterinarians or community based animal health workers (Somalia)²⁰⁸

ActionAid/VetAid conducted an Animal Health Program (AHP) in 1992-1994 in northeast Somalia. The program was designed to train a network of 30 paravets who were linked to the Ministry of Livestock and Forestry and Range veterinary staff. After an evaluation of the program, ActionAid/VetAid redesigned it to reflect the demands and realities of the people and the situation. It was found that herders were willing to pay the full price of veterinary medicines. The problem was not the cost, but the availability of veterinary services. They also learned what diseases were most important for worsening the terms of trade for herders. As a result of the evaluation, the paravet network was privatized and paravets were trained in pharmacy management. The program also linked veterinary assistants with traders to combine technical knowledge of veterinary drugs with business pharmacies.

Many lessons were learned from the ActionAid/VetAid animal health program. Despite the difficulties ActionAid/VetAid encountered, establishment of a basic veterinary service involving small private pharmacies linked to paravets was a realistic proposition. Veterinary assistants involved in establishing the new privatized vet pharmacies were able to provide a secondary/referral service for the paravets in the field. One of the problems with this system was that there was a lack of formal regulation of the importation and use of veterinary medicines (which resulted in theft), and a lack of trained veterinarians in the study area. Both herders and traders were interested in privatization of veterinary services. Therefore the program ceased to provide free and/or subsidized drugs in Somaliland. Here are some lessons learned from the evaluation:

- If private paravet type systems emerge in pastoral areas, veterinarians could be involved in supervision of paravets, monitoring drug usage and the establishment of disease surveillance systems. However, it is not always apparent that trained vets are willing to work outside urban centers.
- Training of traders and paravets is a key component; paravets should focus on correct use of drugs as their ability to diagnose main diseases is important.
- Involve the herders and the NGO committee in the selection of paravets and identification of local veterinary priorities.
- For monitoring work, a more qualitative approach which incorporated herders' perceptions of animal disease and utilized their considerable knowledge of animal health and husbandry.
- Document local skills and technical knowledge as well as test, apply and share them.

disease and Rift Valley fever, and provide vaccines. They are welcomed and accepted because they provide a needed service. However, there have sometimes been difficulties associated with payment of paravets. Often herders do not have cash to pay for the services. In-kind payments do not allow paravets to recoup their costs for medicines purchased with cash. Box 7 describes a paravet program and the lessons learned during its implementation.

Another intervention that has not been tried on a large scale, except as a pilot, is the establishment of mobile health and veterinary services to deliver both human and animal health interventions in pastoral areas. The Expanded Program on Immunization, an immunization pilot

²⁰⁸ Catley (1996) *ibid*.

in southern Sudan, shared cold chain equipment with veterinarians. The International Red Cross has implemented vaccination campaigns using veterinarians' vehicles in the past, especially during emergency situations.²⁰⁹ It should also be noted that similar collaborations have been conducted during humanitarian crises such as droughts and conflicts. In vaccinating pastoralists, "the veterinary and public health staff observed that when the two sectors were present together, pastoralist families vaccinated their livestock and children more spontaneously."²¹⁰ This collaboration between the two sectors made both logical and economic sense as well due to savings on transportation and on cold chain facilities for both initiatives.

Another rehabilitation intervention is restocking, an activity that may be extremely costly. Some drought affected pastoralists lose numerous animals, and replacing them can be expensive. Hence restocking interventions should be implemented by a donor agency, government or NGO. Restocking is normally viewed as a short-term relief or recovery solution. The theory is that "wealthy herders sell surplus stock to the restocking program and the poor herders receive this stock in the form of a loan or grant."²¹¹ It is important to target households that have the capacity to build a viable herd size of about 3.50-4.5 TLUs per capita to ensure a successful restocking package. This implies that targeting be pursued more carefully to distribute the few available breeding stock to those households that could successfully reengage in mobile pastoralism.²¹²

Restocking is a form of asset building that if implemented appropriately, might restore not only short-term household welfare, but also enhance social relationship and status in the

²⁰⁹ Esther Schelling, Kaspar Wyss, Mahamat Bechir, Daugla Doumagoum Moto and Jakob Zinsstag, "Synergy between public health and veterinary services to deliver human and animal health interventions in rural low income settings," November 2005:331, www.bmj.com (accessed 12/13/05), 1264.

²¹⁰ Ibid 1266.

²¹¹ Ibid 11.

²¹² Ibid.

community.²¹³ Every pastoral group has a traditional restocking system. Traditional restocking has relied on communal reciprocity where the better off households donate animals as gifts to poor households to assist them in building their herds back up to a viable size. However, reciprocity today has changed with the times because pastoralists are increasingly poorer than before. Their “per capital livestock holdings and their concomitant difficulty of recovering from drought mean that there is a larger group of chronically poor pastoralists who increasingly depend on support from others to survive. Thus reciprocal relationships increasingly resemble patron client relations where positions of wealth and poverty are more or less static.”²¹⁴ In other words, reciprocity relationships are less effective than in the past in rebuilding herds after a drought. NGOs have tried to take up some of the responsibilities in restocking vulnerable households. Here are some lessons learned from recent restocking programs:²¹⁵

- Pursue restocking fewer households with more animals, i.e. 60 small stock or a mixed herd of 30 small stock and 3-4 cattle, rather than trying to distribute animals to as many households as possible. Providing 5-10 small stock per household makes little sense in a pastoral area, as these numbers will not reconstitute a viable herd.
- Restock small stock instead of larger ones because they are easier to manage with fewer resources, they reproduce faster, and they cost less to purchase. Herders are always able to graduate up to larger stock when and if they have enough small stock to trade in for them. In this way, herders are not immediately overburdened with responsibilities of obtaining larger stock sufficient supplies of fodder or addressing the medical needs of larger animals.
- Allow herders to have an input on which animals (species, sex, age) they are to receive, and allowing herders the option of rejecting animals that they do not want.
- Experience has shown that successful restocking programs have generally been coupled with community animal health activities, i.e. Turkana and Samburu program in Kenya.
- Build on local traditional institutions and existing systems.
- Restock about one year after a drought or disaster, and where possible source the animals from local or nearby regions.
- Most of these programs vary with respect to the costs per participant and some form of credit/loan should be made available to both herders and traders. Small-scale restocking programs have had some success but often require inputs of large subsidies.

²¹³ Ibid.

²¹⁴ Ibid 3.

²¹⁵ FAO (2001); and Richard Hogg, “An Institutional Approach to Pastoral Development an Example from Ethiopia,” Paper 30d (ODI: London, October 1990).

Restocking is time-sensitive. Restocking that takes place too early will not be feasible due to pastoralists' lack of resources immediately after a drought. Restocking too late will not be effective because without livestock assets pastoralists may decide to settle and diversify their livelihoods out of necessity. The general rule is to restock about one year after a shock while pastoralists are in the process of re-establishing their livelihoods. Some will return to mobile pastoralism without much support from NGOs/PVOs, while some will require food aid and livelihood diversification until this is possible.

The last type of rehabilitation intervention, which focuses on diversification into income generation activities, is important for today's pastoralists. In particular, poorer herders, who are unable to return to mobile pastoralism settle near towns and take up non-pastoral income generating activities to supplement their incomes. Hence, there is a need to promote and support alternative income generating activities for this group of herders. Spontaneous sedentarization does not mean that herders will suspend all pastoral practices; these activities will simply be limited to a particular location and timeframe. Many continue to maintain mobile herds during the dry season while their families remain settled near town cultivating crops. These households have thus become agro-pastoralists. Pastoralist-driven diversification strategies tend to work best since they are aware of their skill set and needs. Some settled pastoralists generate extra income through cropping, waged employment, dairying (from cows and camels), bee keeping and petty trading of charcoal (although not good for the environment), selling construction poles and wild products. Again, for pastoralists, livelihood strategies are most effective if they are livestock related because they build on pastoralists' knowledge and current assets, such as dairying, skins and hides, butchery, marketing of livestock and petty trade of livestock and livestock products. If

possible, petty trading and non-livestock related activities should only be implemented when livestock related activities are not viable.

Conclusion

It is important to reiterate how essential mobility is to understanding pastoralists in northern Kenya and southern Ethiopia. Mobile pastoralism is economic and ecological opportunism at its optimum in certain agro-ecological zones. The mobility paradigm is now part of the general understanding of pastoralists today. The need to support continued pastoral mobility is key to a successful development relief approach program in the study area. As it is now, acute food insecurity situations are increasingly becoming chronic in character. The frequency and short recovery periods better describe a chronic food insecurity problem than an acute one. In these areas, pastoral livelihood is fragile and failed rains create livelihood crises that require timely and appropriate interventions in order for households to re-establish themselves back to self-sufficiency. In the context of climatic, political and market uncertainty, more pastoralists will be pushed to give up their animal-based livelihoods with each successive drought. Pastoralist livelihoods will remain at risk to the vagaries of variable climate, ineffective livelihood diversification options, continued conflict and insecurity, and poor market conditions.

However, risk can be mitigated with the appropriate interventions introduced at the right time and targeted to the right people. Determining the target group may be the greatest challenge of all because in extreme droughts, most ASALs are affected to a greater or lesser degree, but resources tend to be limited and may be insufficient to ensure implementation of effective interventions. Hence targeting becomes extremely important in ensuring a successful project. In the case of pastoralists, it is important to note that herders require about 3.5-4.5 TLUs per capita

to maintain pastoral viability in absence of other income streams.²¹⁶ For those owning less than 3.5 TLUs, it is often not easy to make ends meet. If they are unable to maintain a viable number of animals to ensure a mobile herd sufficient to sustain a household, most pastoralists have opted to settle in nearby towns to take advantage of opportunities such as waged employment, petty trading, and farming. Also it is important to note that those pastoralists that have diversified (the poor pushed to diversify out of desperation and the rich pulled to diversify due to opportunity) have more than one stream of income. They are also involved in “non-livestock forms of wealth such as cultivable land, salaried employment or business ownership”, petty trading, and diversification into education that would lead to formal sector employment.²¹⁷

Within most pastoral groups there are a small number of wealthy pastoralists, albeit these numbers are declining along with the numbers of livestock during the past twenty years. The “rich” group is not significantly affected by droughts or shocks because they have large herds to fall back on and they have a greater capacity to quickly rebuild their herd sizes thanks to their strong breeding stock. Relative to the “extremely poor” and “poor” group, the “vulnerable to poverty” group will recover more quickly because they will need to obtain fewer animals to reach a viable herd size. However, at the same time, there will be vulnerable transitional herders that maintain livestock, but are unable to fully recover from shock and hence may choose to remain sedentary for a period of time (temporary) or may even permanently settle and abandon the pastoral livelihood.

Based on this discussion, it is important that programs focus on supporting those pastoralists that can viably return to mobile pastoralism because it is an effective and economical use of unimproved pasture, namely the “vulnerable to poverty” group and the transitional

²¹⁶ Little et al, “Challenging Stereotypes,” (2006).

²¹⁷ Ibid 12.

vulnerable group. Programs should also assist those pastoralists that are too poor to build their herd size and have become sedentarized or temporarily sedentarized with market linkages and structures, skills training for effective petty trading and waged employment. Temporary sedentarization is a coping mechanism that pastoralists utilize to recover from livestock losses, supplement income and food consumption needs, stay safe, obtain better prices for their livestock, and improve their chances of paying reasonable grain prices. Again, interventions focusing on both the “vulnerable to poverty” and transitional vulnerable groups have the most effective impact in terms of graduating households from one food security category to the next. Productive assets can be provided such as small stock to start rebuilding the herd and/or equipment and seeds to cultivate crops for household consumption. Programs should also collaborate with local and national governments (whichever is more appropriate), research institutes and other NGOs to promote pro-pastoralists policy changes, access to market, and resource linkages, such as land policy, land use policy, children and adult education, human and animal health, quarantine issues and conflict mitigation in pastoral areas.

Livestock interventions vary according to the different phases of the shock and level of household food insecurity. In most cases, the goal of interventions is to improve existing productive assets by intensifying and improving productivity. When necessary, interventions introduce livelihood diversification to vary rural income generating options and opportunities. In general, a diverse array of income generating activities tends to afford pastoralists greater capacities to cope with frequent shocks, and sometimes with on-going political and economic shocks that often can take time to resolve. These may include conflict situations and unfavorable market structures.

This outline uses the pastoralist mobile paradigm as the lens to understand pastoralism and systems thinking as the overarching framework to illustrate the holistic nature (interdependence) of interactions of the issues that surround and effect pastoralism. While the outline demonstrated the importance of viewing pastoral issues from the pastoralist mobile paradigm, it also recognized that reactions to the suggested interventions can also have positive impacts and other negative side effects that can not be known now. Hence, systems thinking was used as the over arching framework to remind us to constantly question the intervention rationale and program's actions. Do pastoralists want their problems to be solved? Do pastoralists feel there are problems for others to solve? From the perspective of systems thinking both perspectives could exist at different times, for different people, and in different contexts. In other words, there is no one absolute answer because of the complex nature of systems thinking and the way in which it lends itself to a holistic understanding of pastoralism that looks at all the different factors involved at the same time. Pastoralism must be understood within the context of current issues that impact pastoralists, and these must in turn be viewed within the larger systems (small-scale livestock production, environmental forces, political and economic factors, etc).

7. CLOSING REMARKS

Shocks such as natural disasters and political conflicts continue to affect many parts of Africa, especially in arid and semi-arid lands such as northern Kenya and southern Ethiopia. Most livelihoods in these areas are dependent on rain to irrigate crop fields and pasture for household consumption and livestock fodder needs. Livestock tend to serve both at the same time as insurance and as investments that pastoralists, agro-pastoralists and smallholder farmers

tap when a drought or other shock occurs, i.e. sold for cash or food. However, many livestock keepers wait too late to sell their animals before they die during the drought and/or flood. IFPRI has suggested that both environmental and poverty concerns can be addressed if small-scale mixed-farm producers are linked with large scale processors and marketers, i.e. in the case of Land O'Lakes/Zambia program. This approach can combine the environmental and poverty alleviation benefits of small-scale livestock production with the economies of scale and human health benefits that can be gained when connected with larger scale processing.²¹⁸

For smallholder farmers and agro-pastoralists, having a reliable productive asset is critical to increasing household resiliency to cope with shock. More generally, it is important to have livelihood diversification options in case having productive animals does not work out as planned due to variable climate, market, or security reasons. Hence in Zambia, smallholder farmers participate in a number of income streams because subsistence crop farming is not enough to feed the entire household sufficiently throughout the year. Although Zambia is a chronically food insecure country, Land O'Lakes/Zambia proved that provision of heifers, cooperative development, dairy livestock training and extension services, and market linkages can increase smallholder farmer income, providing her/him with a reliable income stream and capacity to better cope with future shocks.

For pastoralists, the key to improved livelihood is continued mobility because mobility is economic and ecological opportunism at its optimum in arid and semi-arid lands. While environmental and political factors affect pastoralists' coping strategy and eventually adaptive strategy, there is also a social change that is slowly occurring within the climate of uncertainty. Many changes in pastoral and smallholder societies have come about due to changes in social values. This has resulted in the urbanization of the rural areas, and the increased influence of

²¹⁸ Delgado et al (1999).

modernization on traditional societies and livelihoods. For pastoralists, social change has meant that their children are being educated and as a result may choose to stop practicing mobile pastoralism. Pastoral elders have witnessed this trend over the past three decades and have more or less adapted slowly to the changing times. Their educated children are residing in towns and cities, earning waged income and remitting money back to their homestead. This has become a pastoral coping mechanism in modern times. Hence pure nomadic pastoralism numbers have declined over time. It was suggested by participants of an e-conference sponsored by FAO, that education about how to use livestock to reverse desertification, especially education of women, is important to preserving and improving the land.²¹⁹ How long modern practices such as these will continue and yet still allow for the continuation of traditional mobile livelihoods is unknown. Nonetheless, pastoralists are extremely adaptive and their ability to adjust with the times may yet allow their traditional livelihood modalities to persevere even in the face of climate variability, ineffective diversification options, political trends and poor market infrastructures.

While this literature review aimed to increase donor and development communities' understanding and awareness of current livestock interventions among livestock keepers (namely, pastoralists, agro-pastoralists and smallholder farmers), there is a lot more research needed to fully understand the systems and subsystems related to livestock and livestock societies. However, the case study and outline in the review provides a good understanding of some livestock interventions that enhance African livestock keepers coping mechanism in chronic and acute household food insecurity.

²¹⁹ Allan Savory, "Alive/LEAD Livestock e-conference", contribution 12/12/06, <http://www.virtualcentre.org/en/ele/default.htm> (accessed 12/13/06) [1].

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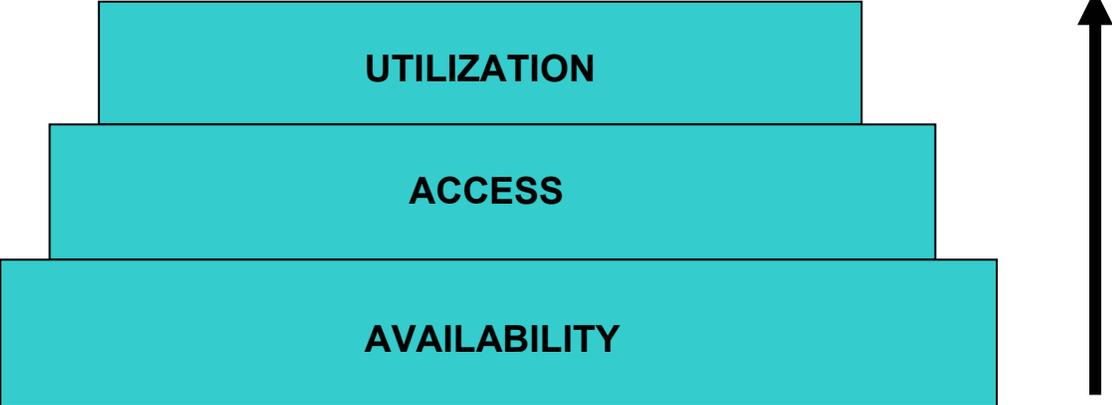
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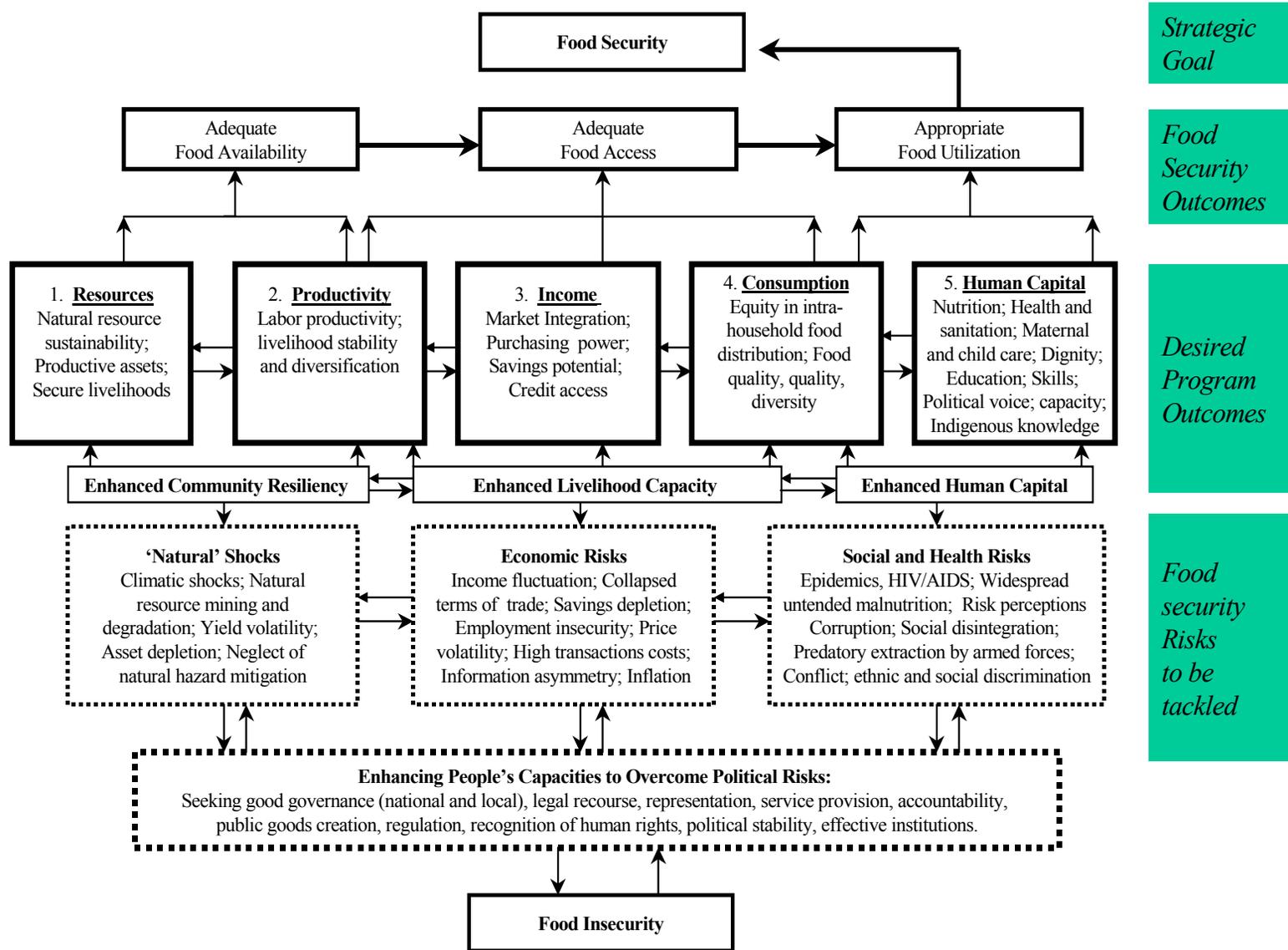
APPENDIX A: Food Security Hierarchy

Food Security Hierarchy



APPENDIX B: FFP Conceptual Framework

USAID Food for Peace Expanded Conceptual Framework for Understanding Food In-Security



APPENDIX D: Coping Matrix

<u>Negative Coping Strategy</u>	Examples of Negative Coping Strategy		
	Food Insecurity	Severe Food Insecurity (as things get worst)	Suggested indicator
Adjust Dietary Consumption Habits	<ul style="list-style-type: none"> • Rely on less preferred and less expensive food (also tend to be less nutritious food • Consume more starchy staples, less meat, fish, egg, fruit and vegetables • Reduce of number of meals eaten in a day • Reduce meal portions • Ration money for daily consumption to buy prepared food (sometimes cheaper and less nutritious 	<ul style="list-style-type: none"> • Restrict consumption by adults for small children to eat • Feed working members of household at the expense of non-working members • Consume Non-Timber Forest Products (NTFP, wild food, bush food; fruit/leaves from trees • Consume seed stock held for next season • Skip entire days without eating • Send family members to eat elsewhere • Direct food aid distribution • Migrate to find food 	<ul style="list-style-type: none"> • CSI** • MIHFP** • HDDS • Average # liters of milk consume daily per household • Average # of liters of milk/day/by animal type • # participants in FFW/FFA/FFT and CFW • # of working people in household • Price of NTFP and other wild foods**
Adjust Human Resources	<ul style="list-style-type: none"> • Seasonal/urban migration • Women taking up work outside of the home • Children leaving school to work to earn extra income for the household 	<ul style="list-style-type: none"> • Early marriage of girls • Children leaving home to work 	<ul style="list-style-type: none"> • CSI** • MIHFP** • Average annual crop yield** • Monthly net income from sales • # participants in FFW/FFA/FFT and CFW • # of children attending/# of children enrolled in school • Asset index • # of working people in household • # of income streams in past 3 months • Monthly remittance
Informal Private Transfer	<ul style="list-style-type: none"> • Informal loan from relative • Credit from private individual • Gift (monetary and in-kind • Temporary/permanent fostering of children to better-off relative to smooth income expenditure 	<ul style="list-style-type: none"> • Send children to eat with neighbors/relative • Send household members to beg for food • Resort to transactional sex for food 	<ul style="list-style-type: none"> • CSI** • MIHFP** • # participants in FFW/FFA/FFT and CFW • # of children attending/# of children enrolled in school • Monthly remittance

<u>Negative Coping Strategy</u>	Examples of Negative Coping Strategy			
	<u>Food Insecurity</u>	<u>Severe Food Insecurity (as things get worst)</u>		<u>Suggested indicator</u>
Productive and Wealth Asset Sale	<ul style="list-style-type: none"> • Divesting in small stock, clothes, and small household goods for food and other household needs 	<ul style="list-style-type: none"> • Sell large stock, cattle or camel, for cash for household needs and pay for children's school fees • Sell personal assets such as gold and jewelry for household needs • Sell breeding stock 		<ul style="list-style-type: none"> • CSI** • MIHFP** • HDDS • Average annual crop yield** • Monthly net income from sales • Asset index • # of income streams in past 3 months • Monthly remittance • # of animals household own b type • # of productive female livestock for sale in the market** • Price of main staple food** • Price of live livestock**

Positive Coping Strategy	Suggested Dairy and Livestock Interventions					Suggested indicator
	Chronic Food Insecurity (ongoing interventions)	Acute Food Insecurity			Rehabilitation	
		Risk Preparation	Emergency Alert	Emergency		
Livestock production	<ul style="list-style-type: none"> • Dairy livestock production: Use crossbred dairy cow; training and extension in animal husbandry, pasture cultivation and fodder storage, water conservation, recordkeeping, and cooperative development; build Milk Collection Center; and develop market linkage with processor, creating a viable value chain • Form cooperative/group and develop transparent and inclusive organizational structure • Provide AI services • Train paravets • Develop animal health, land, and/or water committee • Build fodder storage shed • Collect and save fodder • Improve animal nutrition • Diversify livestock holding: Large stock-donkey, oxen, camel and small stock-rabbits, chicken, pig, goat/sheep • Diversify livestock products: meat, milk, hides/skins, honey • Build value of livestock and products: cheese, ghee, leather handicrafts, jerky, specialty honey • Support the vaccination of sick animals • Use vet/medical mobile model to reach more mobile groups • Train dairy cow as traction animal • Trade in large stock for smallstock or destock for money 	<ul style="list-style-type: none"> • Dairy livestock production • Build Milk Collection Centers for bulking milk • Build and strengthen market linkages with processors • Form cooperative/group and develop transparent and inclusive organizational structure • Provide AI services • Train paravets • Develop animal health, land, and/or water committee • Create private sector water/pasture management options • Build fodder storage shed • Collect and save fodder • Improve animal nutrition • Diversify livestock holding: Large stock-donkey, bull, camel and small stock-rabbits, chicken, pig, goat/sheep • Diversify livestock products • Build value of livestock and products • Repair and improve water points • Designate cattle camp grazing area for breeding stock 	<ul style="list-style-type: none"> • Utilize saved fodder • Protect water points • Provide feed supplement to breeding stock and immature females • Empower application of animal health, land, and/or water committee • Adjust animal management: split herd, culling of young and old bulls, stagger breeding among animal types, graze males and milk dairy animals • Support paravets • Vaccinate sick animals within the vector • Use vet/medical mobile model to reach more mobile groups • Voluntary destocking • Provide subsidies to traders to simulate destocking initiatives, i.e. cover transport cost, feed costs • Slaughter animals and purchase meat for food distribution at location • Truck animals into markets • Provide water and fodder along trekking route using camels • Place animals in fattening/quarantine/breeding camps • Mitigate conflicts 	<ul style="list-style-type: none"> • Food Aid: direct, natural resource oriented FFW/FFA/FFT or CFW • Provide potable water and shelter to the needy • Utilize saved fodder • Protect, repair and improve water points • Provide feed supplement to breeding stock and immature females • Support application of animal health, land, and/or water committee • Adjust animal management: split herd, culling of young and old bulls, stagger breeding among animal types, graze males and milk dairy animals • Support paravets • Vaccinate all animals • Use vet/medical mobile model to reach more mobile groups • Commercial destocking • Provide subsidies to traders to simulate destocking initiatives, i.e. transport cost • Slaughter animals and purchase meat for food distribution at location • Truck animals into markets • Provide water and fodder along trekking route using camels • Place animals in fattening/quarantine/breeding camps • Mitigate conflicts 	<ul style="list-style-type: none"> • Dairy livestock production • Strengthen cooperative/group • Strengthen Milk Collection Centers • Provide access to AI services • Strengthen market linkage with processor • Support paravets • Strengthen committees • Improve animal nutrition • Diversify livestock holding • Diversify livestock products • Build value of livestock and products • Collect and save fodder • Repair and improve water points • Provide vaccination as disease may still exist in area • Provide fodder/water subsidy as fodder may still be scarce, using camels • Develop alternative feed • Restock smallstock to appropriate marginalized hhs 	<ul style="list-style-type: none"> • % of farmers adopt project defined minimum sustainable agricultural technology • # of animal health, land, and/or water committee formed • # of milk collection centers • # of animals destocked by type in past 3 months** • # of animals restocked by type • # of animals stocked by type • # of animals own • # of productive female livestock for sale in the market** • # of beneficiary trained • HDDS • Average annual crop yield** • Monthly net income from sales • PGCI • Price of main staple food** • Price of live livestock**

Positive Coping Strategy	Suggested Dairy and Livestock Interventions					Suggested indicator
	Chronic Food Insecurity (ongoing interventions)	Acute Food Insecurity			Rehabilitation	
		Risk Preparation	Emergency Alert	Emergency		
Livelihood Diversification	<ul style="list-style-type: none"> • Local waged labor • Petty trading of vegetables, milk, bamboo poles for construction, tree gum, hides/skins, honey, fruit, non • timber forest products • Livestock trading • Cash cropping • Diversify livestock holdings: large and small stock • Diversify livestock products: meat, milk, hides/skins, honey • Build value of livestock and products: cheese, ghee, leather handicrafts, jerky, specialty honey • Develop and strengthen market information system; disseminate info • Support the vaccination of sick animals and those who may get sick • Train dairy cow as traction animal 	<ul style="list-style-type: none"> • Build milk/bulking centers • Develop marketing associations • Build and strengthen market linkages with processors • Provide access to AI services • Local waged labor • Petty trading • Livestock trading • Cash cropping • Diversify livestock holdings: large and small stock • Diversify livestock products: meat, milk, hides/skins, honey • Build value of livestock and products: cheese, ghee, leather handicrafts, jerky, specialty honey • Develop and strengthen market information system; disseminate info • Support the vaccination of sick animals and those who may get sick • Train dairy cow as traction animal • Locate/build fattening/quarantine/breeding camps 	<ul style="list-style-type: none"> • Food Aid: direct, natural resource oriented FFW/FFA/FFT or CFW • Provide potable water and shelter to the needy • Local waged labor • Voluntary livestock sales • Small stock sales • Disseminate market information as appropriate • Vaccinate animals in select areas 	<ul style="list-style-type: none"> • Food Aid: direct, natural resource oriented FFW/FFA/FFT or CFW • Provide potable water and shelter to the needy • Local waged labor • Commercial livestock sales • Small stock sales • Disseminate market information as appropriate • Vaccinate all animals 	<ul style="list-style-type: none"> • Local waged labor • Petty trading • Livestock trading Cash cropping • Diversify livestock holdings: small stock fattening and breeding • Diversify livestock products • Strengthen market information system; disseminate info • Support access to vaccination of animals • Use vet/medical mobile model to reach more mobile groups • Eliminate market inefficiencies via cooperatives, traders and processors • Collaborate with local and national government in support of pastoralists/smallholder farmers • Support appropriate pro-pastoralist/pro-poor policy, i.e. cross border trade and animal health/quarantine issues • Restock smallstock to appropriate marginalized households 	<ul style="list-style-type: none"> • CSI** • HDDS • Average annual crop yield** • Asset index • # of working people in household • # of income streams in past 3 months • Monthly remittance • Monthly net income from sales • # of animals destocked by type in past 3 months** • # of animals restocked by type • # of animals stocked by type • # of productive female livestock for sale in the market** • # of animals own • # of milk collection centers • % of market information users • % of farmers adopt project defined minimum sustainable agricultural technology • Price of NTFP and other wild foods** • MIHFP**

Positive Coping Strategy	Suggested Dairy and Livestock Interventions					Suggested indicator
	Chronic Food Insecurity (ongoing interventions)	Acute Food Insecurity			Rehabilitation	
		Risk Preparation	Emergency Alert	Emergency		
Community Capacity Building	<ul style="list-style-type: none"> • Diversify livestock holdings and products on community scale • Form community group and develop transparent and inclusive organizational structure i.e. cooperative or association • Community level training in appropriate IGAs • Repair, improve and protect water points • Cover boreholes/wells • Develop and strengthen land/water management committee • Build storage shed for fodder and grain • Collect and save fodder and grain • Encourage community development of safety net program • Development of early warning system (EWS; emergency plan in place) 	<ul style="list-style-type: none"> • Establish community EWS • Diversify livestock holdings and products on community scale • Repair, improve and protect water points • Cover boreholes/wells • Develop and strengthen land/water management committee • Build storage shed for fodder and grain • Collect and save fodder and grain • EWS info disseminated to communities • Promote and train group members to develop community safety net activities 	<ul style="list-style-type: none"> • Food Aid: direct, natural resource oriented FFW/FFA/FFT or CFW • Provide potable water and shelter • Protect water points • Promote community water harvesting • Cover boreholes/wells • Support land/ water management committee • Utilize stored fodder and grain • Vaccinate herds, esp. breeding stock • EWS info disseminated to communities • Guide community members in application of safety net activities 	<ul style="list-style-type: none"> • Food Aid: direct, natural resource oriented FFW/FFA/FFT or CFW • Provide potable water and shelter • Protect water points • Promote community water harvesting • Cover boreholes/wells • Support land/ water management committee • Utilize stored fodder and grain • Vaccinate herds, esp. breeding stock • EWS info disseminated to communities • Guide community members in application of safety nets activities 	<ul style="list-style-type: none"> • Diversify livestock holdings and products on community scale • Repair, improve and protect water points • Strengthen community water harvesting activities • Cover boreholes/wells • Strengthen land/water management committee • Strengthen storage shed • Strengthen EWS • Strengthen community safety nets activities 	<ul style="list-style-type: none"> • % of communities have EWS plan • % of communities with strengthen physical asset/infrastructure to mitigate shocks • % of communities with improved safety net activities • PGCI • CSI** • Vulnerability index • Average annual crop yield** • Asset index • # of income streams in the past 3 months • MIHFP** • Price of NTFP and other wild foods** • Price of main staple food** • Price of live livestock** • # of sick humans and animals in the past 3 months**

Positive Coping Strategy	Suggested Dairy and Livestock Interventions					
	Chronic Food Insecurity (ongoing interventions)	Acute Food Insecurity			Rehabilitation	Suggested indicator
	Risk Preparation	Emergency Alert	Emergency			
Adjust agricultural practices	<ul style="list-style-type: none"> Plant trees: fruit, gum, fuelwood, fodder purposes Conservation Farming: nitrogen fixing crop rotation and use of cover crops; retention of crop residues for animals; better quality farm equipment; kitchen gardens; use animal manure as compost and/or biogas Water conservation: water containers for drinking and cooking; protect and cover boreholes/wells; improve water points; water harvesting, micro-irrigation Build fodder and grain storage shed Collect and save fodder and grain Where water is available cash crop and live fence Develop and strengthen community groups, i.e. land, water, food security, animal health committee 	<ul style="list-style-type: none"> Plant Trees Conservation Farming Water conservation Plant pasture and build fodder storage shed Collect and save fodder Use animal manure as compost and biogas if appropriate Where water is available cash crop and live fence Develop and strengthen community groups, i.e. water, food security, conflict Build fodder and grain storage shed 	<ul style="list-style-type: none"> Food Aid: direct, natural resource oriented FFW/FFA/FFT or CFW Provide potable water and shelter Promote community water harvesting Cover boreholes/wells Support land/ water management committee Utilize stored fodder and grain Collect and feed crop residues to cattle Guide community members in application of safety net activities 	<ul style="list-style-type: none"> Food Aid: direct, natural resource oriented FFW/FFA/FFT or CFW Provide potable water and shelter Promote community water harvesting Cover boreholes/wells Support land/ water management committee Utilize stored fodder and grain Collect and feed crop residues to cattle Guide community members in application of safety net activities 	<ul style="list-style-type: none"> Conservation farming Water conservation Promote community water harvesting Cover boreholes/wells Support land/ water management committee Plant fodder pasture for storage shed Collect and save fodder and grain Use animal manure as compost and biogas if appropriate Have kitchen gardens Maintain trees, if mature: eat/sell fruit; use branches/leaves as fodder; collect and sell gum, sell branches for fuelwood Where water is available: cash crop and live fence Strengthen community groups 	<ul style="list-style-type: none"> CSI** MIHFP** HDDS % of farmers adopt project defined minimum sustainable agricultural technology PGCI Average annual yield Kgs of main staple in storage # of animal health, food security, land, and/or water committee formed Price of NTFP and other wild foods** Price of main staple food** Price of live livestock** # of sick humans and animals in the past 3 months**

Notes

* Situations of chronic food insecurity are not without shocks that bring about acute food insecurity. However, these shocks can often be predicted via early warning mechanisms, such as for droughts, failed rains or below normal rains than expected. Nonetheless, interventions appropriate to address chronic food insecurity may or may not be appropriate when addressing episodes of acute food insecurity, and thus interventions may shift to ones more commonly implemented in emergencies.

** Indicator can be used as a trigger indicator to prepare for possible acute food insecurity shock.

APPENDIX E: Suggested Indicators and Trigger Indicators

- # of animals household owns
- % wasting among 6-59 age children
- % of communities using market information
- # of income streams in past 3 months
- % of communities have EWS plan
- # of children attending school/
- # of beneficiaries trained
- % of communities with strengthen physical asset/infrastructure to mitigate shocks
- HH monthly net income
- Average monthly amount spent on vet services
- % of farmers adopt project defined minimum sustainable agricultural technology
- % of communities with improved safety net activities
- Kgs of main staple in storage
- # of animals restocked by type
- # of animals stocked by type
- Average # liters of milk consume daily per household
- # of liters of milk/day/by animal type
- Monthly remittances
- # of working people in household
- Asset Index
- Household Dietary Diversity Score (HDDS)
- Group Capacity Index
- Vulnerability Index
- # of dependents in household
- Household food insecurity access scale**
- Coping Strategy Index (CSI)**
- # animal disease cases reported within the past quarter**
- Average annual crop yield**
- Months of Adequate Household Food Provisioning (MAHFP)**
- # of productive female livestock for sale in market**
- # of animals destocked by type in the past 3 months**
- Price of nonfarm products and wild foods**
- Number of days between current start of rainy season and normal start of rainy season**
- Price of main staple food (weekly, monthly) **
- Price of live livestock (weekly, monthly) **
- Price of nonfarm and wild foods (monthly) **
- Rate of livestock body condition**
- Animal mortality in the community**
- Number of productive female livestock in the market**
- Number of animals destocked by type in the past 3 months**
- Rate length of rainy season**
- Distance to water resource for household consumption**
- Distance to water resource for agriculture and animals**
- # insecurity incidents**

** Indicator can be used as a trigger indicator to prepare for possible acute food insecurity shock.

APPENDIX F: Descriptions of Some Livestock

Livestock animals such as cattle, buffalo, pigs, poultry, camels, donkeys, sheep, goats and chickens are common animals that pastoralists and smallholder farmers keep as part of their herd and/or household. Other livestock less commonly kept in the study area are ducks and bees. Pastoralists tend to maintain large numbers of cattle, camels, sheep and goats, while smallholder farmers tend to keep a smaller number of animals (except for camels depending on their food security or poverty level). Certain pastoral groups favor certain species of livestock depending on their culture and agro-ecological zone. Livestock that is not so commonly practiced in Africa but is increasingly becoming a viable option for poor smallholder farmers are donkeys used as draft animals and beekeeping as an income generating activity.

Cattle and Oxen

In terms of cattle, pastoralists take advantage of extensive, non-arable land areas to graze their animals. Keeping livestock is the most viable form of livelihood in arid and semi-arid lands, where pastoralists dominate, particularly in the Sahel-Sudano areas. The more mobile the pastoral group, the more animals they own. For many groups, having many cattle is a status symbol. However, in the past ten years, the trend is toward more intensive and semi-intensive livestock keeping because more pastoralists are settling down or rooting themselves in agriculture to ensure food security of their household. The pastoralist livelihood is fast changing, and often involves encroachment on grazing land, and increased commercialization. Natural and manmade disasters such as recurrent drought due to a shortage of water during the transhumance journey and conflict kill animals in warring areas, limiting access to pasture and water. Increasing population growth also places a strain on the land, as more land is converted for agricultural purposes to supply the growing demand for livestock meat and by-products.

Oxen are not common transhumance animals but they are raised by smallholder farmers for traction, manure and milk purposes. In Ethiopia around 6 million draft animals are found in the highlands, where almost all the farmers use draft oxen.²²² In Kenya, about 12 percent of all farmers use 700,000 oxen as working animals, mainly Zebu oxen. In some areas many farmers use draft animals, in others, such as Maasai rangeland, no cattle are used for cultivation.²²³

Camels and Donkeys

Camels are commonly found in arid lands (areas with less than 450-500 mm of annual rainfall where agriculture is unproductive due to low or unpredictable rainfall. Camels are used for traveling (long distance travel and transport and are a means of investment and long-term savings. Having large numbers of camels also bring prestige to their owners. Camels supply milk, meat, hair, hides and skin and dried dung, which is used for fuel. “Marketing of live camels is a significant trade and sales of surplus milk are sources of cash income for pastoral families.”²²⁴ Camel sales are a function of household cash needs for basic goods, such as grains, clothing, and education fees, healthcare. During droughts, camel sales also help support household basic needs. Camels are an essential part of pastoralist livelihood. In some pastoral groups, “they are important for the pastoralists to be recognized as a member of the community.”²²⁵ Camels are mainly browsing animals and utilize browse for most the year, hence areas with trees are ideal. During the rainy season, browse is not a problem for camels but when the dry season sets in, the quality of life for camel and cattle herders is difficult depending on the quality of the previous rainy season. If the previous rainy season was poor or below average, the

²²² Paul Starkey, “The introduction, intensification and diversification of the use of animal power in West African farming systems, implications at farm level,” Keynote address in *Animal Power in Farming Systems*, ed. Paul Starkey and Fadel Ndiame, (GTZ, Eschborn and Vieweg, Braunschweig: Eschborn, Germany, 1986) 101.

²²³ Ibid 102.

²²⁴ Omar Abdurahman, Ph.D., “Udder health, milk quality and constraints to camel pastoralism in the Horn of Africa,” abstract, www.vulnerability.se/files/omar_abdurahman.pdf (accessed 5/24/06) 1.

²²⁵ Yohannes Mehari, Zeleke Mekuriaw and Getachew Gebru, “Camel and Camel Product Marketing in Babilie and Kebrieribeyah Woredas of the Jijiga Zone, Somali Region, Ethiopia,” (Addis Ababa, 2006) 2.

following dry season will present problems for herders, and they will need to make difficult choices. These would include:

- a) Sale of some animals to buy fodder (as well as to purchase extra grain
- b) Division of the herd into two or more groups, each of which would be expected to browse in different areas
- c) Migration to a different, often remote habitat (i.e. irrigated areas, forests)²²⁶

Donkeys are used as draft animals and are found all over Africa. They are most prevalent in West Africa where in total about 800,000 donkeys are employed for work on farms, with high concentrations in cotton and groundnut growing areas.²²⁷ In Mali, about 50 percent of the farmers use draft animals, of which 150,000 are donkeys. In the Gambia, about two thirds of the farmers employ 30,000 donkeys as draft animals. Use of donkeys as draft animals increased between 1965 and 1985 in the Gambia as a result of farmer innovation rather than extension.²²⁸ Gambians, learning from their Senegalese neighbors, saw the benefit in using donkeys as draft animals for donkey-drawn seeders and plow (tine cultivation. Despite the fact that equipment for donkeys is more expensive because they require a different harnessing system using a single animal, the animals are cheaper and require less training and supervision.²²⁹ Donkeys were preferable because of their low cost, easy to train, and docile manner. In the Gambia, donkey meat is not eaten, so theft of these animals is not a constant problem. Higher value animals such as oxen are, however, often subject to theft, require a pair, and difficult to train.

Sheep and Goats

Sheep and goats (together often referred to as “shoats”) are common small ruminants that are managed by most livestock keepers, especially those with limited assets. They are small livestock that require less input (feed and require less grazing land than cattle. Goats have fast

²²⁶ Babiker Abbas, “A Synopsis of Research on Pastoralism in Eastern Sudan with Emphasis on Camel Husbandry and Ecology,” <http://www.ossrea.net/dhp/dhp01-03.htm> (accessed 5/24/06) [3].

²²⁷ Starkey 101-102. All statistics on donkeys are from this source.

²²⁸ Ibid 107.

²²⁹ Ibid 108.

reproductive cycles; they can give birth twice per year. Hence goat rearing is an appropriate intervention for resource poor populations (i.e. landless poor, women-headed households, and can contribute significantly to household income without interfering with the main occupation of smallholder farmers.²³⁰

Sheep and goats play an integral part in mixed-farm (livestock/crop production systems, namely smallholder farmers and agro-pastoralists, in the Sahelian regions. For example, in central Mali, between 75 and 95 percent of the households possess sheep and goats, respectively, with an average of 30 head per family.²³¹ Shoats require less water and have been effectively bred to adapt to the long dry season in the Sahel. Ninety percent of international livestock exports from the Horn of Africa derive from Somalia, Ethiopia and the Sudan; and 30-40 percent of the small stock that is exported out of northern Somalia and western Ethiopia originate from Ethiopia. There is a strong market for goats and sheep in the Middle East since the key importer, Saudi Arabia, has recently lifted a five-year ban on shoaat imports from several Horn of Africa countries.

Pigs and Poultry

African smallholder farmers also keep pigs and chickens, feeding them crop residues and collecting manure for vegetable gardens. Pigs will eat almost anything, including: crop by-products such as maize bran, wheat and rice polishing, oil cakes, vegetable wastes and garbage. Traditionally, chickens are raised in free range where they hardly get feed supplements, except kitchen waste and crop residue. Women tend to do well with poultry rearing because it does not

²³⁰ M. Saadullah, M.M. Hossain and Shajeda Akhter, "Experiences with Goat Project as a Tool in Human Development: Goats for Poor Women in Bangladesh," <http://www.husdyr.kvl.dk/htm/php/tune96/24akhter.htm> (accessed 7/25/05) [1].

²³¹ M. Sangare and V.S. Pandey, "Food intake, milk production and growth of kids of local multipurpose goats grazing on dry season natural Sahelian rangeland in Mali," *Animal Science* 71 (British Society of Animal Science: London, 2000) 166.

require much in the way of resources, skills, or training. For the most part, pigs and poultry are not raised by pastoralists because cattle and camel are more prestigious and profitable.

Ducks and Beekeeping

In Africa, ducks are not common domestic animals raised for household consumption or profit as they are in Asia. Most smallholder farmers raise domesticated ducks called muscovy ducks that are easy to care for and they control flies. Ducks forage for most of their own food, resist disease, reproduce easily.²³² They do not need a pond nearby; they need clean water to drink. They need special attention during the first few weeks of their lives, such as warm shelter. Muscovies eat grass and other vegetation. However, they grow faster if given extra protein foods for the first two - three weeks.²³³ “Muscovies will lay up to 80 eggs a year and hatch about four sets of ducklings.”²³⁴

Beekeeping (apiary) is increasingly practiced in Africa as an income generating activity. It is considered a reliable income generating activity that resource poor populations can manage with little input and effort. There are four by-products from keeping bees that can be utilized and sold for income: honey, beeswax, pollen and propolis. Honey is one of the most popular and common by-product from bees. There is a high market demand for honey as well as beeswax, which is used in cosmetics, candles, and floor polish. Beeswax can be stored for a long time and fetch a higher price than honey.²³⁵ Pollen is the yellow powder produced by flowers that bees collect as their protein. “Pollen is becoming more popular in some parts of the world now as a health food for people because of the protein and other nutrients it contains.”²³⁶ Lastly, bees

²³² Harvey P. Harman, “Muscovy Ducks are Easy to Raise and They Control Flies,” Package 31, Script 3 January 1994, www.farmradio.org/English/radio-scripts/31-3script_en.asp (accessed 4/4/07) 1.

²³³ Ibid 2.

²³⁴ Ibid.

²³⁵ Marina Biasutti, “How bees help you make money,” Package 47, Script 7 January 1998, http://farmradio.org/english/radio-scripts/47-7script_en.asp (accessed 4/4/07) 1.

²³⁶ Ibid 2.

make propolis from the sticky resin collected from leaves, flowers, and logs, which they combine with beeswax to seal the hive.²³⁷ It is considered a health food for people.

A community in Shewula, Swaziland started to keep bees as an income generating activity after 10 of the community members took a year-long training course about beekeeping. They returned and trained their friends and neighbors. They built the bee hives and trap boxes, established the yard, a shady area where bees can have access to water and flowering plants. They also managed pests well. When livestock wanted to get into the apiary, they fenced the area. When ants and termites invaded the hive, they used wood ash and cans filled with oil so ants would not get far up the hive. When baboons and monkeys invaded the hives, the community placed a metal sheet on top of the hive and then large rocks on top of metal sheets to keep it in place.²³⁸

²³⁷ Ibid.

²³⁸ Betty Rigler, "The Beekeepers of Shewula," Package 48, Script 3 April 1998, http://farmradio.org/english/radio-scripts/48-3script_en.asp.(accessed 4/4/07) 2.