OFFICE OF U.S. FOREIGN DISASTER ASSISTANCE

DISASTER REDUCTION: A PRACTITIONER'S GUIDE

U.S. AGENCY FOR INTERNATION DEVELOPMENT

BUREAU FOR DEMOCRACY, CONFLICT, AND HUMANITARIAN ASSISTANCE

OFFICE OF U.S. FOREIGN DISASTER ASSISTANCE

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1. INTRODUCTION

The primary motivation in emergency situations is to assist vulnerable populations through rapid and effective responses. Experience shows that assistance provided with the best of intentions can create dependency and other negative consequences for households and communities. Fostering positive outcomes requires careful planning to ensure that assistance responds to actual needs, strengthens local capacities, and avoids exacerbating existing conflicts.

USAID's Office of U.S. Foreign Disaster Assistance (OFDA) initiates and coordinates U.S. government relief activities in response to disasters abroad. Coordination includes working with other USAID offices in order to prepare or prevent potential disasters, incorporating development concepts into disaster responses, and integrating disaster concepts into USAID development programs.

Governments request assistance because they are unable to organize a large-scale emergency response or do not have flexible safety nets. In responding to these requests for assistance, OFDA works closely with numerous private and public sector agencies. USAID/OFDA provides guidelines to all participants in an effort to coordinate effective assistance.

1.1 Purpose

The purpose of *Disaster Reduction: A Practitioner's Guide* (*Guide*) provide a frame of reference for OFDA staff and the numerous private and public organizations that work with OFDA in providing disaster assistance during emergencies. Emergencies include natural disasters, such as earthquakes, floods, or droughts, and complex situations characterized by civil strife and conflict. In both natural and complex disasters, productive systems are disrupted and social services become unavailable.

In all emergencies, OFDA aims to foster self-sufficiency by helping people obtain the resources needed to survive through the current crisis and to better meet their needs in the future. Focusing solely on saving lives in the short term is insufficient. Disaster-affected populations have their own strategies for using limited resources to their best advantage. The *Guide* shows how interventions can be tailored to reflect the decision-making dynamics of affected populations, and foster their self-sufficiency and productivity over the long term.

The *Guide* encompasses interventions emphasizing prevention, planning, and preparedness. At an early stage, **preventive** actions can reduce risks. For example, when reduced rainfall is anticipated, households may be encouraged to plant drought-resistant crops. In conflict situations, aid may include interventions fostering stability and conflict resolution. In the short term, **planning** activities can ameliorate the effects of disaster. For example, establishing public works programs can enable people to work for cash or food. In the long term, actions that promote **preparedness** will facilitate a quick response to potential emergencies. For example, an early warning system that projects weather trends and patterns can be used to identify and plan for expected food shortages.

This *Guide* encourages aid workers to recognize the challenges of providing emergency

assistance and minimizing harm. Assistance that strengthens a community's capacity to prevent crises and plan for emergencies fosters community self-sufficiency. When emergencies overwhelm communities, assistance can help people overcome the crisis and maintain or re-establish their livelihoods. Even in protracted emergencies, assistance can save lives and maintain livelihoods while discouraging ongoing dependency.

The *Guide* supplements OFDA's *Field Operations Guide for Disaster Assessment and Response* (FOG) in seven areas —seeds systems, livestock and fisheries, water and sanitation, work incentives and food aid, settlements and shelter, health and nutrition, and hydrometerological extremes such as floods and droughts. Each of the sectors discussed in the *Guide* contains technical information that should be addressed by non-governmental organizations (NGOs) when submitting sector specific proposals. Where appropriate, the *Guide* refers to relevant sections of the FOG.

The Center for Research on the Epidemiology of Disasters (CRED) maintains a worldwide disaster database which provides information on countries and regions prone to various types of disasters. Their website is http://www.cred.be/.

1.2 Understanding Emergencies

Until recently, most requests for OFDA assistance were related to natural emergencies such as earthquakes, floods, or droughts. In the 1990s, conflict-related complex emergencies predominated. Unlike natural disasters, complex emergencies involve both the deliberate creation and the consequences of crises. These crises are characterized by the collapse of public services and political authority, rise in death rates from starvation and epidemics, and population movements. Often, vulnerable people become exploited and have to make choices. Fragile political, economic, environmental, and social systems struggle to meet increased demands, while at the same time, they are being systematically destroyed. In the absence of a functioning civil society, communities may generate self-reliant ways to provide basic services, seek external assistance, or do without. Except in cases of genocide, most people survive the crisis by using a variety of coping mechanisms or by making trade-offs between the immediate survival of all and the long-term survival of the majority.

In all emergencies, establishing food security provides a way to save both lives and livelihoods. Food security has three dimensions: availability, access and utilization. Food is available when people have sufficient quantities of food of appropriate quality. Food is accessible when households and individuals have adequate resources to acquire appropriate foods for a nutritious diet. Food is utilized effectively through adequate diet, water, sanitation, and health care. Food security exists when all people at all times have physical and economic access to sufficient food to meet their dietary needs for a productive and healthy life.

Famine can result from both natural and complex emergencies whenever food is scarce or in low supply, or local populations lack income to purchase food (complex emergencies displacements) from other areas. The total food supply in the country may be sufficient to meet the needs of the entire population, but in the affected area (i.e. drought situations), people can be vulnerable to starvation due to insufficient access to basic needs.

Emergencies can occur with little warning or evolve over a period of months and present different opportunities for prevention, planning and preparedness as they unfold. As a result of drought, floods, pests, economic collapse, or conflict, people become incapable of producing their own food and lose the opportunity to earn the income needed to purchase food. The nature of the emergency guides their coping options. For example, people affected by natural disasters may be interested in stabilizing production and preserving stocks of grain. In conflict situations where stocks of grain might invite raids from armed groups looking for food, vulnerable populations may be more interested in retaining markets and having a ready supply of cash so they can purchase the food they need.

In many conflict areas, some unscrupulous leaders may exploit societal divisions and manipulate sub-group identities for their own purposes, discouraging the belief that power can be shared among diverse groups. Wars are sometimes fought among people who formerly lived and worked together. Systems of governance are disrupted or absent. Fighting often takes place in the living and working areas of everyday life. Distinctions between civilians and combatants become blurred and norms of humanitarian conduct collapse.

Conflict situations can bring radical shifts in the division of labor. Children may be conscripted into military service. Women may have greater productive responsibilities but no access to key inputs such as credit or technology. Conflict-related death and disability require adaptations by households and communities in the division of labor and the provision of recovery-oriented social services.

Emergencies often enrich a few at great cost to many. "Losers" incur debt, take jobs at lower wages, or sell assets, such as livestock, at bargain prices. "Winners" take advantage of the market's bargain prices and cheap labor, and may view relief supplies as unwelcome intrusions that undermine their profits. Thus, people whose interests are threatened can undermine relief activities that promote self-sufficient viable communities.

In emergency situations marked by conflict, some people can be subjected to atrocities, sometimes as both victim and perpetrator. As people become disillusioned with their leaders, war itself becomes a means for promoting a certain biased justice or a means to achieve other social goals. Gender issues become more acute and more pronounced.

Environmental damage may be severe. Frequently, conflicts lead to the burning of forests and wildlife habitats, poaching, and the destruction of farms and productive enterprises. People's short-term needs can inhibit the long-term management of natural resources.

There are winners and losers in all disasters. Relief programs can hinder, or help, or both. The focus of disaster prevention and prepardness should be to help re-establish social, economic, environmental and physical health.

For aid workers, emergencies, especially complex emergencies, may be challenging, confusing and personally dangerous. Effective assistance programs require sensitivity to the local culture, neutrality in the allocation of assistance, an understanding of the many factors contributing to the emergency, and a strong ability to adapt as circumstances change.

2. DISASTER ASSISTANCE

Effective planning recognizes that the impact of external aid is rarely neutral. Humanitarian assistance can inadvertently increase suspicion and tension, change power relationships, affect the economy, and carry implicit messages that exacerbate and prolong conflict. Humanitarian assistance can reduce self-sufficiency, while also saving lives by providing needed food and essential health services.

Before designing assistance programs, aid workers should strive to understand the local culture, the motivation of competing forces in the conflict area, and the coping strategies of the vulnerable groups. In fluid situations, an appropriate response may be to wait and monitor the situation as aid may exacerbate rather than ameliorate conditions for vulnerable populations. By being creative in assessing programming options and sensitive to the many ways aid can influence people's actions, relief workers can provide assistance with positive consequences for people and their communities.

2.1 Linking Relief and Development

U.S. Congressional mandates differentiate between relief and development funding. Relief provides resources in emergency settings enabling communities to return to their pre-emergency conditions. Development engages communities at the policy level to encourage long-term impact by promoting greater self-reliance, sustainable community structures or increased economic productivity.

Agencies providing assistance require some flexibility to respond to local conditions, without adhering to artificial distinctions between relief and development. In ongoing complex emergencies, people need strategies both for immediate survival and to address ongoing needs in the future. Emergency situations may call for strengthening markets, repairing roads, or training health personnel. In a disaster setting certain activities can help people to survive in the short- and medium-term and maintain conditions conducive to earning a living and being self sufficient. The emphasis is on alleviating disaster-related human suffering and saving lives.

Although donor-funding cycles limit opportunities to do long-term programs in relief settings, interventions can be designed to build a foundation for long-term development. Even in the midst of a crisis, it may be possible to identify projects that will set in motion longer-term local development. During a crisis in Angola, the immediate priorities were to provide food and health care. In his spare time, one relief worker worked with 67 families to plant 30,000 fruit trees. Five years after the crisis, within a peaceful area, the families have a source of sustainable income from the sales of fruit.

In all phases of disaster response, OFDA strives to link relief with development through the following principles:

- Collaboration/coordination
- Context-specific conditions
- Livelihoods

- Mitigation, planning, preparedness
- Promotion of international standards
- Systematic information collection
- Training/capacity building
- Use of existing local capacity/local community interaction
- Synergy and linkages between the project and broader social, economic and political trends
- Utilize monitoring and evaluation tools to measure progress

Although OFDA funding focuses on short-term relief and may terminate well before the development phase begins, the application of these principles can increase the effectiveness of both relief and development programs. ***Annex A: Programming Principles of Developmental Relief*** sets forth operating guidelines for each of these principles that can strengthen the development process.

2.2 USAID Objectives

The objectives of USAID's disaster assistance are to preserve life, minimize suffering, foster self-sufficiency, and enhance recovery. USAID guidelines specify that humanitarian assistance focus on the most vulnerable groups and a well-defined at-risk population.

Ideally, interventions help beneficiaries to support themselves and enhance their capacity to maintain or improve their way of life. People respond to crises based on their existing capabilities and their strategies for coping with the emergency. The goal is to blend interventions with the beneficiaries' own coping strategies.

In general, interventions should:

- Lessen the impacts of the current emergency while reducing vulnerability to future emergencies
- Identify and preserve productive assets at the household level
- Strengthen existing capabilities and reinforce effective patterns or strategies for dealing with the emergency
- Ensure that those most in need are being reached
- Enable participation of regional, national and local institutions, village councils, farmer organizations, women's associations or other groups
- Assist communities to shift the focus away from conflict towards alternative systems

for overcoming current problems

During every emergency, these objectives should be revisited frequently so that programs can be modified to accommodate changing conditions.

2.3 Food Aid Issues

Delivering food to those in need is very expensive. Airlifting food, obtaining and maintaining trucks for delivery, and staffing relief operations adds considerably to the cost of the food. Food aid can overwhelm local markets, becoming a disincentive to local producers and causing disruptions in local transport systems. The result may be a long-term dependency on food aid.

To be effective, responses to emergencies must pay close attention to the specific conditions in the affected area. Where the source of the emergency is due to conflict, food aid may be the wrong tool. Where food aid is appropriate, interventions should strive to supply food through local markets (existing private sector systems) and through increased purchasing power, rather than through direct distributions.

2.4 Fostering Self-Sufficiency and Productivity

Encouraging self-sufficiency is a vital part of OFDA's mandate primarily because it is important for the survival of vulnerable groups. Although OFDA places a high priority on meeting the immediate needs of the most vulnerable, usually women and children, interventions should also help people survive over the long-term. By integrating traditional relief interventions (food, water and sanitation, seeds and tools, emergency health) with measures to strengthen self-sufficiency and productivity (capacity building and support of local structures), relief can ensure survival while building a foundation for future development. Subsequent sections illustrate how assistance can foster self-sufficiency and productivity. ***Annex B Fundamentals of a Livelihoods Strategy*** presents fundamentals of a livelihoods strategy, with guidance for assessing emergencies and designing interventions that save livelihoods.

2.4.1 Enlist Community Participation

Broad community participation increases the likelihood that people will take ownership of interventions and maintain activities over the long term. The participation of various individuals and diverse groups decreases the potential for manipulation by an individual or a group. Participants should include vulnerable populations, elites, women, ethnic minorities, children, business people, rural and urban residents and government and community leaders.

Participants can help relief workers understand the community's values and assist in designing effective and appropriate assistance. For example, if the highest priority of the group is to protect certain assets (for example, cattle) providing food aid may be less effective than establishing emergency cattle vaccination programs or facilitating agreements to end cattle raids. Emergency food aid could be converted to cash or traded for other resources, despite prevailing hunger. Thus, an emphasis on self-reliance and productivity may be more appropriate than a narrow focus on short-term survival of the most vulnerable.

Even in the worst of disasters, people have strengths they draw on and strategies that help them cope. They make trade-offs and other decisions that reflect their awareness of life beyond the emergency. They modify planting practices, initiate inter-household transfers and loans, sell possessions, or send some household members to other areas for employment. Understanding the local coping strategies can enable relief workers to provide appropriate assistance in a timely manner.

Where circumstances permit, requiring villagers to contribute to relief by providing local materials or labor helps ensure that local priorities are met. In Somalia, for example, a community that wanted a well agreed to dig the first 10 meters if a donor provided "Food for Work" for the rest of the well digging workers.

2.4.2 Enhance Local Capacity

The key to self-sufficiency is building local capacity by assisting individuals and communities to strengthen their ability to prevent and mitigate emergencies. Essentially, crises become disasters when individuals and communities no longer have the capacity to prepare or respond to them. For example, when communities are repeatedly threatened by emergencies, they often organize to respond, creating herders associations or informal cooperatives to help manage risk. Capacity building can strengthen the community's ability to handle risk or restore its ability to cope when it has been weakened.

Effective capacity building is local empowerment. It involves complementing existing knowledge and ability with resources brought in from the outside. For relief workers, the challenge is to determine what groups should be strengthened and how. Both formal and informal groups merit consideration, including government-based organizations, community health committees, traditional healers, pastoral associations, and women's committees. In emergency responses, the potential contribution of local groups is routinely overlooked. By working with local groups and their members, relief workers can strengthen civil society, enhance accountability, and improve ongoing responses to emergency situations. In addition, working with local groups avoids creating a parallel system of service delivery that is unlikely to be sustained.

2.4.3 Minimize Migration-Caused Stress

In fostering self-sufficiency and productivity, timing is critical to help vulnerable populations retain essential assets and limit the need for irreversible decisions. As emergency situations worsen, families sell valuables and sacrifice productive resources (animals, seeds, tools, household goods). Eventually, they abandon their homes and migrate. Nomadic households depart from normal migration routes and travel to towns in search of food, water and health services. Thus, as situations worsen, families take actions that make it progressively more difficult for them to return to their normal livelihoods. Out-migration undermines the productivity and self-sufficiency of communities, whether they are subject to out-migration or in-migration. Out-migration reduces the quantity and quality of labor available in a community. In-migration may be an unwelcome burden, fueling cultural or ethnic conflicts or depressing wages in labor markets. Male out-migration can disrupt the access of families to resources, such as water rights or credit, because the recognized head of household is not present. Migrants themselves often move into conditions of extreme poverty and experience high rates of morbidity and mortality.

Most potential migrants weigh the benefits and costs of alternative options (staying versus leaving, leaving for one location versus another, everybody leaving or only one or a few members leaving). Interventions to discourage migration or provide relief to migrants must reflect the dynamics of migration and address its benefits and costs. For example, providing urban migrants with emergency food aid may increase the benefits of migrating, encourage further migration, and discourage repatriation. Initially, relief operations may be essential to assist vulnerable, displaced populations, but relief workers need to remain alert to the long-term consequences of providing assistance and should make changes to discourage dependency and encourage self-sufficiency. In situations of involuntary migration, migrants are extremely vulnerable, especially if they have been forced to abandon rather than sell their assets. Immediate survival needs (food, water, shelter, sanitation) are paramount.

2.4.4 Incorporate Gender Perspectives

Complex emergencies and natural disasters have differential effects on men, women, adolescents and children, according to a wide variety of variables, including socio-economic status, religion, ethnicity, and health. The roles of women and children often expand during crises in which men have been displaced or killed. In most parts of Africa, for example, women are the major agricultural producers. Providing them with land, credit, seeds and tools, and training them in improved production methods, can help ease the dependency on food aid. At the same time, care must be taken not to overburden women with additional tasks, further damaging their health and well-being.

Interventions should seek to address the concerns of all gender categories at an early stage in the design of a program. Experience has demonstrated that when certain groups are selected for assistance, others in the community often feel neglected or discriminated against, thus endangering the success of the activities. Relief workers should encourage the participation of all members of the community, in particular marginalized groups such as the elderly, the widowed and the handicapped.

2.4.5 Use Market Channels

Using markets to deliver relief assistance can contribute to self-sufficiency and productivity. Markets are areas of economic activity in which buyers and sellers come together and the forces of supply and demand affect prices. Markets include the exchange of goods and services through cash sales in local open-air markets and through barter transactions. Even when relief supplies are given away, related market activities can stimulate economic activity. In southern Sudan, for example, an intervention supplied seeds and tools to help increase agricultural production, and then established barter shops where residents could exchange surplus production for blankets, cloth, salt and other necessities. The barter shops enabled the regeneration of economic activity in the area.

Active local markets help keep transportation networks open, encourage farmers to produce above minimum subsistence levels, and provide sources of both food and non-food items. Thus, markets have the potential to support a community's capacity to maintain a certain level of productivity. When the relief community ignores markets, individuals with resources and market power may pursue alternative exploitative economic strategies. Relief can

counteract the negative aspects of exploitative markets and increase competition. Monitoring market activities and market behavior of intended beneficiaries can provide valuable planning information. The sale of relief items may indicate a desperate need for cash or a pressing need for something not readily available.

2.4.6 Understand the Sociocultural Context

Each culture is unique and requires analysis within the context of the disaster. Many different factors define who is vulnerable during an emergency, but the specific factors vary from one context to another. Understanding the sociocultural context helps determine who is vulnerable and who may become more self-sufficient and productive with appropriate assistance.

The sociocultural context helps draw attention to the interconnectedness of various sectors and how change in one sector can impact another. For example, constructing boreholes to alleviate drought can decrease the mobility of pastoralists and contribute to environmental damage as they continuously graze their herds near the boreholes. Awareness of the connectivity between change in one sector and change in another sector, and how they impact each other can lead to complementary interventions that address more than one sector simultaneously.

2.4.7 Consider Environmental Impacts

In both natural disasters and conflict situations, the natural environment is often damaged. To foster self-sufficiency and productivity in the long run, the natural resource base must be conserved. If damage is already extensive, interventions may be needed to address deforestation, erosion, soil depletion, or other changes that affect future productivity. Where refugee camps are changing the local environment, various interventions can be used to reduce the burden of population pressure and enhance productivity.

In planning interventions involving refugees, the impact on the environment deserves close attention. For example, relocating people on marginal land may cause extensive environmental damage in the short run and may not be sustainable in the long run. Government ministries and local environmental experts may have detailed information on natural resources (flora, fauna, water resources, climate and topography). This information can assist in planning interventions that minimize damage and build on existing strengths. Some environmental considerations are incorporated into each of the chapters that follow.

2.4.8 Use Financial Management Tools

To foster self-sufficiency and productivity, relief workers must consider the future as well as the present. Financial management tools, such as cost-benefit analysis, can help in comparing intervention options, maximizing the effectiveness of limited resources, and recognizing both the positive and negative consequences of emergency interventions.

Experience in the Horn of Africa illustrates the importance of assessing the relative costs and benefits of saving lives or saving livelihoods in an area with a high probability of recurring disaster. In Somalia, Sudan and Ethiopia, many pastoralists who lost their livestock in

the drought of 1985-1986 had not recovered their herds ten years later. Community efforts to rebuild livestock herds were underway, but the animals had been wiped out by the 1991 drought. In retrospect, immediate sustainable livestock interventions might have been a cost-effective addition to the free distribution of relief items.

Even in the midst of a disaster, people can be assisted in ways that foster self-sufficiency and productivity, and reduce the likelihood of ongoing dependency. Subsequent chapters return to this theme as they address specific types of interventions.

3. SEED SYSTEM INTERVENTIONS

The main goals of seed system interventions are to prevent food shortages by enabling a population to grow food and to decrease emergency costs incurred through the provision food aid. While food security has long been defined within the context of three components – availability, access, and utilization – seed security has only recently been approached in a similar manner. Practitioners of seed interventions are starting to understand the roles that each of these components plays in agricultural recovery following a crisis and to use this understanding to target interventions accordingly.

Seed availability refers to the seed supply within the affected district, region, or community. It is described according to the desired type, quantity and quality of seed or planting material[1] available, as well as where and when it can be obtained. Availability may refer both to the farmer seed system and to the commercial seed sector. Commercial seed systems may consist of agricultural research that releases new varieties, seed multiplication schemes, seed processing activities, and market promotion and distribution methods. While seeds are often distributed through informal farmer-to-farmer networks, there is also a commercial seed system supported by governments, organizations, private companies, and international research institutes.

In almost all regions of the world, each year farmers retain seed from their harvests, carefully selecting the grains that they believe have desirable characteristics. In addition to saving seed, some farmers purchase all or part of their seed on the market, either to supplement their own supply or to add diversity to their seed selection. Other methods of obtaining seed include seed exchanges, gifts, and loans. Farmer seed systems vary somewhat from place to place, but they are resilient and often preferred by farmers. In Kenya, for example, farmers prefer traditional maize to hybrid maize because they cannot afford to renew stocks of hybrid maize annually. With traditional maize, they can save seed from year to year and be self-reliant.

Seed availability is often a factor following a long-term drought or a sudden-onset disaster. In these cases, both stored and planted seeds may be destroyed or lost, leaving farmers without seed to plant, and without the ability to obtain new seed through traditional farmer seed systems. In these cases, seed distributions may be an appropriate intervention.

Seed access refers to the ability of farmers to acquire the seed or planting material that is available. In some cases, seed may be readily available on local markets, but subsistence farmers are either unable to purchase the needed seed, or may not be able to physically reach the area where seed can be obtained. Lack of access to seeds should not be confused with lack of availability, because interventions for lack of access are very different from those for lack of availability. Treating access problems with seed distributions may actually cause more harm than good, since local farmers rely on market sales to maintain their livelihoods.

In many crisis situations, access will be limited to only a certain portion of the

[1] Planting material includes seeds, tubers, cuttings, or any part of a crop used for regenerative purposes.

population. As seed prices go up, the purchasing power will be reduced for many people in the community and they will no longer be able to purchase what they need for the season. Interventions should be targeted toward increasing market access for this segment of the community, rather than the community as a whole.

Seed utilization refers to the ability of farmers to make use of seed, once it is accessed. This implies that farmers have the tools, the land, the knowledge, and the physical ability to plant seed. In many situations, this will not be an issue. However, land tenure may play a role, particularly when refugees or IDPs are trying to farm. In addition, tools may be needed following a major crisis, and training may become important in situations where new planting materials are being introduced.

Before making decisions about seed system interventions, especially in complex emergencies, it is important to assess all components of the system, and to understand what problems the community is facing. It is equally important to understand the values, preferences and skills of the communities themselves. For example, during an emergency in southern Sudan, farmers preferred to grow red sorghum because its short height enabled rebels to be seen as they approached. Taller crops were likely to be burned by the army.

Before any intervention is implemented in a region, it is important to determine the origins of seed supply, factors affecting seed security, and how these factors can be dealt with in a sustainable fashion. Perhaps the most important part of this assessment is to distinguish between problems of availability and problems of access before designing a program to address the seed issue. In many cases, the crisis will affect both of these components, but in some cases only one will be affected.

When availability is determined to be the most significant problem faced by a community, seeds are often distributed to local farmers. The most commonly distributed seeds are for cereal crops such as maize, wheat, rice and sorghum. Drought-tolerant roots, tubers, and vegetables may also be distributed; they can be grown close to homes, taking advantage of water recycling. Cassava is useful in drought situations but distribution requires vegetatively propagated materials that may be difficult to obtain because of international trade restrictions. However, cassava is especially useful in conflict situations since the plants can be left in the ground and harvested over a long period of time, allowing farmers to come and go from their fields as security improves or declines.

In some situations, distribution of hand tools may also be appropriate. These tools are low-cost, easy-to-use assets needed for implementation of agricultural activities. The most common tools are cutlass or machete for clearing debris, hoes for weeding and for preparing beds and ridges, rakes for leveling beds, trowels for transporting seedlings, and watering cans. For maximum benefits, tools must be properly designed, used, and maintained. Some tools, for example the adaptable hoe with changeable blades, support multiple garden operations. Tools should not automatically be included in seed distributions; need or tools must always be assessed separately.

3.1 Assessing the Options

Seeds and tools interventions merit consideration in continuing emergencies and in

situations where pests, floods or drought have eliminated normal seed supplies, or have completely limited access within a vulnerable community. Even in refugee settings, gardens may help people increase food security and exercise a small measure of self-sufficiency. The feasibility of seeds and tools interventions depends on the stability of the population, the security of land tenure, agro-ecological conditions, labor supply, and timeliness. Success and longer-term sustainability depends on accurately assessing the needs of the community prior to implementing interventions.

3.1.1 Feasibility

Several conditions affect the feasibility of seeds and tools interventions. Perhaps most importantly, farmers must have access to fields for planting, weeding and harvesting during the agricultural cycle. Seeds interventions may be particularly inappropriate in conflict situations, where crops are being destroyed and people are migrating. In addition, if land tenure is in question, promoting land cultivation could create or exacerbate conflict over resources. In order for seed system interventions to have an impact, farmers must feel confident that they will benefit from the crops they grow.

Seed system interventions require a good understanding of the agro-ecological and socio-economic systems of the farming community. This understanding can help determine not only what kind of interventions are needed, but also how to target those interventions. If seed distributions are necessary, an understanding of the agricultural systems can help determine what kind of seeds are needed, what varieties are most appropriate and accepted by the community, and what technologies are familiar to local farmers. Care should be taken to ensure that the tools and methods proposed are not harmful to local land and water resources.

Knowledge of community resources, including labor in the agricultural sector, is crucial. Although women are the primary producers in Africa, they may often have less access to training and agricultural inputs than men. In these cases, it may be important to provide training or extension services targeted toward women, particularly if the community contains a large proportion of female-headed households.

Finally, timely seed interventions are critical. In most countries, the agricultural season presents a short window for planting, so seed must be provided at the appropriate time to be useful. When agriculture relies on seasonal rains, seed distributions will only be successful if the rainfall is timely and appropriate, but seeds must be in farmers' hands at the start of the rainy season in order for these interventions to have an impact. If an agricultural crisis is ongoing, seed distributions may need to be coupled with food distributions so that all of the seeds make it into the ground.

It is important to note that farmers eat their seed only in the direst of circumstances, or if they know that seed distributions will occur prior to planting dates. Even in lean times, farmers retain a portion of their seed to plant, since they are well aware of the consequences in later months if they eat their seeds instead of planting them.

3.1.2 Need

When seeds and tools interventions are feasible, an assessment of need can be undertaken by analyzing responses to the following questions (See OFDA's *Field Operations Guide*, Chapter III for more assessment details.):

Addressing availability:

- Is there a current shortage of seed? If sufficient quantities or appropriate varieties are not available, what are the specific causes? Possible sources of available seeds may include household seed stocks, supplies on the local market, commercial seed sources or national and international research centers.

- What happened to the seed from the most recent harvest? Is grain for sale in local markets? Have households built new grain storage structures recently? Is there after-harvest stubble in the fields? If so, is it of normal size or is it dwarfed, for example by drought? How much land has been left unplanted?

- Was seed provided by an NGO during the previous season and, if so, was it planted? Or did farmers eat the donated seed and plant their own? Did farmers plant their own seed before the donated seed was distributed?

- What is the ratio of seed consumption to propagation, and is the output expected (either from crops in the ground or from available seed) sufficient to cover consumption needs of the community?

Addressing access:

- Is it customary for households to save seed? How was seed acquired for the most recent planting? For previous plantings? Can a seed-saving development activity be implemented to enhance sustainability of seed supply?

- What markets provide local seed sources? Are they being utilized? If seed is available in the area or on the local market, how do prices compare to normal years?

- How does seed get accessed by different groups of farmers, and what are the limiting factors for each group in terms of accessing seed, and what can be built on to improve accessibility? How do farmers find out about good sources of seed or new varieties?

Addressing utilization:

- What hand tools could enhance local productivity? Are they likely to be used as weapons? Were tools distributed for the previous season's planting? If so, what happened to them? What are the local sources of tools? Would training support the creation or improvement of these sources?

- Is training needed? What kind of training? Who should be targeted?

- What other constraints (for example, land tenure, seed storage, soil fertility, erosion, water, post-harvest storage, markets, etc.) merit attention? How can these be addressed?

3.2 Seed System Interventions

The success of a seed system intervention depends on how closely matched the intervention is to the seed problem in the region. For example, interventions that aim at improving access will not meet the needs of communities if availability is the problem. Many practitioners of seed interventions are distinguishing between acute and chronic seed shortages, recognizing that different interventions will be needed in each case. Chronic shortages require both relief assistance to address immediate needs, and development assistance to address the longer-term issues that are leading to recurring seed crises in the region. Acute shortages may be addressed through short-term interventions only, or may require longer-term programs to prevent the system from spiraling into chronic shortages.

If availability is a problem in the region, seed distribution activities may be warranted. The success of a seed distribution activity depends on the availability and accessibility of seed of acceptable quality that is appropriate for the local agrological area. When local supplies are available, a seeds intervention that purchases local seed can facilitate and support indigenous marketing of both traditional and commercial seeds. When local supplies are depleted, however, finding appropriate varieties may be a challenge. National and international research institutes may maintain seed stocks of traditional varieties from the area. Frequently, these seed stocks must be multiplied rapidly to meet cropping deadlines.

If seeds are available to farmers, either on the local market or though traders, interventions should aim to increase access to the seeds, which may be done through a variety of interventions: In some cases, directly addressing the cause of the seed crisis may be appropriate, but in most cases, interventions aimed at directly improving individual farmer access will be more appropriate. Seed distributions are still important in many crisis situations. In these cases, the following recommendations highlight special concerns in organizing distribution activities (See OFDA's *Field Operations Guide*, Chapter II-E, for information on assessing aspects of the agricultural system.):

- Understand both the farmer seed system and the commercial seed system in the country and plan the intervention to support and strengthen existing capabilities. Research existing laws relating to the importation of seeds or vegetatively propagated cultivars.

- Identify seed varieties that are suitable to the agro-ecological area and are known to farmers. If possible, purchase seeds locally for distribution or enable targeted farmers to purchase seeds with vouchers. If seed must be obtained outside the community, contact national and international agricultural research institutes to obtain seed of traditional varieties. With advance planning, farmers may be recruited to multiply seed for sale.

- Assess the costs of seed distribution and options such as vouchers, sales, loans (for in-kind return), or grants. Compare the costs of seed and tool distribution with the costs of other interventions. Include labor, transport and administrative costs in making

comparisons. Local economists can be helpful in conducting assessments of relative costs and benefits.

- If farmers have the resources to purchase seeds, use local markets (traders, local stores) for distribution. Use of local markets enhances the economic benefit and encourages sustainability. To target specific groups, such as farmers with limited purchasing power, use non-governmental organizations, local women's groups or farmer associations to handle seed distribution.

- Identify suitable varieties and include them in any seed packs distributed. Experience suggests that farmers in famine-prone areas are eager to experiment with short-season varieties. When distributing new varieties, make sure they have been tested in a similar agro-ecological area and that cooking and processing quality are compatible with local taste preferences.

- Consider issues of self-reliance in selecting seeds and methods of assistance. For example, in areas of acute or chronic disaster, traditional maize seed promotes risk aversion because farmers can save some of their seed for the next year. In contrast, hybrids have built-in genetic deterioration and stocks must be renewed annually. Open pollinated varieties are almost always preferable in smallholder farmer systems.

- Identify the types of inputs and training needed to increase productivity and build local capacity.

- Ensure that seed is preserved properly and is readily available to farmers at planting time.

- In refugee situations, clarify land tenure issues before distributing seeds or encouraging refugees to plant them. If land cultivation implies tenurial rights, local communities and authorities may object to field crops but may agree to vegetable gardens.

- Ensure that new methods or tools do not cause long-term damage to the environment.

In the cultivation of field and garden crops, the vast majority of smallholder farmers use hand-made tools produced locally. The following recommendations highlight areas of special concern in planning for tool distribution:

- Identify tools that are needed and suitable for the agro-ecological area and the growing crops. Locate places in the country or region where they can be purchased.

- If farmers have the resources to purchase tools, use local markets (traders, local stores) for distribution. To target specific groups without purchasing power, distribute tools through organizations or local groups, and combine with seed distribution.

- Combine tool distribution with training in proper use and maintenance, if needed.

- Encourage the use of readily available local materials for the manufacture and repair of tools. Strengthen local skills development, for example, in blacksmithing or carpentry.

- Be aware that in conflict situations tools may also be used as weapons.

3.3 Case Study: Emergency Seed Vouchers and Farm Tools in Uganda

Northern Uganda has experienced severe hardship for years because of insurgency and unrest. In the early months of 2000, an additional incursion threatened people in the area. Nomadic tribesmen from neighboring districts arrived in search of pasture and water for their animals. Their normal migration turned violent when small groups of armed tribesmen started looting, killing and raping. As violence escalated, thousands of residents fled. Some families left everything behind—valuables, seeds, harvests and livestock.

The Government of Uganda requested assistance from the United Nations and other donors to help displaced families with shelter, clothing and household items. Families obtained immediate assistance, but when hostilities subsided and they were able to return to their farms, they needed to reestablish the farming systems that provided their livelihoods.

Advance planning enabled OFDA and its implementing partner, to help families in two districts obtain seeds and tools quickly because the rainy season had already begun. The intervention illustrates how a seed program can be designed to reinforce development objectives and support existing networks of seed sellers and suppliers in the local economy.

The **intervention** provided families with farm tools and vouchers for the purchase of seed. Instead of purchasing commercial seed and distributing it to farm families, the program distributed vouchers that could be redeemed from certified sellers in the local trading area. With vouchers, farmers were able to buy the commercial or traditional seed of their choice in the crops and varieties they preferred.

The intervention was based on an assessment that showed lack of access to seed (not lack of availability) to be the main problem. Beneficiaries redeemed their vouchers for seed at seed fairs or special market days. About 12,000 families accessed over 200 metric tons of seed of 10 different crops and 30 different varieties.

The intervention responded to an emergency situation while providing assistance to enable families to rebuild their livelihoods. The tools were essential to their farming activities. The vouchers helped families obtain the seeds they needed to plant their fields. Advance planning enabled families to receive both tools and vouchers after they returned home and in time to plant.

The intervention was market-oriented and strengthened local seed systems. It built on local market capacities without disrupting regular marketing activities. Both farmers and traders were empowered to organize procurement, transport, marketing, and purchase of seed. Seed fairs facilitated interaction between seed sellers and farmers, enabling both traditional and commercial seed sellers to market their seeds and helping large numbers of farm families to access the seed they needed. Almost 50 percent of the participating grain traders were women.

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Assistance met short-term needs and supported long-term sustainability. The use of vouchers enabled farmers to access the seed of preferred crops and varieties. They were able to examine the seed themselves and choose seeds of acceptable quality. Since families were not able to return to their farms until the middle of the rainy season, they chose the seed of crops and varieties that are traditionally planted late.

The assistance was timely and cost effective. Vouchers were simple to implement, monitor and evaluate. They eliminated the costs of procuring large quantities of seed. Further, they reduced significantly the need for transportation and the costs of moving relief supplies in an insecure area. Vouchers allow flexibility, so that if security concerns had delayed their use, money reserved to reimburse seed traders (for redeemed vouchers) would have been available to purchase local grain and food for displaced families. In northern Uganda, vouchers were printed and distributed at the same time as the farm tools. Both the voucher system and seed fairs were planned and implemented in a short period of time.

In a similar program to assist Kenyan farmers suffering from the effects of drought, OFDA's implementing partner was able to target farm families, distribute vouchers, inform grain traders, and organize and implement seed fairs within a three-week period. In contrast, many relief agencies that ordered from commercial seed companies failed to receive the seed in time for planting.

Lessons Learned:

- How can the exchange of vouchers for seeds be supervised? In northern Uganda, agricultural extension agents held sensitization sessions with local officials in areas where vouchers were being distributed to make sure they understood the voucher system and related issues. Nevertheless, there were instances of voucher holders being coerced by traders. In other countries, traders have cheated illiterate voucher holders.

- Can vouchers be used also to help families obtain farm tools? Traders know how to obtain seed in adequate supplies and in a timely manner. Would it be possible to use local sellers and markets to procure, transport and redeem vouchers for farm tools?

- Is the local seed of adequate quality? Seed quality consists of physical, physiological and genetic quality. Farmers' opinions of seed quality often differ from those of commercial seed companies and seed registration authorities. Experience in Uganda suggests that farmers prefer crops that they know and varieties that meet their preferences in terms of color and taste. The physical quality and varietal purity of commercial seed is high, but these traits are often less desirable than the known qualities of local seed.

- In prolonged or recurrent disasters, how can seeds or vouchers be used without creating dependencies? In parts of Kenya, where farmers received seed aid several times during the past decade, their comments suggest that they have come to expect emergency aid on a continued basis.

- Since vouchers depend on the capacity of the farmer seed system, how can that capacity be assessed? In Uganda, relief workers knew seed was available locally, but in other locations, obtaining accurate information about farmer seed systems may be difficult. In a recent Kenyan study, farmers had differing views on the usefulness and acceptability of vouchers. For example, in some areas, farmers preferred seed distribution so they could obtain hybrid maize and other crops and varieties that were difficult or expensive to access locally. In other areas, the preference for local maize persevered despite vigorous and prolonged government efforts to promote hybrids.

- How can relief workers determine the risks and benefits of using the farmer seed system instead of the formal seed system or some combination of the two systems? The work of seed companies, procurement agencies and transporters is well understood and trusted; their companies have a vested interest in the ongoing use of the formal seed system. By comparison, relief agencies may have little information about farmer seed systems and little time in which to obtain information for confident decision-making.

- Commercial seed is often assumed to be of higher quality than farmer seed because its quality is regulated and it offers new varieties derived from research and development. But farmer seed systems can also be of high quality. Farmers select and save superior seeds, based on years of experience. They use informal networks (social capital) and assets (cash, livestock) to procure seeds. They share seed information locally and know what seeds have high potential in their area. More refined methods are needed for analyzing seed system farmers, commercial interests and those that aim to integrate the two.

3.4 Case Study: Seed Fairs in Tanzania

During 2000, a severe drought occurred in the Lake Zone and Arusha Region of Tanzania. Having suffered through four previous years of delayed and erratic rains, many farming households were ill prepared to cope with further drought. Communities in the region requested food assistance.

In the traditional emergency response, donors purchase and distribute relief commodities (food, non-food items, seeds and tools) to affected communities. OFDA's implementing partner proposed a new approach to the communities—to empower them to access what they needed from within their respective communities. The intervention shows how a relief program can be designed to reinforce development objectives.

The **intervention** provided vouchers to vulnerable households to enable them to buy seed at special seed fairs organized in their respective communities. Local farmers and seed vendors brought their best seeds to the fair. Voucher recipients bought the seed of their choice; seed that was suitable for their farms and for the nutritional and economic needs of their families. Each household received six vouchers, valued at about $1.80 each. Voucher recipients were free to negotiate prices with vendors. Thus, one voucher could buy from one kilogram of certified seed to up to five kilograms of local seed.

In preparation for the intervention, project

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staff conducted surveys of seed availability in three project locations to determine the availability of seeds. They held sensitization meetings to inform partners, village relief committees, agricultural extension staff, and potential seed suppliers about the voucher system and how it would work. Local village relief committees identified households to receive vouchers, using democratic and transparent guidelines that selected the most needy households in village public meetings.

Vouchers were designed in the form of a check, with space for the name of the recipient, his or her village, the name of the seed vendor and the type and quantity of seeds bought. The village relief committees delivered them to beneficiaries the morning of the fair. Recipients inspected the types and qualities of seed offered by vendors at the fair, negotiated the prices of the seeds they wanted to buy, and used vouchers to pay for them.

The intervention met short-term emergency needs and supported long-term goals of strengthening local seed marketing. Even after four years of drought, large amounts of seed were available locally. About 57 percent of the seeds purchased by voucher holders were local; the remaining seeds were certified. The intervention demonstrated the resilience of traditional seed systems. It helped communities discover their internal survival mechanisms and recognize that seeds do not have to come from outside the community.

The intervention was timely and efficient. Seed fairs met the seed requirements of a large number of vulnerable households. At 30 seed fairs, almost 14,000 voucher recipients bought seeds from more than 400 seed vendors. Seed fairs were simple to administer because the moving of seed and its marketing were handled by farmers and seed vendors. Project organizers assumed that farmers would purchase relatively expensive certified seeds. Since many voucher recipients preferred traditional seed, which was less expensive, they were able to buy many more seeds than anticipated.

Assistance empowered beneficiaries and stimulated the local economy. In two communities where other donors distributed seeds, farmers expressed a preference for the voucher system because it enabled them to access seeds of their choice. The voucher system injected money into the local village economy (rather than placing it with outside agencies), thus stimulating local businesses by putting the extra cash into circulation.

Lessons Learned:

- How can relief agencies ensure that village relief committees, voucher holders and seed vendors understand the voucher system and seed fairs? In Tanzania, some fairs were organized hastily, without adequate sensitization. In retrospect, organizers believed that sensitization should have started about a month before the planting season and should have included opportunities for participants to ask questions and make suggestions. Lacking adequate information, some committees hindered the proper identification of voucher recipients and the monitoring of seed fair exercises. Adequate advertising of

the seed fairs might have increased the amount of seed available and the participation of women sellers of seed.

- How can the exchange of vouchers for seeds be supervised? Some voucher holders, especially those who were illiterate, did not understand the value of the voucher and the possibilities for negotiation. Some seed vendors took advantage of their lack of knowledge and overcharged them.

- What is the optimum denomination for vouchers? In Tanzania, the value of each voucher was too high because it exceeded the needs of some of the poor households. Some participants wanted to negotiate smaller quantities of different seeds. Also, not all seeds were planted. Some voucher recipients confirmed that they ate some of the seeds obtained at the seed fair because they were hungry.

- How can communities be encouraged to organize their own seed fairs to meet local needs in normal times and when there is an emergency? The seed fairs in Tanzania were one-shot emergency projects, but the prevalence of traditional seed in the communities suggests that communities have the capacity to meet many of their own needs. Seed fairs could be broadened to include other agricultural inputs such as tools, small machines, small stock and agrochemicals.

3.5 References

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3.6 Technical Information Requirements

Proposals should reflect the USAID/OFDA mandate and address gender issues, propose mitigation interventions when applicable, provide linkages to other sectoral activities, discuss sustainability and transition to reconstruction and development, and present evaluation and monitoring plans. In addition to these common elements, the technical information below is suggested as a minimum requirement for all sector specific proposals submitted for USAID/OFDA.

Program Rationale

- Describe your rationale for the seed needs as determined by a seed assessment, whether seed needs are related to availability or to access, and how the proposed activity will affect the ability of people to obtain seeds. If seeds are to be distributed, describe distribution effects on local markets and seeds sourcing. Strong justification should be provided for non-local seed purchases, and for purchase of any grain that is not open-pollinated.

- Describe the normal context of agriculture in this region, how is agriculture commonly done in this area when it is not in crisis/disaster, what livelihood opportunities are potentially available as part of the agricultural activities, normal market dynamics, contextual market trends in the affected area(s); and whether this project will interfere with the normal functioning of the market or reduce incentive for production.

- Crop varieties should be appropriate to the climate and the needs of the population, i.e. grown, known, and accepted by the beneficiaries. Crops can include roots and tubers, short-cycle crops, should be disease-resistance where appropriate, and nutritionally well balanced.

- Discuss the rationale for the utilization of fertilizer, applications, training, and program impact. OFDA does not fund the purchase of fertilizers, but fertilizer can be utilized in the implementation of USAID/OFDA programs.

Proposal Framework

- Address the major limiting factors to productivity (or storage) in the region. Describe linkages between the project and broader political, social, and economic issues. Describe technical staffing needs, including the number of trained agronomists.

- Discuss the program's plans to target and preserve assets at the household level, how the intended outcome serves to strengthen existing capabilities and reinforces coping mechanisms, and plans to strengthen local capacity.

- Describe the decision-making process in identifying the proposed actions, and who participated in the process. Discuss local tribal and/or national government support, and how the proposal accommodates those who are most vulnerable.

- Address safety and security issues for the proposed available land; describe how beneficiaries are selected, how land is allocated to each farmer, and any land right issues that might arise. Describe how much land is available for each farmer, how far

the land is from their homes, whether the land/seed combinations will produce enough to feed a family, and if not, how will the shortfall in productivity be supplemented. Describe how the existing land tenure system encourages soil conservation and management, and address any health risks associated with the planting of the land.

Program Description

- Explain how seed distributions will be implemented, whether local systems for obtaining seed currently exist, and/or if there is a need for them to be circumvented.

4. LIVESTOCK AND FISHERIES

LIVESTOCK

Livestock — including camels, cattle, goats, sheep and fowl— are an important component of agricultural economies. They provide meat, milk, manure, traction, transport, fuel, skins, hides, and other products. When emergencies occur, livestock productivity decreases and animals can be lost. When conditions improve, livestock are important assets in helping people to recover nutritionally and economically. In times of insecurity, when local populations are displaced, livestock can enable families to retain some stability; families maintain some food security by taking the animals with them when they move.

Livestock systems vary depending on whether they are part of pastoral lifestyles (nomadic or semi-nomadic) or mixed farming systems. In pastoral systems, populations derive most of their food and income from livestock. Pastoralists usually live in arid or semi-arid areas or mountainous regions where crop production is difficult, and the availability and distribution of forage varies seasonally, depending on precipitation. Pastoralists cope with this variability by migrating with their herds and using other strategies to maintain productivity. Livestock production is critical to pastoral economies as they have few economically viable alternatives. But the pastoralist environment has changed drastically in the past century as land has been removed from pastoral production for other uses such as agriculture, forestry and tourism.

Mixed farming systems include both livestock and crops, and are either sedentary or agro-pastoral (livestock spend a portion of the year in distant grazing areas while crops are produced close to home). Livestock and crop production complement each other and provide many advantages over crops alone by reducing risk and increasing productivity. Animals can graze on crop residues that would otherwise be wasted. They provide manure to fertilize the soil and improve the soil structure. Livestock can survive a short, dry spell, ensuring food security when crops fail.

In both pastoral and mixed farming systems, livestock owners adopt practices that promote food security and reduce risk. Some animals may be placed with other families to avoid total loss from disease or disaster. Keeping different species (e.g. cattle, sheep and goats) reduces the risk of disease and uses grazing resources more efficiently than keeping only one species. Pastoralists with large herds often split their herds into smaller groups, each tended by a different family member, to more rationally use grazing resources and to reduce the risk of loss from theft, disease, or disaster.

Livestock offer a multitude of benefits to both pastoral families and families engaged in mixed farming. They provide high protein foods (milk, meat, eggs) for the household and for cash income. Funds from the sale of milk, eggs and poultry generate income for frequent purchases, such as salt, oil, fresh vegetables, school fees and animal health care. Infrequent sales of large animals provide funds for major purchases. Livestock are a productive investment for household capital and are culturally associated with gifts, loans and social obligations. They provide transportation and traction for farm activities. They also provide such non-food products as skins and hides.

In emergency situations, conflicts arise when refugees with livestock compete for

reduced forage and water resources, or when moving herds destroy crops. Often, livestock are slaughtered to generate income, or stolen by soldiers or other hungry people. Animal mortality from malnutrition increases when fodder is insufficient or inappropriate. When herds mix at watering points, local endemic diseases increase, and weakened animals with low resistance succumb. Livestock losses can be enormous. For example, livestock production is a cornerstone of the Afghan economy and household livelihoods. Historically, livestock has provided up to 40 percent of Afghanistan's export earnings. Ravaged by conflict and protracted drought, cattle, sheep and goat populations are estimated to have now fallen as low as 40 percent of their 1988 levels. Increased movement of animal flocks within the country and across neighboring borders, together with disruptions in veterinary services, increase the risk of disease outbreaks and further animal mortalities. To safeguard Afghanistan's remaining livestock populations, the International Center for Agricultural Research in Dry Areas (ICARDA)-led consortium is purchasing vaccines against Rinderpest, Peste de Petits Ruminants (PPR), sheep pox, and anthrax. They procure antihelminthics and support delivery of these and other vital animal health services through community-based animal health networks.

Livestock losses can reduce income and food security for five years or more while flocks and herds are being restocked. If emergencies continue, as in conflict situations, losses may be so severe that recovering herds is not a viable option. People lose their livelihoods completely as animals die or are sold on local markets, and households become increasingly vulnerable. Destitution is becoming more common among livestock owners as livelihoods are lost.

4.1 Assessing the Options

Assessing options for livestock interventions requires an understanding of the role of livestock in local production systems and an evaluation of the need to preserve the nutritional and economic benefits of livestock resources. Knowledge about the severity and distribution of the emergency is important in order to identify target regions. Monitoring the climate and other conditions is helpful because situations may change rapidly.

In pastoral economies where few alternatives to livestock production exist, interventions generally revolve around attempts to support traditional coping mechanisms, develop alternatives, and strengthen and build livelihoods and local capacity.

Extensive information on livestock in pastoral groups and mixed farming systems is available from specialists, libraries and resource centers, such as the International Livestock Research Institute (ILRI). This existing knowledge can provide valuable insights into what interventions may be appropriate. A quick participatory appraisal of local conditions and a few conversations with local people may add to these insights. Community dialogue is valuable to ensure that appropriate community members are involved in the intervention and that people are empowered and willing to cooperate in any intervention under consideration.

In general, a livestock intervention should reflect knowledge of the following:

- The priority ranking of sectors requiring assistance. This should be determined by holding community dialogues and participatory appraisals with a cross-section of the target community.

- Local uses of livestock and the economic and cultural implications of these roles.
- The variety of gender roles and responsibilities in livestock management.
- The extent to which livestock contribute to household food intake at different times of the year.
- The importance of livestock as a source of household income.
- The levels of livestock losses that are acceptable while still maintaining viable herds or flocks.
- Livestock price changes in recent months.
- The level of market access held by livestock owners and the ability of these owners to off-take animals from herds in difficult times.
- The feed availability for animals.
- The carrying capacity of the local rangelands and water sources. (**Note**: carrying capacity may have little relevance in pastoral systems that use mobility, herd dispersion, species diversity and other strategies to make the best use of carrying capacity.)
- The relevant laws. For example, Kenyan law stipulates that before slaughter, public health technicians or veterinarians must examine livestock intended for public consumption. Thus, in Kenya, a destocking intervention requires the involvement of relevant public health officers.

In emergency situations, answering the following questions may be useful:

- What is the estimated duration and severity of the emergency? For example, the second year of a drought in a pastoral economy is generally far more devastating than the first and can cause almost total collapse of the economy.
- What are the potential livestock losses? What is the estimated length of time needed to rebuild the pastoral economy?
- What is the nature and complexity of the emergency and its effect on livestock movements and marketing?
- What problems do livestock owners identify? What actions have they taken to preserve or sell livestock assets? Is movement of livestock being considered? If so, where are the livestock movement corridors?
- How will livestock needs be supported? What are the costs and time involved for donors in organizing and administering particular interventions? Consult a local economist for assistance in assessing costs and benefits.

- How will livestock interventions influence other interventions and vice versa? What are the potential effects of livestock interventions? Has there been success with similar interventions in the past?

Since livestock have a life cycle spanning multiple years, losses during an emergency situation represent disruptions in both present and future income. Thus, interventions must respond to current needs, while simultaneously addressing long-term opportunities to preserve and enhance livestock assets.

4.2 Livestock Interventions

In emergency situations, livestock owners must make difficult choices. Some of those choices are:

- Move the livestock to another area
- Manage the best they can by selling some stock and hoping that some remaining animals survive
- Buy supplemental feed for the most valuable animals
- Seek preventive animal health and therapeutic care

Which actions should a livestock intervention support? The answer depends on the situation. An intervention must be tailored to the local context, taking into account people, crops, livestock, the natural resource base, and the interrelationships among these factors. Effective solutions require interdisciplinary approaches. Even within a pastoral community, households may be diverse in terms of livestock, available labor, gender responsibilities, alternative income sources and social networks. Interventions should address these differences at the household level.

Livestock interventions are designed to help people who are struggling to maintain or rebuild their livestock populations. In times of crisis, interventions include the provision of supplemental feed, assistance with livestock marketing at the onset of the crisis, veterinary assistance to improve animal health, and perhaps restocking of animals that were lost or sold. Households that have lost their livestock and livelihoods may be located in and around urban areas. Adults can be provided with training in alternative skills for urban employment.

Complicating any livestock intervention effort is the perception that livestock are competing with people for local resources. Although human lives are judged more important than farm animals' lives, livestock are still a vital resource. In fact, pastoralists may occasionally place animal needs above human ones to ensure the economic future of their families. If they sell livestock in times of drought, pastoralists may be unable to re-establish themselves financially after the drought.

The following are some recent interventions that have met with success. The following recommendations highlight areas of special concern in designing livestock interventions:

- Plan an intervention early, engaging the participation of livestock owners and seeking agreement on the nature of the problem and its level of priority. Participation requires that adequate time be scheduled to carry out community dialogue, build capacity, and come to agreement on local responsibilities. Engage existing pastoralist membership organizations (which can be numerous).

- Exercise caution with restocking interventions. Restocking is usually an option that is not taken seriously by beneficiaries, as animals rarely remain with intended beneficiaries for long. Restocking proposals should include three types of supportive information: a detailed analysis of traditional restocking mechanisms; data on the extent to which the mechanisms are still functioning; and, sound reasons why these mechanisms should be minimized or supported. Targeting and environmental issues are extremely important to consider in designing a restocking intervention.

- Ensure that livestock interventions support (or at least do not subvert) existing systems and will enable the beneficiaries to carry on when the assistance ceases.

- Focus on sustaining a key nucleus of animals rather than whole herds. Recovering rangelands will be able to support only small populations of livestock. In the Sahel, severe droughts are frequent occurrences and can actually help maintain a balance between livestock, people and range resources. Relief activities should avoid upsetting this balance.

- Identify and support the roles and decision-making capacities of women as livestock owners, milkers, care providers, forage and water gatherers and birth attendants.

- In relief situations, explore options to move people and livestock out of drought areas. Research alternative sites very carefully. If most populations in the new area are unsupportive or belong to a different ethnic group, the option may be unworkable.

- In livestock health interventions, make use of existing veterinary knowledge and successful community-based delivery systems, including perception of diseases, traditional treatments (if they are considered effective) and traditional healers.

- Keep in mind that during droughts, livestock mortalities are frequently due to disease and nutritional deficiencies. If provision of feed is impractical or too expensive, the provision of animal health care can make a large difference in mortality rates of drought-stressed and weakened animals.

- In livestock production interventions, build on existing technologies and avoid importing new technologies, species or breeds.

- Consult local economists for assistance in conducting a cost-benefit analysis to address issues of long-term sustainability and impact on local markets.

- Plan for appropriate and timely phasing out of relief to minimize effects on traditional coping strategies. Relief can undermine existing coping strategies. For example, when famine relief food is distributed at a few central locations, pastoralists respond by

splitting their families so that some members can remain close to the relief food. If relief food continues to be available after the drought, the split in the family may become permanent.

Interventions can be many and varied. If an untested intervention has widespread community support and people are willing to take responsibility for its implementation, give the intervention serious consideration:

- Take steps to promote livestock marketing early in the crisis and encourage pastoralists to reduce their herds to core reproductive stock that will have a better chance of surviving on the limited resources available. Destocking interventions may include meetings to inform herders of the need to reduce herds, mechanisms for purchasing livestock from pastoralists, implementing the slaughter of animals, subsidizing the transport of animals to distant markets, and processing of meat for distribution to relief agencies.

- Where viable private or decentralized animal health systems exist, support them to encourage increased efficiencies and sustainability without dependency. Work with communities to ensure that pastoralists who are economically marginal have access to animal health care. Where animal health systems do not exist and there is a lead-time of at least six months before high livestock mortality rates are expected, establish a community-based animal health care delivery system.

4.3 Case Study: Destocking and Market Intervention in Kenya

As a result of prolonged drought in Kenya during 2000, experts predicted high livestock mortality among pastoralist herds in a number of remote arid districts. Boreholes and shallow wells dried up. Pastures were scarce. Pastoralists moved into new areas and even crossed the international border into Ethiopia in search of water and pastures. Increasing numbers of livestock were vulnerable. Relief workers realized that even when the rains returned, livestock would be vulnerable to disease.

Pastoralists had not sold livestock because prices for livestock were depressed and because markets were lacking in the areas where livestock were located. The intervention illustrates how a relief program can be designed to reinforce development objectives.

The **intervention** offered pastoralists in selected districts a reasonable price for livestock. This market opportunity to destock provided poor households with access to cash through the sale of weakened animals. In general, households were invited to sell one cow/bull or five shoats (less than one year old hog). To stimulate ongoing market activity, the intervention offered transit subsidies to selected women's groups to enable them to transport shoats to Nairobi for sale.

The intervention provided emergency relief and reinforced long-term development. Destocking salvaged some

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value from animals that would otherwise have been lost. Cash from livestock sales enabled poor families to pay for water, food, and other necessities. Purchased animals were examined by meat inspectors (as required by law) and then slaughtered to obtain meat. The meat (fresh or dried) was distributed to local relief programs, schools and hospitals, providing a cheap source of protein to the rations being given to hungry people. Thus, the intervention supplemented emergency relief while helping families to maintain livelihoods. Transit subsidies assisted active women's groups to participate in livestock trading and improve their skills and earning opportunities.

The intervention stimulated market development in the region. The assistance addressed a major problem for long-term development—the lack of markets in pastoralist areas. When about 50 women's groups used the transport subsidy and contracted to buy shoats for transport to Nairobi, they created markets in areas that previously had no market. Thus, the project brought markets closer to the pastoralists. Available evidence showed that the markets in Nairobi were capable of absorbing increased livestock supply. Communication with traders indicated that the marketing potential in the districts was extensive. Therefore, new traders were contributing to the development of the region and not feeding into or causing conflict. In addition, the use of marketing mechanisms built a foundation for exchange relationships between pastoralists and assistance agencies (as opposed to welfare relationships in relief/food distribution).

Assistance showed that pastoralists were willing to sell their livestock. They did not need to be convinced by community education programs. In all areas of operation, pastoralists offered more animals for sale than the project could purchase. The main problem was availability of markets.

Lessons Learned:

- Assessment of the intervention when it was still in progress raised several issues that remain unresolved.

- How can assistance be supplied without undermining traditional coping mechanisms? During the project, relief agencies learned that pastoralist communities have not implemented traditional destocking mechanisms (slaughtering a cow or camel to survive through hard times) since the early 1980s. The younger generation was not even aware of such systems. Pastoralists have taken advantage of relief provisions rather than use traditional coping strategies. Outside interventions are just one of the influences undermining the role of traditional leaders. Other influences include modern education, exposure to the outside world, conflicts, and government interference.

- How can the unintended effects of interventions be anticipated or prevented? Since there were limitations to how many farm animals could be purchased in each community, the project had the unintended effect of creating a disparity between those who were lucky enough to sell their animals and those who were not.

4.4 Case Study: Livestock Pan African Rinderpest Campaign (PARC) PARC-VAC Project In The Greater Horn of Africa (GHA)

Rinderpest is a cattle disease that can cause up to 90 percent mortality in susceptible herds. In endemic areas, it frequently causes 10 percent mortality sapping the future of pastoral herds by taking most of the young calves. Historically, rinderpest has surfaced in the wake of civil unrest and natural disasters, further exacerbating local conditions. In such difficult environments, traditional veterinary services are often ineffective.

In the early 1980s, the government of Niger earmarked a portion of a grant from USAID/Niger for the development of a thermostable rinderpest vaccine, Thermovax. Thermovax does not require refrigeration to maintain vaccine quality, making it especially suitable for use in remote and insecure areas. The Pan-African Rinderpest Campaign (PARC) used the new vaccine in remote, disaster-prone areas, coordinating vaccination campaigns that by 1995 had confined rinderpest to limited areas of five countries (Chad, Ethiopia, Kenya, Sudan and Uganda). The Organization of African Unity/Interafrican Bureau for Animal Resources (OAU/IBAR) leads PARC with technical assistance from Tufts University.

Production technologies of the vaccine were transferred to five African manufacturers. One manufacturer is Botswana Vaccine Institute, a private-public sector joint venture that provides reliable vaccine of high quality. The African manufacturers ensure the availability of inexpensive local sources of the vaccine and encourage the growth of local markets.

In 1995, PARC initiated a widespread vaccination intervention called PARC-VAC. The intervention focused on low-cost, community-based animal health delivery and the reinforcement of vaccine quality control to ensure that African-based production is sustained. PARC-VAC works with local institutions (including NGOs and PVOs) and the private sector (veterinary pharmacies, for example) to encourage empowerment and responsibility at the community level. The goal is to help communities in their efforts to create sustainable animal health care. PARC-VAC builds on the experience of emergency activities in southern Sudan (now extended to northern Sudan) that were funded by UNICEF, with technical assistance from Tufts University School of Veterinary Medicine. Since 1990, OFDA, primarily through the Famine Mitigation Activity, managed by USDA, has provided support to OAU/IBAR. In addition, a consortium of donors has provided significant funding for program operations.

The purpose of the Participatory Community-Based vaccination and Animal Health Project (PARC-VAC) was to improve pastoral food and economic

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security through the establishment of a private, veterinary-supervised community-based animal health delivery system for the Greater Horn of Africa (GHA). This was accomplished by improving the animal health related legal and policy frameworks in nations of the GHA to create an enabling environment for community-based rinderpest vaccination and animal health care delivery; and by introducing a private sector, veterinary supervised participatory approach to animal health care in pastoral areas of the GHA.

PARC-VAC uses community-based animal health as an entry point not only to empower communities but also for "value added" initiatives that can generally improve social and economic conditions in which pastoralists live. PARC illustrates how ongoing planning in Africa is enabling communities to vaccinate cattle against rinderpest and provide for animal health. It demonstrates the principle that countries can have primary responsibility for their own transition from relief to development.

The **intervention** promoted local responsibility by enabling countries to be active in defining livestock health strategies. Participating countries recognized the importance of livestock to national and regional economies. After initial resistance, national veterinary services participated in developing interventions that were appropriate to the evolving needs of local environments. They helped with mass vaccination campaigns and with assistance to isolated, vulnerable populations. Even in Sudan, which was embroiled in civil war, the intervention worked directly with local authorities and successfully vaccinated over 80 percent of the estimated 4.5 million cattle against rinderpest (1989-94). OAU/IBAR's leadership provided regional and continent-wide guidance to enhance the national program.

Assistance was participatory and included a wide range of actors in the process. By starting at the community level and respecting the local culture, the intervention assisted pastoralists and livestock producers to define their needs and seek sustainable local solutions. Communities chose their own members to be trained as community-based animal health workers. In the beginning, before a community-based approach was used, UNICEF teams undertook the vaccinations, administering an average of 100,000 vaccinations per year. Later, when the community-based approach was introduced, herders trained as animal health workers performed the vaccinations. Thus, the beneficiaries themselves assumed responsibility for vaccinations (except for the procurement of vaccine). Community-based animal health workers now average more than a million vaccinations per year. The intervention strengthened the ability of pastoral communities to address their own needs, and at the same time greatly increased the effectiveness of the program.

The intervention initiated quarterly coordination meetings to bring together PVOs and NGOs (often the community-level implementers), animal disease researchers, government livestock services, and such private sector organizations as pharmaceutical firms. The coordination meetings address such issues as regional trade policies, animal health and disease control, and research agendas. They establish and promote policies that make service delivery easier and assist

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communities to help themselves.

Assistance encouraged communities to pay for their own animal health care and, where possible, incorporated cost recovery into fees charged for drugs. Livestock owners understood the need to have sustainable access to quality primary animal health care and were willing to pay for the services. In most communities, money earned from the sale of drugs is used to replenish stocks through market-oriented, private sector mechanisms and to provide profit for community-based animal health workers. In Sudan, cost recovery has been a component of the program, in preparation for a future without relief assistance. In 1998, drugs in Sudan cost 150 percent of the cost in Nairobi, providing a margin for transportation and profit. Since the Sudanese pound cannot be used to purchase drugs outside the country, surplus funds are being used by communities for development efforts, to support schools or road repair.

Assistance linked development objectives with disaster mitigation. By supporting the transfer of the technology to African institutions, the intervention promoted the long-term availability of the vaccine in Africa. The intervention supported development by promoting the use of the vaccine in vulnerable areas and developing a sustainable community-based method of vaccination. Even communities that are forced to move to new areas are in a better position to recover and survive when their animals can be cared for during the relocation.

The intervention strengthened the ability of communities to provide for their own needs. In Uganda, the intervention even became a catalyst for conflict resolution. In an area where cattle raiding contributed to general insecurity, communities were offered rinderpest vaccination on the condition that the cattle raiding stop. Community leaders on both sides agreed. Thermovax was supplied. Community-based animal health workers were trained. The cattle raiding ceased, at least temporarily.

4.5 References

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FISHERIES

4.6 Fisheries Interventions

Fish provide an extremely important source of income, protein, and micronutrients to populations around the world. During most emergencies, the availability of fish is curtailed, whether through destroyed infrastructure that hinders markets for fish, or through limited access to bodies of water where fish live. Helping fisher folk to reestablish their livelihoods not only improves the lives of their families, but also can provide the wider community with fish (thus a source of protein), and opportunities for multiple economic spin-off activities.

Capture fisheries and fish farming (or aquaculture) are two basic types of fisheries that are relevant to disaster assistance. There exists a wide variability within each of those systems, as well as a range of ecosystems where they take place, including freshwater (cold or warm river, pond, lake), brackish water (estuaries and tidewater areas), and salt water (salt lakes, oceans or seas).

Capture fisheries systems are akin to hunting, where specialized tools–ranging from baskets, boats, and hooks to spears, nets, and harpoons–are employed to catch fish or shellfish. Almost all fishing communities have or had customary laws concerning the management of their aquatic resources. In recent years, the global demand for fish has resulted in severe over-exploitation of both saltwater and freshwater fishing grounds. In some cases, the grounds have been closed by government decree to allow certain species to recover. Pollution, agricultural runoff, the introduction of exotic species, and habitat degradation have diminished fish production around the world. Careful management of capture fisheries systems is necessary to maintain this renewable resource. It is especially important to ensure the survival of a healthy population of brood stock.

Many fishermen and their families are among the poorest in the world, often working in isolated areas far from schools and health facilities. While few women participate in the physical catching of the fish, they often undertake the processing, marketing, and preparation for family consumption, and thus can contribute significantly to their household income through such activities. Once a good market network is established, other spin-off activities are created: bicycle and vehicle transport, supply of fish processing materials, processing of fish by-products such as skins, bladders, and racks (the leftover segment of a filleted fish), cold transport, and storage.

Fish farming or aquaculture systems are more like animal husbandry, where juvenile fish or shellfish are confined in bodies of water until they are of harvestable size. Fish can be raised in ponds, raceways, rice fields, or holding pens, usually in fresh water, while shellfish and crustaceans are cultivated in pens or ponds in salt or brackish waters. Many fish farming operations create enough organic pollution to harm the local ecosystem as well as the species being raised. Great care must be taken to monitor and limit this damage. Similarly, farm-raised species are susceptible to previously polluted waters, to sudden changes in water temperature, and to storm-induced waves and currents. Certain improved commercial species are

particularly susceptible to disease. Non-indigenous species that escape pens or ponds can have serious negative influences on the local ecosystem.

While large-scale production of oysters for pearls, or commercial shrimp production can require significant capital investments, raising fish in small ponds is an enterprise that at its most basic level requires very few, if any, expensive or complicated inputs. Women and children often play important roles in feeding, caring for, and harvesting the fish. Keeping ducks or pigs in cages raised above the ponds can serve to fertilize the ponds, encouraging algal growth that feeds the fish. In warm climates, fish fingerlings can grow to marketable size in six months, providing a quick source of high-quality protein. Households must have access to land near their houses to dig ponds and guard them from human and animal predators.

4.7 Assessing the Options

Assessing options for fisheries interventions requires an understanding of the local fishing ecology and economy in the case of capture fisheries, and of the past performance or potential for aquaculture. For every fisheries or aquaculture initiative, there should be experienced staff with formal training.

In emergency situations, proposals dealing in Capture Fisheries and Aquaculture should address the technical information requirements discussed in sections 4.10.2 and 4.10.3 below.

4.8 Case Study: Post-Typhoon Assistance for Vietnamese Shrimp Farmers

The Mekong River Basin in southeastern Vietnam is a highly productive area that supports capture fisheries, shrimp farming, agriculture, and trade. In 1997, in response to the loss of lives, destroyed houses, lost and damaged boats, and flooded fields from Typhoon Linda, USAID/OFDA's implementing partner provided an integrated response that included food aid, emergency response preparedness, and material assistance to fishermen and fish farmers in the form of nets, boats and long-shafted engines.

The fishermen in the Mekong Basin fish in the river channel and tributaries, the delta, and in the open ocean. The shrimp farmers raise shrimp in long channels cut out of the mangrove forests. Boats are the primary mode of transportation throughout the water network; they transport fresh water to homes, agricultural products to markets, and children to school.

In part because many families in this area do not have access to radios or up-to-date climate information and storm warnings, they did not evacuate the area, and some people died. In particular, those who had been far out to sea were lost with their boats. In collaboration with local authorities, OFDA's implementing partner staff designed an emergency warning system using flags, flares, and radio alerts to encourage people to move to shelters or high ground and secure their assets.

The nets, boats, and engines bought with USAID/OFDA funding were distributed to individuals chosen by committees

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comprised of villagers and local authorities. Priority was given to those who had lost husbands or close relatives on ocean-going fishing vessels, and those who had lost fishing assets in the storm surges and flooding.

A joint evaluation of the program revealed that, for the most part, the assets provided by the project were very well received, highly appreciated, and well taken care of.

In some cases, more training was needed in the maintenance of the boats and engines. Because this equipment is used for many more tasks than just fishing, the positive impacts of the program were even greater than had been originally hoped for. Follow-up studies are needed to determine the longer-term value of both the material assistance and the emergency storm warning system for the vulnerable fisher folk in the Mekong Basin.

4.9 References

The International Center for Living Aquatic Resource Management (ICLARM), also known as the World Fish Center, is a member of the Consultative Group on International Agricultural Research (CGIAR), established to contribute to food security and poverty eradication through the promotion of sustainable development and use of living aquatic resources based on environmentally sound management.

The ICLARM website, http://www.iclarm.org/, describes the various research and applied programs of the center, and lists many publications in the domains of both capture fisheries and aquaculture of all types.

Noble, R.P., *Utilization of On-farm Resources for Aquaculture in Rural Africa*. In: The Third International Symposium on Tilapia in Aquaculture. ICLARM Conference Proceedings 41, ix, pp. 141-151., 1996.

4.10 Technical Information Requirements

Proposals should reflect the USAID/OFDA mandate and address gender issues, propose mitigation interventions when applicable, provide linkages to other sectoral activities, discuss sustainability and transition to reconstruction and development, and present evaluation and monitoring plans. In addition to these common elements, the technical information below is suggested as a minimum requirement for all sector specific proposals submitted for USAID/OFDA.

4.10.1 Livestock

Program Rationale

- Discuss the current levels of livestock loss, the duration and severity of this current emergency, problems identified by livestock owners, recent market fluctuations, actions being taken to preserve or sell livestock assets, and whether the traditional livestock movement corridors are still open.

Proposal Framework

- Describe the decision-making process in identifying the proposed actions, and who participated in the process. Discuss local tribal and/or national government support, and how the proposal accommodates those who are most vulnerable.

Program Description

- Explain how livestock needs can be supported, and discuss the costs/benefits of various interventions. Explain how the proposed intervention might affect the environment and what steps are being taken, if any, to avoid further degradation.

- Discuss market dynamics, any project implications on the normal functioning of the market, and whether incentive for production will be reduced as a result. Include a discussion on the contextual market trends in the affected area(s).

- Discuss the project's plans to target and preserve assets at the household level, how the intended outcome serves to strengthen existing capabilities and reinforce coping mechanisms, and plans to strengthen local capacity.

- Restocking proposals should be supported by a detailed analysis of traditional restocking mechanisms, data on the extent to which they are still functioning, and sound reasons why these mechanisms should be disrupted or supported. In many cases, nature enforces stocking levels by producing only minimal forage – in cases where the stocking rate has been exceeded, can other livelihoods be introduced?

4.10.2 Capture Fisheries

Proposal Framework

- Discuss how local customs or national fishing laws (i.e. mesh size, total allowable catch, protected grounds, species restrictions, vessel and fisherman licensing) will be safeguarded, and how violations will be handled.

- Explain the decision process utilized to minimize any potential displacement of local fisher folk by businessmen or other entities, and address displacement issues. When appropriate, discuss displacement of women fish traders by men.

- The distribution of high-value inputs (such as engines, boats, or large nets) can create severe tensions among individuals and families in communities. Discuss your plans for mitigating these issues.

- Discuss any adverse pressure on the local fish stocks, both in the short and long term. Describe any adverse effects of the proposed fishing gears on other aquatic species (plant or animal), and what monitoring techniques will be used to protect the ecosystem.

- Describe market networks and infrastructure, and their capabilities to absorb the increased catch. Discuss past or current post-harvest fish losses. Discuss what

improvements in transportation, marketing, and fish processing (drying, smoking, salting) have been identified to reduce post-harvest losses.

4.10.3 Aquaculture

Proposal Framework

- Describe the communities' past experience with raising aquatic species in ponds or pens, and any proposed training in appropriate methodologies. Discuss social and gender implications of women and children taking on additional responsibilities for the daily care of the fish.

- Explain land ownership (ownership or user-rights) in reference to the land surrounding the pond, and describe what mechanism will be put into place to protect the species in the ponds/pens from theft.

Program Description

- Provide detailed information on the local soil, its clay content and its ability to retain water for the pond; rainfall/sources of water to maintain a fresh supply; sources of water free of contaminants and pollution to raise healthy stock; potential pollution of local water by the pens, and remedial options. Describe what raw materials will be used to build the ponds; discuss any long-term effects from deforestation, if trees are used to build the ponds. Exotic species should not be used since their potential escape into the local waterways can harm the ecosystem, sometimes causing irreparable damage.

- If pigs or ducks are already being raised locally, raising them in tandem with fish is highly productive.

5. WATER AND SANITATION

Water is a critical resource for people, livestock and crops. Wars or natural disasters can damage water systems or destroy water availability, thus, reduce the supply needed to meet the normal needs of all users. An influx of displaced population may overburden a water system rendering it unable to meet the needs of expanded populations. During a water crisis, people are less likely to wash; gastrointestinal and other diseases may become prevalent and even life threatening.

Water shortages or the disruption of water supplies during an emergency can be dealt with in a variety of ways. Potable water can be supplied by providing hand-dug wells, drilling boreholes, treating surface water, refurbishing/repairing existing wells and urban water systems, cleaning blocked water passages from debris, and trucking potable water (bladders). The rehabilitation of water facilities includes emergency repair of wells or urban water systems, water disinfection, water quality control, and other actions to increase the quantity and quality of potable water.

5.1 Assessing the Options

Water interventions can reduce the adverse effects of shortages caused by conflict or drought and encourage self-sufficiency in addressing future needs. Experience demonstrates the importance of engaging the participation of people most affected by water shortages. In planned interventions, the final responsibility rests at the community level.

Assessing the options for water interventions requires an understanding of the local situation and dialogue with local groups and individuals to establish a participatory framework. Community involvement requires an answer to the following questions:

- What are the existing physical conditions? What conditions existed prior to the emergency? What management and personnel problems existed prior to the emergency?

- What are the water needs for people, livestock and crops? What are the existing water management practices for people, livestock and crops?

- What is the productive capacity of the water source in normal, dry and rainy years?

- Is a water shortage creating emergency conditions? For whom?

- What sources of water exist in the area? What specific problems do people have in gaining access to water? How might water collection and storage be improved? How could agricultural practices be modified to improve conservation?

- What groups are involved in local water resources management? What are their respective roles?

- What water management technologies are being used?

- What human resources are available (skilled and unskilled labor) for water management? Are there water user associations? How do they function? Do men or women dominate the management of water resources?

5.2 Water Interventions

The first goal of water interventions is to save lives. This means providing enough water of acceptable quality to meet daily human requirements (approximately 15 liters per person per day per *The Sphere Project* guidelines), and the establishment of basic hygiene and sanitation measures to prevent the spread of disease. Local communities often view primary health care and hygiene as priority needs. Relevant interventions include public health education campaigns to promote self-help practices in primary health care. Local participation in the planning process is essential.

The second goal is to rehabilitate and improve the water resources management infrastructure and to increase levels of local competence to assure continuing maintenance and development of that infrastructure. This can be accomplished by improving access to existing water (deepening and rehabilitating wells or improving transportation to reduce the time spent fetching water), establishing natural collectors (trees and seasonal water holes), improving the collection and storage of rainwater (repairing and building small dams, cisterns and catchments), and through appropriate training at the local level.

A third goal is conservation, through the modification of water usage patterns by changing crop varieties, cultivating practices or livestock mixes, or reducing herds. Most conservation improvements require few inputs of money or materials, but do require changes in attitudes, behaviors and practices.

Choosing an intervention requires careful assessment of existing conditions and of the available human and material resources to carry out the implementation. The following recommendations highlight areas of special concern in organizing water interventions:

- Plan a participatory intervention, making sure that those affected by water supply problems are involved in the designing and implementing of solutions. Participation is especially important for displaced groups who need useful work and reasons to respond constructively to adverse situations. Find local leaders, including women, who will take the lead.

- Choose interventions that are relatively straight-forward and low-cost, have measurable and broad impact on affected populations and are acceptable to the local community. To have broad impact and be replicable, interventions must be based on existing skills and resources. To be accepted, interventions must have obvious short-term benefits and minimal cost to the community in terms of cash or labor.

- Address the need for sanitation improvements such as the provision of appropriate latrines. Improvements in hygiene-related behavior are an integral part of water interventions.

- Ensure that any new technologies introduced are simple enough to be easily and quickly mastered and, to the extent possible, use locally available materials and labor. Simple technologies can be transferred within and among communities without much need for external assistance.

- Identify and plan for training needs to promote changes in behaviors and practices. Technical training enables local communities to plan, implement, evaluate and manage the practices and infrastructure that assure water security, even in times of drought.

- In emergency situations interventions should be planned around the type of emergency in order to provide immediate relief. Assessments should be done quickly with local participation, and implementation of programs should be short-term.

- Make operation and maintenance plans part of the design to ensure that sustainable technologies are selected and that resources exist for ongoing maintenance.

- Assess recent development history in the area to identify experienced individuals and local organizations to assist in implementing the intervention. Building on existing knowledge and experience saves time and money, avoids repeating inappropriate approaches, and reinforces the community's competence and ability to manage its environment.

5.3 Case Study: Emergency in Southern Africa

In 1991-92, drought conditions prevailed in several African countries. Most of the U.S. assistance focused on food relief. The Food and Agriculture Organization (FAO) reported a cereal crop loss in the range of 60-80 percent. South Africa and Zimbabwe, normally exporters of cereals, had to import cereals. OFDA supported emergency water provision to about 260,000 inhabitants of 900 communities in selected southern provinces of Zimbabwe, Malawi and Zambia, where people lacked potable water because wells had either dried up or were supplying inadequate quantities of potable water as a result of the drought.

The **emergency water intervention** in southern Africa illustrates the principle of designing relief programs to reinforce development objectives. OFDA's implementing partner worked with national, provincial and local governments to rehabilitate existing water resources in the hard-hit southern provinces of Zimbabwe, Malawi and Zambia. The intervention rehabilitated 934 wells and boreholes in the three countries. The aim was to save lives, reduce suffering and the loss of economic and social assets. By providing drinking water, the intervention averted deaths and prevented mass migration. Well deepening provided for continued access to groundwater as the depth to the free water surface receded during the drought, and also provided for some increased storage.

Many traditional wells were hand-dug holes that eroded or collapsed with age.

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Rehabilitation involved stabilizing the top or bottom with masonry and building a low wall or concrete slab for the top, to provide safety and prevent dirt and dung from falling into the well. In other cases, wells were restored only to their original state without building the aprons, drains and fencing needed for environmental hygiene. Sometimes pumps were replaced and spring protection works improved or repaired. Improving traditional wells is an inexpensive means of increasing access to water.

Local community and government structures carried out the emergency response. Communities participated in the relief effort by providing inputs such as labor, sand, stone or gravel. In some villages the labor of skilled masons was available to reduce costs. In Zimbabwe, village water committees designated community members to be trained in the use and maintenance of wells. The social and economic costs were reasonable and the rehabilitation of wells was consistent with acceptable health and environmental considerations. OFDA funding provided pumps and other equipment needed for the rehabilitation. Working with local agencies ensured that post-project maintenance would continue.

In a majority of cases, the reconstruction of wells resulted in an improvement of pre-drought conditions. In others, wells were restored to at least pre-drought levels. Users reported that they were traveling shorter distances to obtain water and spending less time waiting to access it. In many cases the quality of available water was improved. Timely delivery of water allowed inhabitants to devote more time to productive activities. Thus, well rehabilitation helped create a basis for socioeconomic development in the affected areas.

The intervention met immediate needs and built a foundation for mitigating future droughts. Although the intervention focused on providing water to save lives and prevent migration, the rehabilitation and construction of wells provided an ongoing source of water to meet local needs during the current emergency. Activities were designed to go beyond traditional relief (feeding, water, health) and to build a foundation for the future.

During the drought, the lack of potable water reduced the amount of available water needed for hygienic purposes, that resulted in an increased incidence of dysentery, scabies, pellagra, bilharzia, and numerous other diseases. With the provision of potable water, the incidence of these water related diseases declined.

Lessons Learned:

- How can drought planning become a regular part of the strategic planning process in vulnerable countries? The southern African experience suggests the value of ongoing drought planning and pre-planning for emergency food and water assistance in vulnerable countries. Field missions and host governments must be a part of this planning process.

- Attention to slow-onset disasters has generated new policies and program ideas that contribute to better linkages between relief and development. Fostering such linkages

merits careful attention on an ongoing basis.

- What are the standards for rehabilitation and water quality? To what extent should water quality be addressed in an emergency? In some areas, wells were restored to production without improving their protection from animal waste and other environmental contamination. In such a case, water utilized for drinking and cooking should be treated or boiled.

- Protecting the source or treating the water, chlorinating water points after working on them, and testing the water, assure good drinking water quality. Without an analysis of the water quality the nature and gravity of possible contamination is impossible to estimate; untested water cannot be assumed to be potable. The water provided must be potable or improvements in health will not be realized; in extreme cases, health conditions may even be aggravated. It is more important to provide a large quantity of reasonably safe water than a small amount of pure water. Domestic and personal hygiene is critical in the prevention of diarrheal diseases and other "water-washed" diseases. The greater the quantity of reasonably safe water, the more likely that the water will be used for hygiene and cleanliness.

- How can emergency water provision activities be sustained? Installing pumps that use locally available parts enhance sustainability. Also, providing training in the use and maintenance of pumps increases the likelihood that local government or community groups will be able to maintain water structures.

5.4 Case Study: Emergency Water Rehabilitation in Bosnia and Herzegovina

When internally displaced populations and refugees began returning to war-damaged areas of Bosnia and Herzegovina, water and sanitation emergencies were widespread. The water supply infrastructure was damaged in numerous towns and settlements. Untreated sewage flowed into rivers and untreated water from rivers and wells served as the main source of water supply.

The **intervention** focused on towns and settlements where damaged water supply systems threatened public health. OFDA's implementing partner responded rapidly to increase the quality and quantity of potable water. Rehabilitation activities included water disinfection, water quality control, and emergency repair of damaged or destroyed equipment. At one site, mines had to be cleared from the area before rehabilitation began.

The intervention linked relief with development. It was part of a larger effort to repair, rehabilitate, and reconstruct war-damaged homes, apartments, educational facilities, health care facilities and community centers. Emergency assistance supported political stability and ethnic reconciliation by benefiting all residents of the affected communities.

By incorporating community involvement into the identification of need and the provision of in-kind labor, the emergency effort passed ownership of each project to the recipient community and built the capacity of local representatives to plan and implement future rehabilitation projects. Also, by using local companies to contract for the provision of services and by procuring materials locally (when available) the emergency effort generated

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income for the recipient communities and built local providers' capacity to bid on	projects and provide services for future projects.

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5.6 Technical Information Requirements

Proposals should reflect the USAID/OFDA mandate and address gender issues, propose mitigation interventions when applicable, provide linkages to other sectoral activities, discuss sustainability and transition to reconstruction and development, and present evaluation and monitoring plans. In addition to these common elements, the technical information below is suggested as a minimum requirement for all sector specific proposals submitted for USAID/OFDA.

Program Rationale

- Describe the current sources of water for the affected population, the distance to these sources, the available daily quantity of water per capita, and the microbiological quality of the water. Discuss the presence of any chemical contaminants present in the water that have a significant impact on human health, and any recent disease outbreaks in the region. Describe how the proposal addresses the issue of household solid waste disposal, and the current latrine coverage for the affected population.

Proposal Framework

- Discuss what water and sanitation improvements are anticipated following the implementation of the proposal, and what facilities will be constructed or installed to achieve these improvements. If it is not immediately feasible to meet international

standards, provide an explanation as to why it is not feasible, and what is proposed for achieving such standards in the near-term.

Program Description

- Discuss the maintenance and monitoring of water quality standards. Explain your plan for community involvement in the operation and maintenance of water and sanitation facilities, and the involvement of women as key players in the organization of community water and sanitation groups/committees.

- Discuss education and training in personal hygiene issues, protection of water quality, and proper use of sanitary facilities. Address specific issues related to disposal of children's feces, the prevention of diarrhea, food sanitation, vector control, and household solid waste issues.

6. WORK INCENTIVES AND FOOD AID

In emergency situations, food is a valuable resource for saving lives and protecting livelihoods. This chapter presents three types of interventions that can respond to a population's need for both food and income for food purchases. The three approaches can be used separately or in combination. They are:

1. Cash/Food for Work (C/FFW), where cash or food wages are provided in return for labor, generally on public works

2. Cash/Food Incentives (C/FI), where cash or food is used as an incentive, for example, to undertake training or productive activities

3. Cash/Food Transfers (C/FT), where cash or food is distributed to particularly vulnerable or needy households

Cash and food are not interchangeable; the choice will depend on the political, institutional, and economic factors that vary from country to country. In some areas, food may be locally unavailable. In other areas, food may be available, but people do not have the money to purchase it. Using several types of interventions may be helpful, and different combinations may be desirable in different locations. For example, food aid can be coordinated with seeds and tools distribution to ensure that people have enough energy to carry out the planting.

In complex emergencies, relief food may be taxed, looted, diverted, or sold, even when people are hungry. Monitoring can help aid workers ensure that the food is reaching the intended beneficiaries and not having negative impacts by depressing market activity, creating dependency, or promoting conflict between groups.

OFDA's *Field Operations Guide* (FOG) provides details on nutritional assessments and surveillance and feeding programs. ***Annex C: Crop and Food Aid Calendars for Africa*** contains the crop and food aid calendars for low-income countries in Africa, including information on shipping time needed to move food from the United States to various African ports.

6.1 Assessing the Options

Assessing intervention options requires an understanding of local conditions in the affected area, including the multi-faceted sources of morbidity and mortality in emergencies. Examine the emergency from the point of view of the people affected by the crisis. In general, an assessment requires analysis of responses to the following questions to ensure an understanding of the many factors affecting intervention decisions:

- Who are the vulnerable groups? What is causing suffering? Why are people dying? What are their coping strategies? What type of remuneration (food, food/cash, or cash) will best respond to people's needs?

- What is the division of labor in the affected population with respect to food provision, preparation and cultivation? What cultural factors are relevant? Ethnicity? Gender?

Age? How will the provision of cash or food affect cultural practices?

- What food is available in local markets? At what prices? What impact will an infusion of food and/or cash have on food availability and prices? What informal mechanisms of exchange are common (for example, barter)? How will they be affected?

- What government regulations or other barriers exist to the movement of food into the area? How will the provision of cash/food affect power relationships?

- What donated resources have been made available? What are the relative costs and time involved for donors to bring food into the area and for households to purchase food supplies and take them home?

- What is the administrative capacity of the implementing agency to handle interventions using food or cash?

- What activities (public works, training, productive activities) could be supported? Does the local community have traditional requirements that members contribute workdays to local public works? Can the intervention coordinate with these requirements? What are the costs and time involved for donors in organizing and administering such activities? Would the activities weaken the population affected by the emergency?

- How is the emergency affecting the environment, both in the short term and the long term? Will the distribution of cash/food attract outsiders and bring increased pressure on the forests or agricultural fields? How can the distribution of cash/food strengthen the environmental base?

- How is the emergency affecting the health of the population? What groups are most vulnerable? How can the provision of cash/food strengthen the health of vulnerable groups?

- How can the intervention foster self-sufficiency and productivity? What monitoring and modifications may be needed to reduce dependency as vulnerability declines?

6.2 Cash/Food for Work

Cash/Food for Work (C/FFW) is a multipurpose intervention that can be used at all stages of famine mitigation but is difficult to mobilize for short-term relief. Target groups receive cash or food wages in return for labor, generally on public works. The focus is on individuals who are most at risk. However, requesting vulnerable individuals to work may weaken them further.

The work performed can make a contribution both to the provision of food and long-term development but is primarily intended to save lives and reduce human suffering. C/FFW interventions are suitable for the rehabilitation of infrastructure, such as dams, wells and roads. C/FFW interventions increase immediate income but can also be used to build skills for future

employment. In one area, for example, workers were taught to make concrete culverts, rather than purchasing them in urban areas and transporting them to the work site. In Afghanistan IDPs made mud bricks, which were then purchased by the implementing organization to build shelter, providing income and generating business opportunities.

In emergencies, it is rarely possible to coordinate the supplies, equipment and people required in the short time available. C/FFW interventions may increase the already heavy work burden of women who, in times of drought, spend more time and energy on water collection and income generation.

The following recommendations highlight areas of special concern in organizing C/FFW interventions:

- Plan early in an evolving emergency to ensure sufficient lead-time to manage the employment of large numbers of people and to ensure that food is available in the case of FFW interventions.

- Make sure the emergency-affected population wants, and is prepared to maintain, whatever is being created by the work effort. Ensure that capable women who are willing to work are encouraged to participate.

- Guarantee employment to all who apply. The number of individuals prepared to work for low wages provides a measure of unemployment. Fluctuations may occur. Local institutions and international donors may track the fluctuations and use the information in planning other responses.

- Ensure that the local environment is not damaged as a result of the planned activity.

- Base the level of work required for payment on local customs, and the physical condition of the individuals employed. In emergency situations, workers may need cash or food on a daily basis in order to survive.

- Secure the technical, supervisory, and material resources required to assure the quality of works undertaken. Labor should be used to improve conditions, not merely to make-work.

6.3 Cash/Food Incentives

Cash/Food Incentives (C/FI) are flexible interventions that can be used at all stages of emergencies. Target groups receive cash or food for undertaking training or engaging in productive activities that mitigate emergency conditions. The focus is on individuals, households or communities. C/FI interventions can be started up quickly, using local resources or professional employees (teachers, nurses, work supervisors). Target groups can be the needy or those who are better off. For example, training in health services to benefit the whole community may be targeted to the better-off segments of the population rather than the poorest of the poor.

Incentives may benefit the target group directly by their own participation or indirectly

by benefiting a whole group. An example of direct participation is the incentive of receiving food early in the hungry season in return for contributing seed to a community seed bank that will supply the seed at or just before the planting season (thus saving it from being eaten in the meantime). An example of indirect participation is the incentive of receiving food for participation in a training program whose outcomes will benefit the whole group.

The following recommendations highlight areas of special concern in organizing C/FI interventions:

- Use C/FI interventions for quick start-up activities that households or villages are capable of organizing themselves with minimal outside supervision..
- Use C/FI interventions for activities with moderate technical, material or organizational requirements (to ensure that technical standards are achieved).
- Identify the activities and resources of target groups and plan activities in which they are capable of participating.
- Use incentives throughout the emergency to help target groups remain participants as conditions improve.

6.4 Cash/Food Transfers

Cash/Food Transfers (C/FT) may be used to respond quickly to emergency needs while other interventions are being organized, or to assist isolated households, such as nomadic herders. Target groups receive distributions of cash or food, with no requirement for work or action on their part. The focus is on those with special disadvantages (elderly, handicapped, women-headed households with small children), those who need immediate assistance (displaced populations in conflict situations), or remote populations in isolated areas.

- Use C/FT interventions to meet the needs of special groups who cannot otherwise be assisted.
- Combine C/FT with C/FFW interventions to meet the needs of both those who are able to work and those who cannot.
- Use C/FT interventions for remote populations that are beyond the reach of other types of interventions.
- Use C/FT to respond to the sudden needs of displaced persons or refugees, and follow with C/FFW as soon as work opportunities can be organized.
- Wherever possible, keep C/FT interventions decentralized, dispersed, non-periodic, perhaps mobile, and always accompanied by investments in immunizations, morbidity monitoring, and sanitation. When food is provided in feeding centers, populations are encouraged to migrate there, disrupting the next cropping season and creating conditions amenable to the spread of infectious diseases.

6.5 Case Study: Promoting Resettlement in Sierra Leone

In 1991, a rebel war in Sierra Leone devastated communities in the southern and eastern provinces, displacing more than a million people (about one quarter of the population of the country). The emergency removed large numbers of people from agricultural activities and severely affected food security. Finally, in late 1996, the Government of Sierra Leone and the rebels signed a peace agreement. Security began to improve and people started returning to their communities. Humanitarian assistance organizations used food aid and Food for Work (FFW) programs to encourage resettlement and a return to agricultural livelihoods. This intervention in Sierra Leone illustrates the principle of designing relief programs to reinforce development objectives.

The **intervention** was based on a nationwide resettlement and food security strategy developed by humanitarian organizations working in Sierra Leone. The strategy shifted emphasis away from general food distribution in camps to targeted, community-based efforts promoting resettlement, agricultural recovery, and the reconstruction of local infrastructure. An OFDA implementing partner assumed responsibility for meeting food needs in four districts. For the first few months of 1997, the security situation was favorable. OFDA's implementing partner contracted with Community Development Committees comprised of traditional and civil leaders to select sites and beneficiaries for Food for Work programs and resettlement rations. Resettled populations expanded month after month, houses and other physical infrastructure were rebuilt, and farming once again became the main economic activity of resettled populations.

In May 1997, a coup d'état reversed the security situation. Lawlessness increased and several warehouses were looted. The government set up roadblocks in the south, preventing food from reaching beneficiary communities with the claim that food aid was being diverted to opposition forces. Political maneuvering prevented food imports from Guinea from reaching the region. In some areas, the process of recovery continued. In others, settlements were destroyed and people became disinterested in further work programs to repair infrastructure.

The FFW program provided food aid and enabled the reconstruction of local infrastructure, reinforcing development objectives. FFW programs stimulated a wide range of community initiatives toward the goal of consolidating resettlement. Programs supported village cleaning, road maintenance, vegetable gardening, and the construction of houses, bridges, water wells and grain stores. The programs educated communities on the relationship between food and productive work, helping to create an attitudinal as well as an infrastructural foundation for long-term development.

Assistance helped families initiate agricultural activities so they could resume productive work and re-establish their livelihoods. Approximately 15,000 resettling families received agricultural inputs and extension services. Inputs included high-yielding seed rice, tools, and cultivars such as cassava, sweet potato, and groundnut.

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Extension messages linked food aid and agriculture as mutually supportive factors ensuring food security.

In the four districts targeted, relative security was maintained and integrated agricultural activities continued throughout the year, including demonstration plots and the dissemination of technical messages. These ongoing activities continue to promote the development of the targeted region.

Participation of village leaders facilitated the relief effort and contributed a sense of partnership. Asking village leaders to participate in beneficiary verification gave credence to the identification process and supported community accountability. Volunteers assisted with distributions and helped maintain law and order. Although overall community participation was limited, the involvement of village leaders contributed to a sense of partnership.

Food aid encouraged displaced people to return to their communities. Agricultural programs alone were insufficient to encourage resettlement. But when camp feeding was discontinued in favor of resettlement rations that accompanied people to their communities, the response was enormous.

The intervention demonstrated the importance of coordination among relief agencies. When one relief agency began providing larger rations in a neighboring district, beneficiaries of the program started moving to the more favorable location. Coordination resolved the disparity between regions quickly, stemming the flow of migrants.

6.6 Case Study: Disaster Preparedness and Mitigation in Niger

In areas that are chronically vulnerable to natural and human-caused disasters, the ability to detect and respond to imminent crises can save lives and reduce the funding needed to contain a crisis. Niger is a semi-arid, resource-poor, landlocked country that is extremely vulnerable to natural and human-caused disasters and to medical emergencies. Examples of problems that commonly plague Niger's people include low and variable rainfall, desert encroachment, land degradation, locust and grasshopper invasions, epidemics, fires, famine, and civil unrest. Food-related emergencies are frequent.

In the early 1990s, recurrent responses to emergencies were placing high demands on USAID staff in Niger and disrupting ongoing development programs. The USAID mission proposed working with the government to create a more flexible system for responding to disasters. Effective early warning and response interventions enabled local populations to work for cash and food. Their labor improved the productive capacity of the natural environment and mitigated the effects of disasters. Niger's experience demonstrates the principle that relief programs should be designed to help prevent natural and human-caused disasters and to mitigate their effects.

The **intervention** improved the disaster early warning and response capabilities of the Government of Niger. A government

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early warning unit developed a vulnerability analysis that helps determine areas of the country most susceptible to food shortages. With funds from the intervention, the crisis management unit provided support to disaster preparedness, mitigation and relief activities at the local level.

Using a bottom-up approach, the intervention identified vulnerable populations, engaged them in decision-making, and responded rapidly to impending emergencies. Cash and Food for Work activities were organized. Communities constructed wells, firebreaks, siltation dams, microcatchments to enhance water retention on agricultural and grazing lands, and water diversion structures to contain floods and reduce erosion.

The collaboration between technical ministries strengthened the commitment of civil servants to their citizens and demonstrated that citizens could expect and receive useful assistance from government officials.

The intervention addressed immediate needs while strengthening local capacities to respond to future emergencies. The intervention enabled populations in vulnerable areas to receive food or cash (for work). At the same time, the intervention fostered self-sufficiency by strengthening civil society, and enhancing the natural resource base for future productivity.

Assistance enabled appropriate and timely response to impending emergencies. The government's early warning unit developed improved capability to identify populations most vulnerable to disasters and facilitate communication among relevant groups at the national and local levels.

In carrying out the intervention, government personnel had opportunities to become familiar with conditions, populations, and coping strategies at the local level. This familiarity was important because vulnerability varied widely in communities throughout the country.

Assistance addressed the root causes of disaster vulnerabilities. In disaster-prone areas, populations are most vulnerable when they are weakened by hunger and disease, incapable of generating the means to solve problems together, and prevented from producing sufficient food because of a degraded resource base. The intervention provided an important combination of food delivery, productivity-enhancing interventions, increased civil participation, and self-determination. Thus, the intervention contributed to the basic survival needs of at-risk families and enhanced their future productivity potential. Rehabilitation of the natural resource base helped increase agricultural and livestock production and mitigated the impact of floods and drought.

Assistance linked disaster preparedness with development objectives. The intervention addressed preparedness for disasters by improving the ability of the Government of Niger to identify and respond to impending emergencies and by helping vulnerable populations identify ways to implement their own solutions to local problems. Assistance used a participatory approach and built on the strengths of institutions at both the national and the local levels. The intervention created a collaborative process.

Government organizations, technical committees and local community members

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worked together to help prepare for future disasters. The intervention was well organized and transparent at all levels, encouraging trust, accountability, and replicability. Villagers were active participants, receiving a fair wage in exchange for labor they designed themselves in order to enhance their own welfare. The work they performed was focused and capable of being carried out in the allotted time with available funding. The intervention provided a framework for collaborative work on mutually beneficial activities.

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7. SETTLEMENTS AND SHELTER

In their simplest form, settlements are concentrations of people in physical space. Settlements are the locale of OFDA's mandate, whether they are the smallest hamlets or the largest mega-cities. Shelter includes houses, offices, shops, factories, warehouses, granaries, and barns. In many countries, people consider shelter their most important economic asset, a critical contribution to both sustaining life, and supporting productive activities. Shelter thus, has economic, social, political, and cultural importance.

What is the link between settlements and shelter? Shelter and related support services are key features of settlements, typically occupying a majority of the land in larger settlements. An understanding of shelter markets can provide useful insights into a country's society, culture, economy and politics. Shelter is part of the larger environmental context of settlements, and the natural hazards and resource issues in that context that generate disasters and conflicts.

Five global trends affect settlements and shelter: rapid population growth, rapid urban growth, widespread and growing poverty, environmental degradation, and increasing conflicts/natural disasters. In developing countries, these trends converge to increase the vulnerability of millions of people to disasters.

The need for shelter in coming years is on the rise. Experts estimate that the global housing supply of approximately 1.56 billion dwelling units will increase by about 56 percent in 25 years. Approximately 725 million units (84 percent of the total) will be constructed in the cities of developing countries.

7.1 Assessing the Options

Several factors contribute to the vulnerability of a settlement and the shelter within it—where the settlement is located, how it has developed physically over time, how rapidly it has grown, how strong and inclusive its economy is, and how well it is managed. For example, settlements located in floodplains are subject to floods, and settlements that do not provide equal opportunities and services to all residents are vulnerable to conflicts.

When natural disasters or human-caused conflicts cause damage to settlements and shelter, many options for response exist. Options include inaction, provision of plastic sheeting and related materials to address short-term needs, provision of assistance to host families and communities, creation of settlements, and initiation of comprehensive, multi-sectoral efforts that link relief with development. In assessing options, two types of analyses are important: establishing context and establishing impact.

7.1.1 Establishing Context

Shelter sector assessments typically analyze three key housing market characteristics:

the affected population, the extent of informal housing, and the nature of the housing delivery system. The analyses below provide insights into what options are available to address disaster response.

The Affected Population: Contact local and national government authorities to obtain and interpret available data. Reliable baseline demographic and socioeconomic data regarding those living in affected areas can provide valuable insights into needs and possible interventions. Data may vary widely in quality and availability, and may be dated or unrepresentative. Contact local officials and affected populations for help in updating and interpreting data. Given the generally limited quality of demographic and socioeconomic data in many countries, it is important to use both governmental and local-level sources of information. Relevant questions include the following:

- How many people lived in the affected areas prior to the disaster?
- How many people were living, on average, in each occupied house?
- What percentage of families included more than two generations of related family members?
- How did people earn a living? What incomes did they have?
- What assets did families have? What was lost and what remains?
- Do affected families have friends or relatives who can provide assistance?

The Extent of Informal Housing: Obtain information on the informal housing sector. Although definitions vary widely, informal sector is the portion of the housing market that is typically unauthorized by official governments. Informal housing construction may contravene land ownership laws, building codes or planning codes. It is often not purchased at all, may have limited access to basic services such as water and electricity, and may be located in hazard-prone areas. Informal housing comprises 30-85 percent of housing in the cities of developing countries and even higher percentages in rural areas. Studies indicate that informal housing is associated with poverty and degraded and vulnerable living environments. (In contrast, formal housing is authorized by official governments and is associated with middle and high-income households.) Understanding the extent of informal housing and the dichotomy between formal and informal provides insights into the complex character of housing markets.

The Housing Delivery System: Learn about the structure of the housing delivery system. In developing countries, self-building efforts account for a large portion of informal sector housing and a small portion of formal housing. More accurately, eventual occupants typically assume the role of general contractor, with some or most of the actual construction work undertaken by one or more informal sector sub-contractors. Informal sector construction firms keep costs low by substituting labor for capital equipment. Knowing the structure of the housing delivery system can provide valuable insights on what options are available and what livelihood opportunities are inherent in shelter provision and shelter improvement. Specific questions to ask include the following:

- How many different types of housing are there in a given market? Who builds the houses? How are they built? On average, how long does it take to build a house?
- What materials are used? Where do the materials come from?

7.1.2 Establishing Impact

Understanding the impact of the disaster provides insights into the options for response resources needed immediately, shelter requirements, and appropriate disaster reduction measures. Answers to the following questions help establish impact:

- How many households (and people) in the affected area sustained damage to their homes?
- What percentage of the population is directly affected by the disaster?
- Has a damage profile (catalogue of the varying degrees of housing damage) been developed?
- To what extent were non-housing structures (e.g. shops, offices, public buildings) damaged? Other structures are indicators of community well being and security and might serve as resources for shelter provision.
- Are important terms (e.g. houses, dwelling units, households, families) defined clearly and used consistently in reporting documents?
- What local, national and international organizations are present in affected areas? What are the capacities of these organizations and what are they planning?
- What caused the housing damage? Is the cause of damage likely to be repeated? To what extent can the cause of damage be mitigated at reasonable cost?

7.2 Shelter Interventions

The objective of any shelter sector intervention is the provision of shelter that is safe, secure, and private. Achieving this objective often requires the coordinated effort of donors, NGOs, local and national governments and the affected populations. **Timing**, **participation,** and **needs** are critical elements. The following recommendations highlight areas of special concern in organizing shelter interventions in emergency contexts:

- Identify shelter solutions that affected populations have adopted in the immediate aftermath of the disaster. Consider whether these solutions serve as the basis for assistance.

- Assess whether opportunities exist for families and communities to host affected people, possibly for an extended period of time.

- Consider seasonal and weather issues. If winter or the rainy season is approaching, a rapid response may be needed.

- Examine damage and impact assessments to assess whether the most vulnerable people have participated in survey work, damage assessments, and the identification of proposed responses. Look especially for participation from people living on hazard-

prone lands, the poor, squatters, renters,;and young, elderly, handicapped, and displaced people.

- Assess the capacities and capabilities of local homebuilding industries, including the availability of local building materials. Identify industry constraints. Assess whether engaging the homebuilding industry in repair activities can generate opportunities for work and help stimulate economic recovery.

- Identify opportunities to link emergency work to long-term efforts that mitigate and prevent future disasters. Ensure that shelter assistance interventions use information on potential hazards in emergency and reconstruction planning. For example, if seismic hazards are present, the intervention should incorporate seismic resistant design measures.

- Identify opportunities for links to other sectoral activities (e.g. livelihoods, services, environmental management). Ensure that these opportunities are reflected in proposed interventions.

- Secure support from relevant government authorities. Clarify the nature of government support and the roles assigned to local governments and organizations.

- Apply *The Sphere Project* guidelines (see below) to proposed interventions wherever possible and appropriate. The guidelines identify universally recognized levels of service and should be supported wherever possible and appropriate.

- Plan to monitor and evaluate shelter interventions. In reporting and in evaluation, recognize that shelter interventions are about assisting people. The primary concerns are how many people received shelter assistance as a result of material distribution (not the amount of material distributed or the number of houses reconstructed).

According to *The Sphere Project*, the purpose of shelter interventions is to help the repair of home, the construction of temporary shelters or the settlement of displaced people within existing communities, depending on the situation.

Minimum guidelines in shelter encompass the following:

- Program decisions are based on a demonstrated understanding of the emergency situation and on an analysis of the people's needs for shelter, clothing, and household items.
- The performance and effectiveness of the shelter and site program, and changes in the context are monitored and evaluated.
- The disaster-affected population participates in the design and implementation of the assistance program.
- Housing standards average 3.5-4.5 m^2 per person.

7.3 Case Study: Disaster Reduction in Kinshasa, DROC

In 1998, torrential rains caused flooding and landslides that inundated the homes and businesses of 10,000 residents in two communes of Kinshasa, Democratic Republic of Congo (DROC). An estimated 3,000 cubic meters of sand and mud caused widespread damage and dislocation. The inundations of water and mud affected about 90,000 commune residents indirectly. In May 1998, OFDA approved an Ambassadorial Disaster Declaration request and allocated funds to assist in the clean-up effort.

During the review of the disaster declaration, staff sought information on the proximity of communes to adjacent watersheds and the vulnerability of commune residents to future flooding. OFDA's implementing partner used this information as the basis for a proposal to reduce floodwater runoff from the adjacent watershed through a package of disaster reduction measures. OFDA funded the flood/erosion reduction project in June 1998.

The **intervention** assisted in cleaning up the two communes and constructed 17 small dams in the watershed adjacent to the communes. The implementing partner organized local residents to do the construction work and to maintain the improvements. The workers built the dams from bamboo cuttings, grass and sandbags, strengthened the water retention basins, cleaned drainage canals, and seeded portions of the watershed with grass. Residents received information on the importance of reducing flood hazards and maintaining drains and waterways free from refuse and other materials. In addition, they received public health information. Thus, the intervention focused on the causes of flooding, as well as the effects.

The intervention provided short-term relief and reinforced development objectives by preventing subsequent disasters. The adopted disaster reduction measures were severely tested during February 1999 when torrential rains hit Kinshasa again. Two of the 17 dams failed, but the two communes experienced no flood-related damage. No residents were injured or displaced, and no livelihoods were affected.

The intervention was cost effective. Small investments in disaster reduction resulted in large benefits for vulnerable people. An assessment of the disaster reduction measures indicated that the intervention was highly cost effective. Using very conservative assumptions, OFDA's investment of $1.56 per beneficiary avoided direct economic losses of $71.06 per beneficiary during the 1999 rainy season (a saving of $45.58 in 1999 for each dollar OFDA spent in 1998). Each family saved approximately $426 or the equivalent of nearly 54 percent of their average annual income. The savings enabled families to purchase the food, clothing, medicine and other essentials that they might have had to forego in the event of another flood. In 2000, a similar intervention in another commune of Kinshasa yielded similar results during the 2001 rainy season.

OFDA benefited too. The investments in disaster reduction measures eliminated the need for OFDA to return in subsequent years, thereby freeing time, effort, and money for work on disasters in other locations.

The intervention had unexpected benefits for public health. A recent study by the Ministry of Health, DROC, indicated that the flood hazard reduction measures and public health education contributed to substantial

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improvements in commune environmental conditions. The incidence of cholera decreased by over 90 percent (compared to pre-flood years).

Assistance stimulated a regional assessment of ways to reduce flood hazards. Flood hazards are regional in scope and transcend national boundaries. Pressures to locate housing in flood-prone areas remain. Therefore, OFDA is assessing the possibility of initiating a regional, ecosystem-based disaster reduction program in the areas along the Congo River in and near the cities of Brazzaville (Republic of Congo) and Kinshasa (DROC). The goal is to seek resource-based livelihood opportunities in flood-prone areas in order to reduce settlement pressures in those areas, promote flood hazard reduction in normal flood zones, and address emergency watershed management needs in a comprehensive manner.

7.4 Case Study: Emergency Shelter in Kosovo

In 1999-2000, Serb armed forces systematically damaged and destroyed housing and other structures in Kosovo. Affected were nearly 120,000 housing units or about 33 percent of the total housing supply. As winter approached, the need for emergency shelter and heating increased. In response to this need, OFDA developed its largest shelter program ever.

The **intervention** provided winterized shelter to more than 225,000 people or nearly 33 percent of those supported by donor funding. In addition, the intervention provided thousands of fuel-efficient stoves capable of burning different types of fuel.

The intervention met emergency needs for shelter and fuel and reinforced long-term development by conserving forests and sustaining livelihoods. The distribution of fuel-efficient stoves met an emergency need for heat and reduced the demand for fuelwood. Thus, the intervention helped conserve forest cover. Moreover, timber purchases for shelters were dispersed geographically to reduce the impact of timber cutting practices. Finally, the emphasis on local purchases of material inputs promoted the maintenance of livelihoods in war-damaged Kosovo.

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7.6 Technical Information Requirements

Proposals should reflect the USAID/OFDA mandate and address gender issues, propose mitigation interventions when applicable, provide linkages to other sectoral activities, discuss sustainability and transition to reconstruction and development, and present evaluation and monitoring plans. In addition to these common elements, the technical information below is suggested as a minimum requirement for all sector specific proposals submitted for USAID/OFDA.

Program Rationale

- Discuss the damage profile for the affected area, the size of the total housing stock, the degree of disaster/crisis impacts on the housing stock, and identify available market resources and opportunities.

Proposal Framework

- Describe how housing was built in the area before it was damaged, who built it, and the average length of time it took to build the housing. If self-help is proposed, describe how beneficiaries will be assisted if they cannot perform required activities.

- Address local homebuilding industry capacity and capabilities. Describe local availability of building materials, any industry constraints, and to what extent repair activities can help stimulate economic recovery and growth. Explain uses of plastic sheeting and procurement locations.

- Define clearly important terms (e.g., houses, dwelling units, households, families, homeless, etc.), and use terms consistently in proposal documents.

- Identify potential opportunities for mitigation and prevention of future disasters (e.g., seismic-resistant construction, floodplain management) as part of shelter interventions.

- Discuss potential linkages to other sectoral activities (e.g., livelihoods, environmental management, etc.), and opportunities for linking emergency shelter activities (especially strategies and outputs) to subsequent transition and reconstruction efforts.

Program Description

- Explain any differences among proposed actions, *The Sphere Project* guidelines, and

local regulations, practices, and expectations, and how these will be reconciled.

8. HEALTH AND NUTRITION

8.1 Introduction

This chapter outlines the major issues to be addressed in planning and designing emergency health and nutrition interventions. It briefly describes the sequence of steps planners should follow in analyzing, assessing, and designing selected interventions. It is not meant to cover any of these topics comprehensively. For more in-depth discussion and information, please refer to the references at the end of the chapter.

8.2 Assessing the Options

The **purpose** of emergency health and nutrition interventions is to avert epidemics and deteriorating health conditions among the population affected by a disaster or a crisis resulting from protracted political, civil, and/or economic turmoil, as is the case in complex emergencies. The **nature** of the disaster or crisis will determine the appropriateness of specific health interventions. For example, in a complex emergency where civilian injuries are high, surgical and other curative services may be the highest priority. Where there are large numbers of displaced persons in camp situations, infectious disease control is often most critical.

Whatever the nature of the emergency, health interventions should address the highest priority causes of what is often referred to as **excess mortality and morbidity**. Excess **mortality** is measured as the rate of death in the population that can be directly attributed to the disaster or crisis, as opposed to the deaths that would be expected in non-emergency times. Along the same lines, excess **morbidity** is the amount of illness, caused by selected major diseases that can be attributed to the disaster or the crisis.

Health interventions directly contribute to OFDA's mandate of saving lives and alleviating suffering, perhaps more directly than any other sector intervention. Although the scope and timeframe for emergency interventions are more limited than for sustainable development programs, longer-term preparedness and mitigation considerations should be taken into account in the design and implementation of these activities. If we can **build local capacity** while meeting immediate health needs, we are utilizing cost effectiveness principles that will strengthen on-going and future responses to disasters.

Emergency health interventions may involve either, or both, curative and preventive services. The peak need for **curative care** is at the early stages of the crisis. The elimination of physical and other hazards injurious to the population's health must be the highest priority, along with search and rescue of persons already affected by the disaster or in imminent danger. Such activities may require an immediate infusion of medical supplies, trained medical personnel, and other resources to save lives and reduce suffering.

Preventive services may involve: immunization (to prevent an epidemic of measles); health education; supplemental feeding; promotion of early and exclusive breastfeeding; and providing potable water. These services are particularly critical in internally displaced people (IDP) situations where temporary living arrangements result in disrupting access to safe water, food supplies, sanitation, and adequate spacing to avoid transmission of communicable diseases.

8.3 Health Issues During Emergencies

Who is most at-risk in an emergency? Usually, the same people who are most vulnerable in normal times. They include people whose health is already compromised by pre-existing illness, malnutrition, and/or energy depletion — children under five years old, pregnant and lactating women, adolescents (in particular girls who are displaced or otherwise more vulnerable to physical and sexual abuse), people with serious chronic illnesses, and the elderly. These are most vulnerable to mortality and more severe morbidity during a disaster. Identifying these most-at-risk groups among the population affected is critical in designing appropriate health interventions that meet their specific needs.

The major causes of illness and death in developing countries are the same causes of excess mortality and morbidity in a disaster, accounting for 80-90 percent of deaths in IDP populations. They include the following:

- Diarrheal diseases, such as cholera, dysentery, and other diarrhea
- Measles
- Malnutrition
- Malaria
- Acute respiratory infections (ARI)
- Other major causes of morbidity/mortality include: tuberculosis; HIV/AIDs and other sexually transmitted illnesses (STIs); complications of pregnancy and child birth; other vaccine preventable diseases (meningitis); physical and emotional abuse, including trauma, and other psychosocial problems.

8.4 Analysis of the Health Situation

Before designing or approving proposals for interventions, it is imperative that an analysis of the situation be carried out. The purpose of the health situation analysis is to:

1. Collect relevant data for assessing health and nutrition status of the population at risk and identify critical health risk factors in the environment. There may be multiple sources of information provided by the host government, other donors, NGOs, and/or pre-existing USAID programs in the affected area. The Demographic and Health Survey (DHS) carried out in many USAID-assisted countries can provide a readily available baseline of health status of the affected population. Other sources of information include:

    - Sample surveys
    - Immunization campaigns
    - Analysis of reports and records from the Ministry of Health (MOH), other health providers and health information systems. In emergency health programs, each health facility providing outpatient services should complete

standardized surveillance forms for mortality and morbidity providing age, sex, and cause-specific data.
- Direct observation

2. Establish priority needs and determine resource requirements.

3. Coordinate with other donors and implementing partners.

4. Ensure that interventions are based on adequate data and analysis, and are appropriate within the local context.

5. Communicate and share information with implementing partners.

The analysis starts with an initial assessment that will provide the baseline data to measure the impact of the disaster and determine when and how to respond. A trained public health professional should participate in the assessment and any subsequent surveys or other studies. A checklist for carrying out an initial health assessment is available in *The Sphere Project*, Appendix 2.

Major issues to consider in analyzing the health situation include the following:

- Presence of continuing hazards.
- Demographics of the disaster affected area including:
  - Total population affected (estimated where census or other data is not available); sex and age breakdown of the affected population; average family size, female and child-headed households and pregnant and lactating women.
- Needs of the affected population.
  - Availability of food, safe water, shelter, blankets, first aid, cooking and eating utensils, personal hygiene items.
- Age and gender specific incidence of health problems and diseases.
  - The focus should be on the major causes of morbidity/mortality listed above.
- Availability of health facilities, trained personnel, equipment, services and supplies.
  - How did people obtain health services before the crisis and how have these services been disrupted or eliminated? What alternative services (including facilities, trained staff, equipment, supplies) are available?
- Communication and transportation networks .
  - This is particularly important for referral services to function effectively, to keep supply channels open, and to transport trained personnel.
- Estimates of other assistance available to the affected population.
- Other factors directly affecting public health:
  - Poverty, insecurity, environmental sanitation
- Analysis of the local capacity to take on or expand into new areas to address major health problems.
  - Programs should take into account the local health authority's track record in implementing similar activities; training of personnel and community volunteer

workers; motivation; and incentive factors. The best sources of information on this subject are local health workers, host government officials, NGOs and other donors familiar with the area.

The major **indicators** of health status that should receive priority attention in emergencies include: the crude mortality rate (CMR), the U-5MR (children under five years old mortality rate), and measures of nutritional status. Normally, mortality rates are expressed in deaths per **year** per **1,000** people. However, in emergencies, health planners require a measure called the crude mortality rate (CMR) to detect sudden changes in mortality. Therefore, in emergency situations, it is necessary to measure the number of deaths per **day** per **10,000** people. The goal is to maintain a CMR of less than 1 per 10,000 per day and less than 2 per 10,000 per day in the U-5. The average mortality in developing countries is 0.5/10,000/day. Mortality data should be disaggregated by age and gender to determine the need for targeted interventions.

In determining nutritional status, the following considerations should be taken into account:

- Prior nutritional status as measured by chronic under-nutrition, weight for age in the under five-age group.
- Availability of food and the impact of the disaster on food supplies.
- Food allocation practices as they affect women and children as well as other vulnerable groups.
- The prevalence of micronutrient deficiencies in the under five-year age group.

8.5 Emergency Health Interventions

By definition, emergencies result in an acute and immediate need for services to avoid death and illness from sudden changes in the environment and/or protracted turmoil that results in a dramatic deterioration of health conditions. In order to direct an intensified effort toward improving these conditions, often a vertical, disease-specific approach is required.

Whether only external, or a combination of external and internal resources is used, internationally established norms and treatment protocols for the major disease interventions should be followed. These norms and protocols have been approved and adopted by most host government public health authorities. They should be adhered to in an emergency and adapted, only when necessary and in consultation with and approval of local health officials. The following is a discussion of the interventions that address the major causes of morbidity/mortality in an emergency.[2]

[2] With the exception of curative services required to treat gunshot and other injuries, often a major cause of morbidity/mortality in complex emergencies.

8.5.1 Measles Control

Measles vaccination campaigns should be given the highest priority in emergencies. Measles is a highly contagious viral disease that claims the lives of thousands of small children, especially those suffering from malnutrition and other diseases that compromise their overall health status. Large displacements of people, crowding, and less than adequate living environments provide ideal conditions for the spread of this lethal disease. Measles vaccination coverage should be as close to 100 percent as possible, especially in the most vulnerable groups. Where appropriate, measles vaccination should be coupled with the provision of vitamin A (see *The Sphere Project* on this subject.)

8.5.2 Malaria Case Management and Control

In a disaster caused by hurricanes and floods, the sudden increased volume of water and humidity results in an exponential proliferation of mosquitoes, the vector that transmits the malaria parasite to humans. Measures to control malaria include:

- Early detection and appropriate treatment.
    - Due to the prevalence of malaria in some areas, drug resistance issues must be taken into account in determining an appropriate treatment regimen.
- Preventive treatment, particularly for pregnant women.
- Elimination of vector breeding sites.
- Vector control, including distribution of insecticide-impregnated mosquito nets and periodic spraying.

8.5.3 Acute Respiratory Infections (ARI)

Pneumonia is the ARI accounting for the bulk of excess mortality, particularly among children less than five years old. Diagnosis and treatment of ARIs requires training of health workers and volunteers. Environmental factors, including adequate shelter, blankets, clothing, reduction in crowding, must also be addressed.

8.5.4 Malnutrition

The interaction between malnutrition and infection, particularly in young children, 6 months to 5 years, can be a major cause of mortality. Older children, adolescents, pregnant and lactating women, and the elderly are also among the most vulnerable groups. In emergencies, people who are already receiving less than adequate caloric intakes are rapidly compromised by sudden changes that further limit the quantity and quality of their food consumption.

Nutrition programs should be targeted to the most vulnerable groups. Interventions include therapeutic feeding, provision of food supplies, medical treatment, and education. Programs should be based on a clear understanding of the current situation, compared to pre-emergency conditions. Program designers must address gender and age considerations in terms of access to, preparation of, and distribution of food within the household. Equal and appropriate consumption patterns should be ensured in any food distribution program. Estimating food requirements in the context of other sources of available food, both local and externally provided, is particularly important and requires local knowledge and expertise.

8.5.5 Diarrheal Disease Management and Control

Diseases transmitted by contaminated water and poor sanitation, such as cholera, shigellosis, hepatitis A, and several other diarrheal diseases pose a significant public health problem after sudden onset disasters, especially if they were pre-existing, and water and sanitation services are directly affected by the disaster. Strategies to reduce the population's risk to these diseases include an evaluation of the conditions of water and sanitation facilities, access by the affected population to clean water, and sanitary sewage disposal.

Measures to prevent diarrheal diseases should take into account the following areas:

- Establishing adequate supplies of potable water
- Health education on hygiene and water management
- Promotion of breastfeeding, exclusively among infants 0-4 months of age, and proper weaning, supplementary feeding in tandem with continued breastfeeding in older infants and toddlers
- Early cholera detection and control with appropriate case definition and protocols implementation. In a cholera epidemic, it is important to follow WHO guidelines to achieve a case fatality control rate (CFR) of <2%

In designing any health intervention, planners should refer to *The Sphere Project's* minimum standards. These guidelines establish benchmarks for programming and relate to specific sector programs. *The Sphere Project* provides key indicators for measuring and monitoring interventions. Finally, they provide guidance notes, issues to consider in applying the standards in different situations. For more information, see *The Sphere Project*'s website at http://www.sphereproject.org/handbook/health.htm.

8.6 Case Study: Emergency Intervention in a Cholera Epidemic, Mozambique, 1997-1998

In late 1997, a cholera outbreak began in Maputo and spread to Beira where 6,000 cases were reported in a single month. OFDA's implementing partner worked with the government of Mozambique to alleviate the consequences of this emergency by standardizing treatment and improving the case management of those affected.

A few months later, OFDA requested its implementing partner to look ahead to the next potential area for cholera outbreak and make sure supplies were in place and people were trained appropriately to manage future cases of cholera. A mobile team visited the main urban areas of Zambezia province to do advance surveillance of the cholera situation. Although no cholera cases had been reported in these areas, sanitary conditions were found to be sub-standard, which would be disastrous if cholera were introduced. In Quelimane, the evaluation indicated that the city water supply and sanitation systems were functioning far below capacity due to structural breakdown and lack of maintenance.

A team of four expatriates arrived in Quelimane on March 6, 1998, four days before the first cholera cases were identified. Along with its Mozambican colleagues, the team worked around the clock to prioritize actions. They set up a cholera treatment center in an empty warehouse with a 450 beds capacity. During the next seven weeks the center handled more than 5,000 patients, about half of which were severely dehydrated.

Five peripheral centers were set up in surrounding areas and OFDA's implementing partner provided medical training to improve the skills and knowledge of the local health staff. To facilitate fast transfer of severe cases to the main center, a 24-hour ambulance service was organized with three rehabilitated station wagons. In addition, OFDA's implementing partner initiated a public awareness campaign in simple hygiene practices, and trained more than 200 activists and health students to distribute a solution of chlorine to treat drinking water at home.

Assistance was provided to several other districts where the epidemic was less widespread. As the situation stabilized and local staff was able to manage a higher caseload, the team reduced their numbers and then disbanded. In Quelimane, the death rate (CFR) was kept below one percent, but in less-accessible areas, death rates were higher. OFDA assistance with these mitigation[3] activities enabled OFDA's implementing partner to work with local health authorities to save lives and increase the skills and knowledge of local staff to cope with future cholera epidemics.

[3] Most experts consider mitigation activities to be those activities taken to reduce the impact of an emergency prior to the actual imminent event. In this case study, rapid advance planning was done, and a plan was in place to deal with the expected effects of a cholera epidemic.

8.7 References

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8.8 Technical Information Requirements

Proposals should reflect the USAID/OFDA mandate and address gender issues, propose mitigation interventions when applicable, provide linkages to other sectoral activities, discuss sustainability and transition to reconstruction and development, and present evaluation and monitoring plans. In addition to these common elements, the technical information below is suggested as a minimum requirement for all sector specific proposals submitted for USAID/OFDA.

Program Rationale:

- Discuss the target population's access to health services, the status of available health facilities, the types of services provided, and the quality in terms of personnel, services, drug and other supply availability. Explain any on-going health promotion and prevention activities.

- Describe the major causes of morbidity and mortality in the target population, and provide available data to show trends. Compare your data with data from district, regional, or countrywide sources, including USAID-financed Demographic and Health Surveys (DHS) and local Ministry of Health databases.

Proposal Framework

- Describe how current measures of nutritional status compare with pre-emergency conditions in the target population, and whether there is evidence of wasting or of micronutrient deficiencies.

- An itemized list of pharmaceuticals, including vaccines and vitamins, should be submitted with the proposal if USAID funds will be used to purchase them.

Program Description

- Discuss current monitoring or surveillance systems identifying and referring the severely malnourished. Describe therapeutic feeding centers, their availability and accessibility, the type of supplementary feeding programs, and their availability to vulnerable groups. Discuss general food rations and their availability to the community, and whether micronutrient supplementation is included in the health nutrition activities. Discuss the implementation of any immunization programs since the emergency to ensure immunization coverage (especially measles) of the target population. Describe efforts undertaken to promote and support exclusive breastfeeding of infants and appropriate weaning/feeding of small children.

- Discuss data collection, surveillance systems, educational and training needs for professional (physicians and nurses) and non-professionals (community health workers (CHW) and traditional birth attendants (TBAs), curriculum, and identify partnerships with local government ministry of health and NGOs.

9. HYDROMETEOROLOGICAL EXTREMES: FLOODS AND DROUGHTS

Historical records indicate that floods, droughts, earthquakes, and other natural hazards shaped the earth over millions of years.[4] How we forecast, respond to, prepare for, and mitigate natural hazards determine whether hazards become disasters. Although the frequency of earthquakes, hurricanes, volcanoes, and floods has not changed significantly during the last century, the number of natural disasters has increased exponentially. Population growth, increased settlement in marginal lands, technological advances, modern large infrastructures, environmental degradation, and unstable socio-economic conditions make us extremely vulnerable to the impacts of natural disasters.

Extreme weather and climate related disasters are common around the world, with droughts occurring in one region while floods occur in others. Weather and climate variability ranges over many temporal and spatial scales. Natural climate variability, such as El Nino events, gives rise to hydrological extremes, especially floods and droughts. In addition, global climate change may lead to an increase in extreme hydrological events, causing a higher frequency and severity of floods and droughts.

Floods and droughts have major impacts on human health, food security, the economy, and livelihoods. According to the World Meteorological Organization (WMO), natural disasters are blamed for 250,000 fatalities annually. From 1991-2000, more than 90 percent of fatalities were due to weather/climate-related disasters. During this period, these events affected more than 200 million people per year, approximately seven times the number of people affected by armed conflicts. The global annual property damage is estimated to be between $50-100 billion. Between 1990-2000, floods were the leading cause of USAID/OFDA disaster response worldwide, followed by civil strife and droughts.

9.1 Assessing the Options

Mitigation of hydrometeorological disasters is an end-to-end process that includes technology, human behavior, and the link between the two. Technology includes, data collection, modeling of the natural phenomena, forecasting hydrometeorological events, and technological support. Human behavior involves formulating policy, planning, public awareness, education, capacity building, and response. Utilization of technology in the decision making process such as formulating policy, planning, warning systems, and dissemination of information to people in affected areas provides the link between technology and human behavior in order to lessen the impacts of disasters. Since weather and climate cannot be controlled, human decisions and actions are the most important components in mitigating hydrometeorological disasters.

[4] Cohn, T.A., Gohn, K.K., and Hooke, W.H., Lessons from PPP2000: Living with Earth's Extremes, Report from the PPP2000 Working Group to the Office of Science and Technology Policy Subcommittee on Natural Disaster Reduction. 2001.

9.2 Climate And Weather

Weather describes the daily evolution of the atmosphere, while climate encompasses the long-term averages of weather. Weather and climate fluctuate on a daily, monthly, multi-seasonal, yearly, decade, and even multi-century time scales as evidenced in localized thunderstorms, storms and fronts, droughts, and floods. The economic impacts of weather and climate variability on agriculture, water supply, power generation, fisheries, transportation, health, and sanitation are significant. Strong links between weather/climate, and abundance/lack of water create a need for predicting weather/climate for flood and drought mitigation, and water resources management.

Agriculture is among the most sensitive sector to weather/climate variability. Its dependency on weather/climate variability results in uncertainties in production, risks to livelihoods, vulnerability of local and regional economies, and affects global food security. Agriculture's vulnerability to climate variability is expected to increase as the world's population increases, marginal lands are cultivated, and the needs from other sectors (urban, industry, recreation) grow and compete for land, water, energy, and other natural resources[5].

9.2.1 Weather

Precipitation, temperature, solar radiance, wind, and humidity are all key variables with demonstrated or likely impacts on our lives. Precipitation, either in the form of rainfall, snow, sleet or hail, is the major source of the earth's fresh water supply—that is unevenly distributed around the world. Precipitation variability impacts water availability, flood/drought hazards, environment, agriculture, health, navigation, and many other sectors. Excess rainfall translates into an increased potential for flooding, adversely impacting agriculture, urban areas, and the environment. A deficit in rainfall increases competition for water and the likelihood of droughts. Temperature variability affects water supplies due to changes in evapotranspiration, and demand.

Extreme weather events such as thunderstorms, tornadoes, and hurricanes, cyclones and typhoons are short-lived and affect relatively small areas. These events can undergo significant changes in a very short time and space, with considerable adverse effects on life and property. The destruction of food supplies may result in malnutrition unless other affordable food sources are available. Secondary weather effects include an increased risk of infectious diseases due to a breakdown in sanitation, lack of potable water, over-crowding, and damage to the local healthcare infrastructure.

Weather forecasts with a lead-time spanning hours to days can be utilized to develop warnings and coordination efforts to protect life and property against flooding conditions. Forecasts with a lead-time ranging anywhere from hours to two weeks, can be used in flood mitigation, hydropower generation, navigation, and fire detection. Forecasts with a lead-time of two weeks to several months are necessary for agriculture, reservoir control operations, and

[5] Glantz, Michael, H. *Currents of Change: Impacts of El Nino and La Nina on Climate Society*. Cambridge University Press, 2001.

recreation. Seasonal and annual forecasts are used in ecosystem and environmental management, energy, and planning for the potential impacts of weather.

9.2.2 Climate

The concept of climate variability and how to adapt to it is a fairly new idea in the developing world. There is a need to learn how to forecast climate variability, and to bring these understandings and predictions to the end-users. The El Nino/Southern Oscillation represents the most important source of climate variability on a timescale of months to a few years. El Nino is defined as the abnormal appearance of warm sea surface temperatures in the central and eastern equatorial Pacific Ocean every few years. The Southern Oscillation, which is closely linked to El Nino, represents a seesaw of atmospheric pressure in the western part of the tropical Pacific. Together they represent a basin-wide phenomenon called El Nino/Southern Oscillation (ENSO). The ENSO cycle has two extreme opposite episodes: El Nino (warm episode) and La Nina (cold episode). La Nina is the development of abnormally cold sea-surface temperatures across the same region. A La Nina episode does not always follow an El Nino event and vice versa. ENSO occurrences are globally linked to extreme climatic events such as droughts, floods, fires, frosts, and cyclones. The ability to forecast climate events provides lead-time to minimize the loss of life and lessen economic damages. ENSO forecasts, and timely warnings and response, can assist countries in anticipating and mitigating the adverse impacts of droughts, floods and other extreme hydrometeorological events. (See References section below for websites). Forecasts can be used to manage agriculture, water supplies, fisheries, and other resources efficiently.

Seasonal climate outlooks are used to lessen the adverse impacts of climate variability on various sectors such as agriculture, water resources, and health while taking advantage of positive impacts. Effective application of climate forecasts for mitigation depends on the availability of regional climate forecasts with adequate lead time and accuracy, the degree of vulnerability of the sectors to climate variability awareness and contingency plans to improve decisions and policies, and the ability and willingness of decision-makers to modify their actions based on the available information.

The USAID/OFDA funded activities in the **Drought Monitoring Center in Nairobi**, Kenya (DMCN) utilize meteorology to reduce climate and weather induced disasters. The DMCN is the climate diagnostic and prediction center for ten countries in the Greater Horn of Africa (GHA). The DMCN has the responsibility to monitor drought and issue warnings in a timely manner to lessen adverse impacts on agriculture, water resources, energy production, health, and other socio-economic sectors. Although the 2000-2001 drought has been one of the worst climatic events in the history of the region, adverse impacts were relatively smaller due to the activities of the DMCN**.** Governments appealed early for food donations and donors were able to respond on time. Governments and partners managed water allocation for hydropower production, and assisted farmers in using suitable crop varieties.

The DMCN enhanced communication between climate scientists and end-users through the implementation of user workshops in various sectors namely food security, water resources, energy, disaster management, health, and the media. These workshops enhanced the use of climate information in management, planning, and decision-making. In addition, the Climate Outlook Forums made significant contributions to the improvement of the quality of the

seasonal rainfall outlook, and the dissemination of climate information and forecast products for early warning and disaster management. These forums brought together climate scientists, policy makers, and the general user community. The forums demonstrated that pre-disaster mitigation strategies, through optimum use of climate information and products, could contribute substantially to the sustainability of food security in eastern Africa. The DMCN produces seasonal climate outlooks, monthly bulletins that discuss monthly regional rainfall distribution, drought severity, monthly/seasonal temperature, rainfall deviations from long-term averages, weather outlook, and agro-meteorological conditions and impacts.

Another source of climate/weather information is the African Desk, a component of USAID's supported **Famine Early Warning System Network (FEWSNET)** at the U.S. National Oceanic and Atmospheric Administration (NOAA) Climate Prediction Center (CPC) that focuses on short-term climate monitoring and prediction for Africa. CPC products include seasonal precipitation outlooks, discussions, weekly to ten-days, monthly to seasonal analysis, and forecasts for Africa. (See References section for web links).

Global climate change may lead to an increase in extreme hydrometeorological events causing a higher frequency and severity of floods and droughts. The impact of a decrease in water resources will be most severe in areas where high risk of drought and water scarcity already exist, exacerbated by a population increase in semi-arid areas. There are various organizations that conduct extensive research on the impacts of climate change on hydrometeorological events. For more information regarding projects on climate change program at USAID, please contact the USAID Climate Change Program. Detailed information can also be found on the NOAA web pages (see References section).

9.3 Floods

Floods are the most economically devastating and deadly natural hazards. According to the WMO, floods affected about 1.5 billion people from 1991 to 2000. Land use changes, such as urbanization and deforestation, increased population and settlement in the flood prone areas, and increased agricultural activities have significantly augmented the vulnerability to flooding in river basins and coastal regions. Evidence indicates that flooding is getting worse, not only in the number of fatalities, but also in terms of economic losses, despite the spending on flood mitigation efforts. Protective measures sometimes increase vulnerability to flooding by providing a false sense of security, and by encouraging more settlements in the flood prone areas.

Flood hazard, which is essentially created by human decisions, has both direct and indirect impacts. Examples of direct impacts include, damage and destruction of property and infrastructure, restoration cost, and loss of life. Indirect losses may include the disruption of health, social services, and economic activities due to damaged infrastructure and transportation systems, reduced buying power in communities, increased vulnerability of survivors, migration, conflict over scarce resources, and reduced development activities due to the cost of response and rehabilitation.

However, it is important to note that floodwater is also a resource. It is beneficial for the replenishment of land, fisheries, wetlands, and agriculture. The potential of the flood plains for socio-economic development is significant, and that is why floodplains are among the most

populated and highly developed areas. Therefore, it is important to develop mitigation measures to take advantage of its positive outcomes while reducing adverse impacts.

9.3.1 Types and Causes of Floods

A flood event can be defined as an inundation of areas that are normally not submerged. Although most floods are natural phenomena, a flood hazard is caused by human decisions. Understanding the types and causes of floods is important in taking measures to mitigate the impacts of flood disasters. Flooding can be classified as river, coastal or flash floods. Flooding of low-lying coastal areas, estuaries and deltas results in inundation of land usually caused by coastal storm surges resulting from severe cyclonic weather systems or tidal waves, and tsunamis. We will focus here on river and flash floods, as this is more in line with USAID/OFDA's disaster response history.

Excessive precipitation and/or obstruction of river flow are the most common causes of flooding along the rivers. Landslides can block the river flow leading to upstream flooding by ponding water behind the debris dam. Erosion or overtopping of debris dam due to an increase in water level behind the obstruction can cause catastrophic flooding in the downstream areas.

Heavy rainfall due to tropical storms, spring rains, snowmelt, or a combination of snowmelt and rainfall are common causes of slow onset river flooding. River floods can extend widely over areas along the river and can last for several days, and sometimes months. Since river floods rise slowly, people in the affected areas usually have enough lead-time to move to safer ground. Flood and river forecasts and warnings, with a lead-time ranging from hours to days, can facilitate the implementation of appropriate measures to lessen the loss of life and economic damages.

Flash floods are the main cause of weather related deaths in many countries due to its rapid-onset characteristics, limited warning procedures and emergency actions, the high velocity of water flows, and the associated debris flows. The speed and power of flash floods can roll boulders, tear out trees, destroy buildings and bridges, scour out new channels, and trigger catastrophic landslides. Flash floods are commonly caused by slow-moving thunderstorms, thunderstorms repeatedly moving over the same area, or heavy rains from hurricanes and tropical storms. Flash floods can occur within a few minutes or hours of excessive rainfall, a dam or levee failure, or a sudden release of water held by an ice jam or debris dams. In dry areas where ground surface is baked hard or becomes crusted, extensive flat areas may be flooded by heavy rainfall ponding on the surface. Rainfall flooding is common in arid and semi-arid environments.

Water spilling over riverbanks, surface ponding of excessive rainfall, or flash floods usually cause urban flooding. Urban flooding may also occur because of inefficient design capacity of storm water drains and obstruction of the drainage system by solid wastes. Urbanization significantly reduces infiltration and natural storage, and speeds up travel time for flood peaks. As fields or woodlands are converted into houses and roads, they lose their ability to absorb rainfall. Urbanization increases runoff two to six times over what would occur on a natural terrain. As a result there is an increase in the volume of runoff to rivers, wetlands, and other low areas. Increased volume of water travels more rapidly to surface waters, thus

producing higher peak flows and velocities. During periods of urban flooding, streets can become swift moving rivers, while basements can become death traps as they fill with water.

Short lead times characteristic of urban flooding require efficient tools for the design and operation of real-time warning systems. In addition, use of wadis/arroyos and natural drainage channels for roads and settlement during non-flood season, increases vulnerability to urban flooding. The extent of settlement in steep slopes causes soil erosion and makes settlements more susceptible to land slides. The use of storm water drains as sewers increases the risk of health hazards when the storm sewers overflow on the streets during flooding.

9.3.2 Mitigation and Preparedness

Identifying the risks and strategies to reduce vulnerabilities to hazards are important factors in mitigation efforts. Flood prone areas can be delineated based on acceptable risks that define the vulnerability of the people and property to flooding and landslides. In mitigating flood disasters, river basins should be considered as a system consisting of socio-economic activities, land-use patterns, hydrology, climate, and geomorphologic processes. An integrated approach to flood mitigation considers positive, as well as the adverse impacts of floods, the adoption of multi-functional and multi-beneficial solutions, and represents all the stakeholders within the watershed from conception to operation. The approach to flood mitigation should emphasize reducing the vulnerability of the population to flood hazard, and increasing their resiliency to disasters. The economic impacts of flood losses, versus the efficient use of flood prone areas, the adverse impacts on the environment, and other natural resources should be taken into consideration.

Flood mitigation measures should emphasize the adoption of flexible solutions both structural and non-structural that are appropriate to the various physical, social, cultural, and economic characteristics of the basin. Measures should reflect the importance of evaluating different options, and their relative advantages and disadvantages. Non-structural activities usually offer cost effective measures and do not have an adverse impact on the environment and the hydrologic characteristics of the basin. There is still a place for structural measures such as dams, levees, and others, but these measures have significant implementation costs and adverse environmental impacts that might exceed the cost of damages. Incentives to reduce future flood damage, and encourage waterproofing and relocation can be an efficient way of using disaster assistance funds, and increase the resiliency of vulnerable population. Non-structural measures focus on behavior modification of populations through preparedness programs, early warning and response systems, use of technology by decision makers, long-term planning, land use management, loss sharing methods, watershed management policies, and the development of appropriate legislation to reduce disasters.

The involvement of stakeholders in formulating the solution and implementing both structural and non-structural measures from conception to operation is essential for providing culturally acceptable, sustainable solutions, and addresses the needs of the community. In multi-jurisdictional basins, the development of plans and actions, policies, and strategies, should also involve local, provincial, and national governments.

Advance warning is key to an effective response that requires data, information on current and past conditions in watershed, weather/climate/river forecasts, and dissemination of

this information to the affected people in the local language. The dissemination of information, data, and warnings to decision makers, emergency managers, relevant agencies, NGOs, the media, and public is vital in preventing loss of life and property. Weather and river forecasts are critical elements of flood early warning systems. Climate forecasting can be used for emergency response planning such as stockpiling of food, water supplies, medicine, evacuation of high value stored crops and goods, and preparation of emergency action plan including evacuation routes, shelters, and water proofing important and hazardous facilities.

Local early warning systems (LEWS), an example of community-based warning systems is utilized to warn local populations of flood danger. LEWS are commonly used to mitigate the impacts of flash flood events. The ultimate goal of LEWS are to protect life and property through the development and maintenance of community preparedness in cooperation with national hydrological and meteorological services.

Response to hazard warnings must be timely, comprehensive, specific, and have clear lines of authority. Advance planning, the ability to quickly mobilize sufficient resources, periodic exercises to identify weaknesses and problems are essential for efficient mitigation. Local communities should be responsible for preparedness and response plans, but the activities should be coordinated with various levels of government and local organizations. Response plans should be prepared in advance, frequently tested, and updated. Issues that should be addressed in the response plan should include, an inventory of resources, evacuation routes, emergency shelters and their capacities, cooperation with various government levels or international assistance when needed, and defining clear lines of authority.

Structural measures usually alter the natural characteristics of a river and the watershed. They are designed to contain flood flows up to a certain level of magnitude and frequency, based on the design event. Examples of structural measures include dams, levees, floodwalls, channel improvements, and land use modifications. A holistic approach should be considered in the implementation of structural measures to ensure their effectiveness in economic and social terms, and to minimize their adverse impacts on the environment. Structural measures often create a false sense of security, encouraging increased development and settlement in the flood prone areas that may lead to catastrophic disasters when the design capacity is exceeded. In addition, changes in the river course such as channel straightening, dredging, building levees, and other control structures speed the river flows causing increased damages downstream of the modified river reach. Structural works require periodic inspection, rehabilitation, and maintenance, to ensure the safety and stability of the structures through dam safety programs.

9.4 Droughts

Droughts are a natural and recurring part of climate. Contrary to floods and other sudden onset disasters, droughts tend to progress slowly, take place over a longer period of time, and may linger for months or years. Because the impacts of droughts are not localized and not structural, it is often difficult to determine the onset and the end of a drought. The magnitude of a drought and its impacts are closely related to the timing of the onset of the precipitation shortage, its intensity, and the duration of the event. Subsequent droughts in the same region will have different impacts, even if the intensity, duration, and spatial characteristics of the events are identical because of the degree of vulnerability of population at the time of the event. The aforementioned characteristics of droughts have prevented the

development of accurate, reliable, timely estimates of the severity and impacts, and consequently, the formulation of drought contingency plans by most government.

There are various definitions of droughts. A meteorological drought is defined as a deficit in precipitation from the long-term average. Agricultural drought focuses on precipitation deficit, shortages in soil-water deficit, and surface and subsurface water resources failing to meet the demands of a specific crop. Hydrological droughts usually occur when surface and subsurface water supplies are below normal and lag behind meteorological and agricultural drought. Socio-economic drought develops when the demand for water supplies are exceeded due to weather-related water shortages. It is critical to identify the type of drought in order to take proper measures to lessen its impacts.

9.4.1 Drought Mitigation

Droughts have significant social, economic, and environmental impacts. The impacts affect many sectors and extend beyond the area experiencing the physical drought. Direct impacts of droughts include reduced water supplies, crop, rangeland, and forest; increased risk of fires; increase in mortality of livestock and wildlife; and damage to wildlife and fish habitat. Some of the examples of indirect impacts are reduced income and livelihoods of farmers, increase in disease and health risks, increased consumer prices, unemployment, migration, and conflict. Environmental losses can be observed through damages to plant and animal species, affecting wildlife habitat, air and water quality, soil erosion, and degradation.

Social impacts include public safety issues, health concerns, potential conflict among water users, and priorities over water usage (i.e. potable water vs. irrigation). Droughts are one of the most important natural triggers for malnutrition and famine. Famine related deaths are sometimes mistakenly attributed to drought, rather than to the underlying causes such as government policies or civil strife.

Drought impacts can be lessened through mitigation and preparedness including drought planning, drought monitoring and early warning, assessment of impacts, and response. An integral part of drought planning is a monitoring/early warning system that provides decision makers at all levels with information about the onset, continuation, and termination of the drought conditions. However, an early warning system should not only be a process of data collection and analysis, but an integral part of a larger system designed to mitigate and respond to the crisis. The physical aspects of the early warning systems should be able to provide information on the spatial extent of the drought, its duration, the time of occurrence in relation to the crop calendar, the severity of the drought, and climate forecasts. Identifying the factors that explain who and what is at risk, and the underlying factors behind the vulnerability, can lead to the development and implementation of a wide variety of mitigation actions and programs to reduce the impact of potential drought events.

In the 1980s, frequent droughts and their severe economic and social impacts created a need for drought monitoring in Eastern and Southern Africa. Drought Monitoring Centers (DMCs) in Nairobi and Harare were established to monitor drought, its intensity, geographical extent, duration, impacts on agricultural production, and issue early warnings to lessen the adverse impacts. DMCs prepare and disseminate ten-day and monthly weather advisories,

climatological summaries, agrometeorological conditions and their impacts on agriculture and water resources, in addition to seasonal climate outlooks for the subregion.

In Africa, the Famine Early Warning System Network (FEWSNET) monitors a wide range of physical and social variables that signal a trend toward food insecurity with regional partners including the Southern African Development Community (SADC), DMC Nairobi, and Centre Regional AGRHYMET. The goal of FEWSNET is to strengthen capacities of African countries and regional organizations to manage risk of food insecurity providing timely and analytical early warning and vulnerability information. FEWSNET has recently begun programming activities in Central Asia and Central America.

9.5 Case Study: Community-Based Mitigation Following Venezuela Floods

Torrential rains and subsequent flooding, landslides, and debris flows devastated the north coast of Venezuela in December 1999 and January 2000, killing more than 15,000 people, and causing billions of dollars in damages. An accepted tenet of natural hazard mitigation states that the post-disaster time period is a critical window for initiation of long-term mitigation programs taking advantage of public and governmental focus on the underlying causes of the disaster, as well as continuing vulnerability. In that vein USAID/OFDA identified several priorities for follow-on mitigation focusing on land use and watershed management.

The first component of OFDA's mitigation program targeted the technical capacity of the national government to address the immediate and long-term vulnerabilities in the face of continued flooding and landslide hazards. OFDA with technical support from the U.S. Geological Survey (USGS) developed a program working with their Venezuelan Ministry of Natural Resources (MARN) counterparts to document the affects of the extreme events, map additional areas at risk, and develop a systematic approach to hazard identification and mitigation.

OFDA also targeted appropriate non-governmental, community-based natural hazard mitigation initiatives in Venezuela. OFDA provided a grant to implement a program that would reduce the vulnerability of local communities to natural hazards through increased citizen participation, implementation of effective presentations, and through mitigative efforts aimed at integrating risk prevention and mitigation into on-going development activities in Venezuela.

9.6 Case Study: New Radio and Internet Technology for Communication of Weather and Climate Information to Rural Communities for Sustainable Development in Africa (RANET)

The main goal of the RANET program is to lessen the impact of hydrometeorological disasters such as floods, droughts, and tropical cyclones by disseminating weather/climate information in a timely manner to the most vulnerable populations in the targeted countries. The RANET project aimed to achieve this goal by (1) strengthening the access of the National Meteorological and Hydrological Services (NMHSs) to the weather and climate information (2) building the capacity of NMHSs and the end-users to utilize climate information, and (3) providing rural communities access to weather/climate information.

The NMHSs receives weather/climate information from local and international organizations, universities, U.S. government agencies, European agencies, and others. They process the information for local areas. Timely dissemination of this information to public and partner organizations such as NGOs, the media, agriculture, forestry, health, community organizations, and water agencies is vital in preventing the adverse impacts of climate/weather. The RANET project aids NMHSs in receiving and transmitting the information to users through digital, FM, and other local broadcasts. The end-users can receive the information via radio receivers, solar wind-up radios, digital radios, and digital multi-media audio-visual computer connections. The digital aspect allows information from the Internet to be retransmitted, and received in areas where an Internet connection is impossible or not practical due to download time and expense. Plans also include translation of radio broadcast messages into local languages to better serve the rural population.

In Bankilare, a rural community in the Northwest of Niger, the majority of the population is composed of nomads, pastoralists, and farmers who depend on rain-fed subsistence agriculture. Implementation of RANET in Bankilare empowered the local community to alleviate the negative impacts of climate. Local farmers now use forecasts to make better decisions on what and when to plant. Pastoralists feel secure in seeking sources of water or pastures further away from their homes since they can now receive information at a greater distance from the community. The broadcasting also includes other relevant information on topics such as market conditions, agricultural crops, pest and diseases, education, health, and other local information in addition to weather/climate information and forecasts. The Niger experience proved that the broadcast system is reliable. The system does not require a high level of technical knowledge to maintain and operate which makes it sustainable in local communities. Access to the information has also provoked a greater interest in local communities in monitoring weather/climate. For instance, one local community requested 25 rain gauges from the meteorological department in Niger. In Niger, the RANET project has triggered new legislation for broadcasting, and created a National Commission for radio broadcasting, which is chaired by the human rights association.

9.7 References

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NOAA/CPC Africa Desk http://www.cpc.ncep.noaa.gov/products/african_desk/index.html/.

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U.S. National Weather Service http://www.nws.noaa.gov/.

WMO members of National Meteorological Services can be reached at:
http://www.wmo.ch/index-en.html/.

9.8 Technical Information Requirements

Proposals should reflect the USAID/OFDA mandate and address gender issues, propose mitigation interventions when applicable, provide linkages to other sectoral activities, discuss sustainability and transition to reconstruction and development, and present evaluation and monitoring plans. In addition to these common elements, the technical information below is suggested as a minimum requirement for all sector specific proposals submitted for USAID/OFDA.

Program Rationale

- For proposals regarding water resources, explain how an integrated approach will be applied to the proposed activities, taking into account the upstream and downstream consequences of potential measures, regional and sectoral needs/impacts, and social equity. Discuss any adverse impacts of the proposed action on other related sectors.

- For structural measures, discuss the short- and long-term potential impacts of the proposed interventions on the environment and hydrology, especially on the overall river basin, ecosystems, downstream or upstream communities, and groundwater resources.

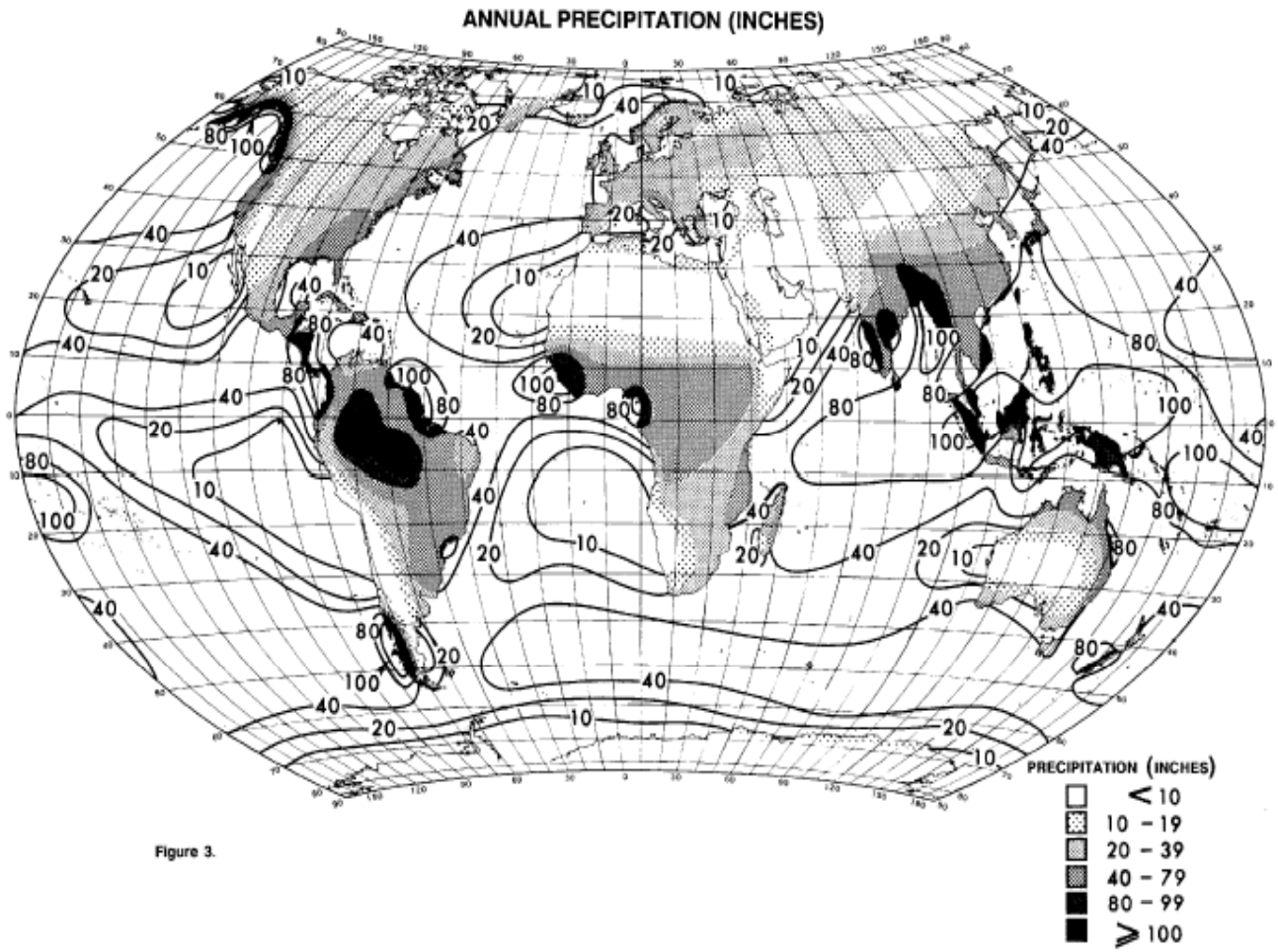

Figure Global annual precipitation, 1931-1960 (Climates of the World, National Oceanic and Atmospheric Administration, National Climate Data Center, 1969, revised 1991)

ANNEX A: PROGRAMMING PRINCIPLES OF DEVELOPMENTAL RELIEF

The principles of linking relief and development apply to all phases of emergency response. OFDA uses the following principles in programmatic decisions:

- **Collaboration/Coordination**: OFDA expects implementing organizations to work together to avoid overlap, gaps in relief assistance, and confusion among local communities regarding assistance programs and availability of services. Implementing partners should regularly share information with other organizations in the area, particularly in accord with established information centers, and work to standardize data collection methodologies and minimize security risks.

- **Context-specific conditions**: OFDA-funded programs should strive to avoid disrupting social organization and networks by recognizing existing social relationships such as community and gender roles and responsibilities, the natural and political environments, local economies, and cultural beliefs and practices. Programs are appropriate and relevant to these conditions, and should consider both immediate and possible long-term impacts. OFDA acknowledges that as some practices must change during disasters and encourages programs to include training and local community participation in order to ensure that new behaviors or temporary technologies are adopted safely.

- **Livelihoods**: The resumption of income- or food-generating activities plays a crucial role in helping disaster-affected populations recover from disasters. OFDA favors programs that support and encourage the maintenance or rehabilitation of livelihood assets and skills where possible, recognizing that the introduction of new livelihood initiatives will require consideration of economic dynamics and other context-specific conditions.

- **Mitigation, preparedness, and prevention**: Programs that operate at the regional, national, and community levels to help prepare for or lessen the impact of disasters are critical to reducing a country's dependence on external relief assistance. OFDA promotes disaster prevention, mitigation, and preparedness activities both in the course of implementing a disaster response and as a pre-disaster strategy to reduce disaster impacts in areas at risk.

- **Promotion of international standards:** OFDA supports the use of international standards in all disaster response programs. While recognizing that reaching the minimum standards (such as *The Sphere Project*) is not always possible, OFDA encourages their use as a guideline when designing disaster response and mitigation activities.

- **Systematic information collection**: OFDA encourages organizations to provide for the systematic collection of information in their areas of implementation to the extent possible. Systematic information collection is defined as using a methodology that is established, or can be replicated by others, and whose results are comparable. This is

vital in designing appropriate strategies and programs and for targeting the most urgent needs.

- **Training/Capacity building**: Where appropriate, OFDA supports programs that include methods and activities that serve to train local staff, NGOs, community groups, and other organizations, building their capacities both to function as organizations as well as to enhance technical skills of individuals. OFDA encourages the use of appropriate technologies, whether local or introduced.

- **Use of existing local capacity/local community interaction**: OFDA-funded programs should incorporate the views, opinions, and experiences of local communities and officials in planning, designing, and implementing programs, wherever possible.

ANNEX B: FUNDAMENTALS OF A LIVELIHOODS STRATEGY

Complex emergencies are characterized, in part, by the deliberate exploitation of civilians. Reduced self-sufficiency and productivity are both the by-products of conflict and the intended consequences of war. Since systems of production are particularly vulnerable in complex emergencies, innovative approaches to providing relief and recovery assistance are essential. Much needed are tools for analyzing the critical trade-offs between implementing immediate survival interventions and fostering self-sufficiency to ensure longer-term survival.

In any complex emergency, there are at least three options. The first option is to do nothing because conditions of operation are untenable, significant risks exist for causing more harm than good, or relief resources are unlikely to reach intended beneficiaries. A second option is to rapidly distribute free relief goods. A third option is to intervene strategically to save lives, using interventions that are oriented toward saving livelihoods. Relief operations are currently a combination of these options.

During every complex emergency, the three options should be frequently revisited so that programs can be modified according to changing conditions. The aim is to minimize the number of disaster-affected people who must do without, while maximizing the effectiveness of limited humanitarian relief resources.

The fundamentals of livelihoods strategy incorporate eight basic principles of self-sufficiency and productivity in complex emergencies. The principles emphasize the importance of:

- Rigorous assessment
- Aggressive capacity building
- Appropriate market support
- Protecting essential assets
- Easing the burdens of vulnerable people
- Timely interventions
- Limiting harmful population displacement
- Establishing sustainable systems

After the first principle, "Complex emergencies require strategic assessment, analysis and intervention," the principles are not listed in order of importance. Rather, they represent a set of tools. The context of each emergency will determine which of the tools will be most useful. The eight principles inform eight strategies for wisely intervening in complex emergencies. The following outline summarizes principles, strategies and associated actions:

Principles	Strategies	Actions
Complex emergencies require strategic assessment, analysis and interventions	Assess the political, military, social and economic aspects of each crisis in complex emergencies and respond accordingly.	Prepare relief workers to act strategically. Move beyond distributing free relief. Formulate country strategies. Improve coordination.
The key is capacity building.	Integrate capacity building aspects into all relief interventions.	Define capacity building. Do capacity assessments. Avoid creating dependency. Weigh the pros and cons of capacity building.
Markets are necessary to facilitate productivity and self-sufficiency.	Use markets to maximum advantage.	Monitor markets. Protect the poorest. Strengthen key infrastructure. Understand the community's tax base.
Social dynamics influence the success of relief responses.	Intervene to ease the impact of complex emergencies on civilians by enhancing the coping strategies of women, children and the elderly	View people not as victims but as proactive survivors. Avoid burdening the vulnerable. Strengthen women's capacities to provide for dependents. Design health programs with women's responsibilities in mind.
Stress migration undermines productivity and self-sufficiency.	Analyze the source of migration and minimize stress migration and its effects.	Determine if migration is harmful. Understand urban migration. Counter dependency of forcibly displaced populations. Provide jobs and economic opportunities.
Poorly designed interventions undermine self-sufficiency and increase vulnerability.	Establish sustainable systems.	Understand the underlying system. Meet emergency needs. Ensure a return to pre-crisis intervention level of services.

Sue Lautze and John Hammock developed this information through the auspices of the Feinstein International Famine Center at Tufts University, Boston, MA.

ANNEX C: CROP AND FOOD AID CALENDARS FOR AFRICA

This Annex presents several types of information needed to plan food aid assistance. Included are tables on planting and harvesting dates for major food crops in 36 low-income countries in Africa, information on major rainfall seasons and months when food supplies are critically short, and estimates of shipping time needed to move food aid from the United States to various African ports. Tables are excerpted from: Kevin Lanagan, *Crop and Food Aid Calendars for Africa*, Washington, D.C.: U.S. Department of Agriculture, Economic Research Service, 1983.

The time required for negotiating food aid requirements, purchasing commodities, preparing documents and loading shipments can vary greatly from one situation to another and must be added to the actual shipment time in planning for food aid. The calendars focus on low-income countries in Africa that are most likely to experience food deficits or to request food aid. They provide useful guides for policy and program officials for planning when food must be delivered to a particular country to provide maximum benefits to those in need.

Calendars for Low-Income Countries of Africa

Table 1 – Crop Calendars for Major Food Items (Pages 92-94)

Table 2 – Major Rainfall Seasons (Page 95)

Table 3 – Estimated Critical Hungry Periods (Page 96)

Table 4 – Optimal Months for Timely Food Aid Shipments from the United States (Page 97)

Table 5 – Shipping Time Requirements from New Orleans (Page 98)

Table 1 – Crop Calendars for Major Food Items (1)

COUNTRY	CROP	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Angola	Corn					H						P	p
Benin	Corn (major)			P	P				H	H			
	Corn (minor)	H								P	P		H
	Yams			P	P	P		H	H				
Botswana	Corn				H	H	H				P	P	P
	Sorghum			H	H	H					P	P	P
Burundi (2)	Corn	H	H								P	P	
	Sweet Potatoes	P	P				H	H					
Cameroon (3)	Rice (major)	H							P				H
	Rice (minor)						P	P			H	H	H
	Corn (major)			P	P			H	H	H			
	Corn (minor)								P	P			H
	Millet					P	P			H	H		
Cape Verde	Corn							P				H	
	Beans							P				H	
Central African Republic	Corn				P	P			H	H			
Chad	Rice						P	P			H	H	H
	Millet						P			H	H	H	
Egypt	Wheat	P			H	H	H					P	P
	Rice	H		P	P	P					H	H	H
	Corn (major)				P	P	P	H	H	H	H		
	Corn (minor)	H	H				P	P	P			H	H
	Sorghum			P	P	P		H	H	H	H		
	Millet				P	P			H	H	H		
Ethiopia (4)	Wheat	H	H				P	P	P	P		H	H
	Corn				P	P	P			H	H	H	
	Barley					P	P	P			H	H	H
	Sorghum				P	P	P	P		H	H	H	H
	Teff	H	H	H	P	P	P	P	P	H	H	H	H
Gambia	Rice (major)					P	P			H	H		
	Rice (minor)	H							P	P			H
	Corn					P	P			H	H		
	Millet					P	P			H	H		
Ghana	Corn (major)			P	P			H	H				
	Corn (minor)	H	H							P			
	Cocoyams	H				P	P						H
Guinea	Rice (upland)				P	P				H	H		
	Rice (swamp)	H				P	P	P	P		H	H	H
	Corn					P	P			H			

Table 1 – Crop Calendars for Major Food Items (1)

COUNTRY	CROP	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG		OCT	NOV	DEC
Guinea-Bissau	Rice (major)				P	P				H	H		
	Rice (minor)	H				P	P		P		H	H	H
Kenya	Corn (major)	H	H		P	P					H	H	H
	Corn (minor)						H				P	P	
Lesotho (5)	Corn (major)					H	H	H			P	P	P
Liberia	Rice (upland)				P	P				H	H		
	Rice (swamp)	H				P	P	P			H	H	H
	Cocoyams	H				P	P						H
Madagascar					H	H	H			P	P	P	
Malawi (6)	Corn	P	P			H	H	H	H			P	P
	Rice (major)						P	P				H	
	Rice (minor)					P	P						H
	Corn					P	P			H			
	Millet (major)					P	P	P			H	H	
	Millet (minor)			P	P						H	H	
Mauritania (8)	Rice						P				H	H	
	Millet						P				H	H	
Morocco	Wheat	P					H	H			P	P	P
	Barley					H	H	H			P	P	P
Mozambique	Corn					H	H	H				P	P
Niger (9)	Millet						P	P		H	H		
	Sorghum							P				H	H
Rwanda (10)	Sorghum		P	P			H	H					
	Sweet Potatoes		P	P			H	H					
Senegal											H	H	
	Millet						P				H	H	
Sierra Leone (11)	Rice (swamp)					P	P				H	H	H
	Rice (upland)						P				H	H	H
	Rice (moistland)				P	P		H	H				
Somalia	Corn (major)			P	P	P		H	H	H			
	Corn (minor)		H	H							P	P	
	Sorghum (major)				P	P			H	H	H		
	Sorghum (minor)		H								P	P	
Sudan (12)	Wheat			H	H							P	P
	Corn				P	P	P		H	H	H		
	Sorghum							P	P		H	H	
	Millet						P	P	P		H	H	H
Swaziland	Corn					H	H	H			P	P	P
Tanzania	Corn			P	P	P	P	H	H	H			
Togo	Corn				P	P			H	H			
	Millet					P	P			H	H		

Table 1 – Crop Calendars for Major Food Items (1)

COUNTRY	CROP	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Tunisia	Wheat					H	H	H			P	P	P
	Barley					H	H	H			P	P	P
Uganda (13)	Corn (major)				P	P			H	H	H		
	Corn (minor)	H	H							P	P		
Upper Volta (14)	Sorghum					P	P		H	H	H		
	Millet					P	P			H	H		
Zaire (northern)	Rice								P			H	
	Corn (major)		P				H						
	Corn (minor)						P					H	
Zaire (southern)	Rice	P				H							P
	Corn (major)	H									P		
	Corn (minor)	P					H						
Zambia (15)	Corn				H	H	H	H				P	P

Note: P = planting; H = harvesting

(1) Cassava excluded. Harvested year-round.

(2) Important food crops not listed include cassava, beans (harvested in February), and potatoes (harvested in July).

(3) Major corn crop is grown in the southern rainy region; millet and minor corn crop in the northern dry area.

(4) Teff is raised as a bread cereal almost exclusively in Ethiopia.

(5) Sorghum is harvested sooner than corn. Wheat (with April-November season) is less important than corn, and is in large part imported from South Africa.

(6) Sorghum and rice have crop seasons similar to corn. Country is vulnerable to seasonal food shortages, due to dry season averaging 5 months.

(7) Minor millet crop is raised in Mopti-Gao region when rainfall provides adequate soil moisture for planting.

(8) Rice is grown on recession plains along the Senegal River.

(9) Quick-maturing millet is grown to provide food before the longer-maturing sorghum crop is harvested.

(10) Sorghum and sweet potatoes are interplanted during the February-June rainy season, and beans and corn during the September-December rainy season.

(11) Tidal and inland swamp rice plants are grown in nurseries April-June and in transplanted July.

(12) Wheat is primarily irrigated.

(13) No prolonged dry season normally, but rainfall is particularly subject to variations in the northeast. All major grains have similar crop seasons.

(14) Sorghum is major staple. Smaller millet crop harvested in August-September, provides food until the sorghum harvest in October.

(15) Millet and sorghum crop seasons are similar to corn. Zambia is heavily dependent upon corn; the long dry season for the crop - 6 months - makes the country particularly vulnerable to shortfalls.

Table 2 – Major Rainfall Seasons

COUNTRY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY
Start: January-March																	
Benin			X	X	X	X	X	X									
Ghana			X	X	X	X	X	X	X								
Tanzania		X	X	X	X												
Start: April-May																	
Cameroon				X	X	X	X	X									
Ethiopia					X	X	X	X	X								
Gambia					X	X	X										
Guinea					X	X	X	X									
Guinea-Bissau				X	X	X	X	X	X								
Kenya				X	X	X	X										
Liberia					X	X	X										
Somalia				X	X	X											
Togo				X	X	X	X	X	X								
Uganda				X	X	X											
Start: June-August																	
Cape Verde							X	X	X								
Chad						X	X	X									
Mali						X	X	X									
Mauritania						X	X	X	X	X							
Niger						X	X	X									
Senegal						X	X	X	X								
Sierra Leone						X	X	X	X								
Sudan						X	X	X	X								
Upper Volta						X	X	X									
Zaire (Northern)								X	X	X							
Start: September-December																	
Angola										X	X	X	X	X	X	X	
Botswana											X	X	X				
Burundi											X	X	X	X	X	X	
Congo									X	X	X	X	X	X	X	X	X
Lesotho										X	X	X	X				
Madagascar												X	X	X	X	X	X
Malawi												X	X	X	X		
Morocco										X	X	X	X				
Mozambique											X	X	X	X	X	X	
Rwanda												X	X	X	X	X	X
Swaziland										X	X	X	X	X			
Tunisia										X	X	X	X	X			
Zaire (Southern)											X	X					
Zambia (South)											X	X	X	X			

Table 3 – Estimated Critical Hungry Periods

COUNTRY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN
Start: January-March													
Angola		X	X	X									
Madagascar	X	X	X										
Malawi		X	X	X									
Morocco			X	X	X								
Mozambique	X	X											
Rwanda	X	X	X										
Swaziland	X	X	X	X									
Tunisia			X	X	X								
Zambia			X	X	X								
Start: April-May													
Benin					X	X							
Cape Verde					X	X	X						
Ghana				X	X	X							
Kenya				X	X	X	X						
Somalia					X	X							
Tanzania				X	X	X							
Togo				X	X	X							
Start: June-August													
Cameroon						X	X	X					
Chad								X	X				
Gambia							X	X					
Guinea							X	X					
Guinea-Bissau						X	X	X					
Liberia							X	X					
Mali								X	X				
Mauritania								X	X				
Niger						X	X	X					
Senegal								X	X				
Sierra Leone					X	X							
Sudan								X	X				
Uganda						X	X						
Upper Volta						X	X	X					
Start: September-December													
Botswana												X	X
Burundi									X	X			
Cape Verde									X	X			
Congo									X	X	X		
Ethiopia											X	X	X
Malawi												X	X
Zaire (Northern)										X			
Zaire (Southern)											X	X	

Table 4 – Optimal Months for Timely Food Aid Shipment from the United States

COUNTRY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Central African Republic	X	X										
Ghana	X	X										
Morocco	X	X										
Benin		X	X									
Kenya		X	X									
Somalia		X	X									
Togo		X	X									
Tunisia		X	X									
Uganda		X	X									
Guinea-Bissau			X	X								
Niger			X	X								
Cameroon				X	X							
Chad				X	X							
Gambia				X	X							
Liberia				X	X							
Mali				X	X							
Mauritania				X	X							
Sierra Leone				X	X							
Upper Volta				X	X							
Senegal					X	X						
Sudan					X	X						
Zaire (Northern)					X	X						
Burundi						X	X					
Cape Verde						X	X					
Djibouti						X	X					
Congo							X	X				
Ethiopia							X	X				
Rwanda							X	X				
Zaire (Southern)							X	X				
Botswana								X	X			
Lesotho								X	X			
Mozambique								X	X			
Madagascar									X	X		
Malawi									X	X		
Somalia									X	X		
Angola										X	X	
Swaziland										X	X	
Zambia										X	X	
Tanzania	X											X

Table 5 – Shipping Time Requirements from New Orleans

Country of Destination	Port	Distance	Travel Time in number of days	
		miles	18 knots	13 knots
Angola	Lobito	6,609	15.0	21.0
Egypt	Alexandria	6,369	14.5	20.0
Gambia	Bathurst	4,381	10.0	14.0
Ghana	Accra	5,603	13.0	18.0
Kenya	Mombassa	9,496	22.0	30.5
Lesotho	Durban	7,957	18.3	25.3
Morocco	Casablanca	4,412	10.0	14.0
Mozambique	Beira	8,651	20.0	27.5
Senegal	Dakar	4,268	9.5	13.5
Sierra Leone	Freetown	4,661	10.5	14.7
Sudan	Port Sudan	7,273	16.5	23.3
Swaziland	Maputo	8,254	19.0	26.5
Tanzania	Zanzibar	9,555	22.0	30.5
Zaire	Matadi	6,562	15.0	21.0