Disaster Risk Reduction for Food and Nutrition Security

KEY PRACTICES
for DRR Implementers

Humanitarian Aid
and Civil Protection

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Disaster Risk Reduction for Food and Nutrition Security: Key Practices for DRR Implementers

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Disaster Risk Reduction for Food and Nutrition Security

This brief is part of the series, *A Field Guide for Disaster Risk Reduction in Southern Africa: Key Practices for DRR Implementers*, coordinated by the FAO Subregional Office for Disaster Risk Reduction/Management for Southern Africa. This series has been produced with contributions from COOPI, FAO, OCHA and UN-Habitat, and comprises the following technical briefs:

- Information and Knowledge Management (COOPI)
- Mobile Health Technology (COOPI)
- Safe Hospitals (COOPI)
- Disaster Risk Reduction for Food and Nutrition Security (FAO)
- Appropriate Seed Varieties for Small-scale Farmers (FAO)
- Appropriate Seed and Grain Storage Systems for Small-scale Farmers (FAO)
- Farmer Field Schools (FAO)
- Irrigation Techniques for Small-scale Farmers (FAO)
- Management of Crop Diversity (FAO)
- Community-based Early Warning Systems (OCHA and FAO)
- Disaster Risk Reduction Architecture (UN-Habitat)

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Foreword by ECHO

The southern Africa and Indian Ocean region is extremely vulnerable to cyclones, floods, droughts and tropical storms. These recurrent climate-related shocks negatively affect the highly sensitive livelihoods and economies in the region, and erode communities' ability to fully recover, leading to increased fragility and vulnerability to subsequent disasters. The nature and pattern of weather-related disasters is shifting, becoming unpredictable, and increasing in frequency, intensity and magnitude as a result of climate change. Vulnerability in the region is further compounded by prevailing negative socio-economic factors, such as high HIV rates, extreme poverty, growing insecurity and demographic growth and trends (including intra-regional migration and increasing urbanization).

The European Commission's Office for Humanitarian Affairs (ECHO) has actively engaged in the region through the Disaster Preparedness ECHO (DIPECHO) programme since 2009, supporting multi-sectorial disaster risk reduction interventions in food security and agriculture, infrastructure and adapted architecture, information and knowledge management, water, sanitation and hygiene, and health. This programme operates with two objectives, notably:

- Emergency preparedness by building local capacities for sustainable weather-hazard preparedness and management, including seasonal preparedness plans, training, emergency stocks and rescue equipment, as well as Early Warning Systems.
- Empowering communities through multi-sectorial and multi-level approaches with DRR mainstreamed as a central component and improved food and nutrition security as an outcome.

This is done in alignment with national and regional strategies and frameworks.

For DIPECHO, one of the main measures of success is replicability. To this end, technical support through guidelines established for DRR implementers is a welcome output of the DIPECHO interventions in the region. ECHO has supported regional partners, namely COOPI, FAO, UN-Habitat and UN-OCHA, to enhance the resilience of vulnerable populations in southern Africa by providing the funding to field-test and establish good practices, and to develop a toolkit for their replication in southern Africa. It is the aim of the European Commission Office for Humanitarian Affairs and its partners to fulfil the two objectives sustainably and efficiently through the practices contained in this toolkit to ensure the increased resilience of the most vulnerable populations in the region.

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Foreword by FAO

The southern Africa region is vulnerable to a diverse array of hazards, largely linked to environmental causes (such as drought, cyclones and floods); human, animal and plant diseases and pests; economic shocks; and in some areas socio-political unrest and insecurity, among others. The region's risk profile is evolving, with new factors becoming gradually more prominent, including a trend towards increased urbanization, migration and mobility, among others. Natural hazards will be progressively more influenced by trends in climate change. Disasters in the region are often composite and recurrent, and have a dramatic impact on livelihoods and on southern African countries' economy and environment, often undermining growth and hard-won development gains.

Increasing the resilience of livelihoods to threats and crises constitutes one of the Strategic Objectives of FAO's Strategic Framework (Strategic Objective 5, or SO5). FAO specifically aims at building resilience as it relates to agriculture and food and nutrition security, which are among the sectors most severely affected by natural hazards. The impact of shocks and disasters can be mitigated and recovery can be greatly facilitated if appropriate agricultural practices are put in place; improving the capacity of communities, local authorities and other stakeholders is therefore central to resilience building.

Together with partners, FAO is undertaking intensive work in southern Africa to consolidate the resilience of hazard-prone communities; this is leading to an improved knowledge base and to documentation of good practices. This toolkit purports to disseminate improved methods and technologies on key aspects of agriculture, such as appropriate seed varieties, irrigation, storage systems, land and water use and Farmer Field Schools, in the hope that they may serve different stakeholders to improve their resilience-building efforts. A multi-sectoral approach and solid partnerships are seen as key to the success of resilience-building work. For this reason, this toolkit also includes non-agricultural aspects of good resilience practices, contributed by FAO partners: the UN-OCHA, UN-HABITAT and COOPI, which certainly strengthen this collection.

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Acronyms and Abbreviations

DRR ..... disaster risk reduction

FNS ..... food and nutrition security

GLEWS ..... Global Early Warning System for Major Animal Diseases

GIEWS ..... Global Information and Early Warning System on food and agriculture

HFA ..... Hyogo Framework for Action

HIV/AIDS ..... human immuno-deficiency virus/acquired immune deficiency syndrome

IPCC ..... Intergovernmental Panel on Climate Change

IPM ..... integrated pest management

OIE ..... World Organization for Animal Health

SADC ..... South African Development Community

SARCOF ..... Southern Africa Regional Climate Outlook Forum

SREX ..... Special Report on Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation

WHO ..... World Health Organization

1. Introduction

Southern Africa[1] is a highly diverse region, from both a geographic and a climatic point of view, spanning the ample deserts in Namibia to the Equatorial rainforests in the Democratic Republic of the Congo (DRC). This diversity is also reflected in the variety of hazards that recurrently affect an important part of the surface and the population.

Hazards in southern Africa are often due to disruptive climatic events, particularly severe droughts, floods and/or cyclones. The 1992 drought that affected most of southern Africa, and cyclones Eline in 2000 and Favio in 2007, which heavily impacted Mozambique and Madagascar, are among the most destructive events of the last two decades in this region. Each of these events led to substantial devastation with regard to lives and livelihoods, and both also had significant impacts on the region's economic development. Climate change is a major concern in this regard, as extreme weather events are expected to increase and become more severe.

During the last decades other crises have occurred, including man-made hazards, such as armed conflicts (i.e. DRC), political conflicts (i.e. Madagascar) in socio violence/conflicts (i.e. Zimbabwe) as well as food price volatility. Biological factors, such as the spread of animal and plant pests and diseases (brown streak and mosaic diseases of cassava, or foot-and-mouth disease that affects cattle) have also impacted the food, nutrition and livelihood security in the region. The impacts of such disasters include reduction of agriculture production, destruction of productive assets, like agricultural equipment and facilities, as well as disrupting trade and market access. All these factors negatively impacted the farmers' income and their ability to adequately and safely feed their families.

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1 For the purpose of this document, the following countries of the southern Africa sub-region are included Angola, Botswana, Comoros, Democratic Republic of Congo, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, Zambia and Zimbabwe.

The people of southern Africa's rural communities are highly dependent on agriculture (including forestry, livestock production and fisheries) for a living; and for them the impact of disasters may lead to a progressive impoverishment. Moreover, underlying structural and vulnerability factors, including extreme poverty levels, HIV/AIDS, water scarcity and environmental degradation, will further increase the impact of disasters throughout the region.

The Food and Agriculture Organization of the United Nations (FAO) leads international efforts to defeat hunger, supporting countries to improve sustainable agriculture, livestock, forestry and fishery practices to ensure food and nutrition security for all. FAO's Disaster Risk Reduction for Food and Nutrition Security Framework Programme, aims at building hazard-prone communities' resilience through strengthening agricultural livelihoods, in order to be prepared for possible hazards, reduce their impact, and facilitate an early recovery. It aims to guide the implementation, scaling up and acceleration of its disaster risk reduction (DRR) work at local, national, regional and global levels and consolidate its technical cross-sectoral expertise on DRR.

Objective and intended application

This brief provides general understanding of what DRR and resilience is, what it means for the agricultural sectors in the southern African context, and what may help to build resilient livelihoods to threats and emergencies and ensure the food and nutrition security of the agriculture-dependent communities. It outlines an overall context for the other documents produced in this series*, A Field Guide for Disaster Risk Reduction in Southern Africa: Key Practices for DRR Implementers.* Moreover, it describes FAO's Framework Programme and within this context provides overall information and technical recommendations, which can help field practitioners, government officers and non-governmental organizations, involved in the formulation or implementation of DRR projects and programmes in southern Africa. In particular, it may serve as a reference guide during the identification, formulation and planning of activities that aim to build resilient livelihoods in the agriculture, livestock, fisheries/aquaculture, forestry and natural resource management sectors in hazard-prone areas.

2. Key Concepts

Disaster risk reduction

People's livelihoods are impacted by various types of shocks and crises, which can lead to the damage or destruction of human lives, crops, animals, fishing boats and gear, infrastructure, etc. The extent of the impact depends on the intensity of the hazard, the level of people's vulnerability and their capacity to cope with these shocks and stresses.

$$\text{Risk} = \frac{\text{Hazard x Vulnerability}}{\text{Capacity}}$$

According to the United Nations International Strategy for Disaster Reduction (UNISDR), disaster risk reduction is: "the concept and practice of reducing disaster risks through systematic efforts to analyze and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events." The concept of DRR as promoted by UNISDR was initiated to address natural hazards. The Hyogo Framework for Action 2005-2015 (HFA), adopted by 168 countries, provides a 10 year action-plan for DRR; it has been adopted by all southern African countries.[2] The HFA provides a coordination mechanism, and has created regional and national platforms guiding the implementation of DRR activities across sectors.

DRR interventions aim to avoid (*prevention*) or to limit (*mitigation* and *preparedness*) the adverse impacts of hazards, thereby minimizing vulnerabilities and disaster risks as well as facilitating an early recovery after the shock. Within the field of DRR, a further distinction can be made between '*structural*' measures (physical and technical), which refer to engineering techniques that focus on hazard-resistance, and those that are '*non-structural*' (diagnostic, policy and institutional), such as advocacy, knowledge and practices or agreements to reduce risks and impacts. In addition to being effective in terms of saving lives and livelihoods, DRR is also efficient and cost effective: it is calculated that for every dollar spent on DRR,

2 The five priority areas of the HFA are: (1) Ensure that disaster risk reduction is a national and a local priority with a strong institutional basis for implementation. (2) Identify, assess and monitor disaster risks and enhance early warning. (3) Use knowledge, innovation and education to build a culture of safety and resilience at all levels. (4) Reduce the underlying risk factors. (5) Strengthen disaster preparedness for effective response at all levels.

between US$2 and US$4 are saved that would otherwise be spent on disaster relief and rehabilitation.[3]

DRR is a key concept for agriculture since the majority of the people vulnerable to natural hazards and disasters are the food insecure and the poor who derive their livelihoods from agriculture and its subsectors.

Resilience

Disasters and crises that affect food and nutrition security go beyond natural disasters; therefore, FAO promotes a multi-hazard approach to strengthen the resilience of livelihoods against disasters and ensure food and nutrition security. The concept of resilience establishes the wider frame, which includes DRR but goes beyond it. The resilience concept as promoted by FAO in the context of shocks and crises applies multi-sectoral and multi-hazard perspectives; the shocks and crises addressed in integrated ways in FAOs approach include natural disasters, food chain emergencies/transboundary threats; socio-economic crises; violent conflicts; and protracted crises.

The FAO resilience concept applied to the context of shocks and crises:

- stresses the link between underlying risk factors that create overall vulnerability, and the acute threats people face through their exposure to extreme events;
- emphasizes the need for stronger synergies between development and humanitarian perspectives and actions to promote short- and long-term resilience; and
- reinforces that, ultimately, resilience must be embedded into the institutional, social, economic, environmental dimensions of sustainable development, in efforts at all levels to fight hunger and malnutrition.

The promotion of resilience of livelihoods calls for synergies between technical good practices for disaster risk reduction and climate change adaptation, food chain crises prevention, social protection, financial risk transfer and tenure of natural resources for the most vulnerable.

FAO's definition of resilience is

"the ability to prevent disasters and crises as well as to anticipate, absorb, accommodate or recover from them in a timely, efficient and sustainable manner. This includes protecting, restoring and improving livelihoods systems in the face of threats that impact agriculture, nutrition, food security and food safety."

3 DFID, 2006

3. FAO's DRR for Food and Nutrition Security Framework Programme

In its commitment to support livelihood protection and to strengthen capacities to absorb the impact of and recover from disasters through risk reduction, FAO has developed a Disaster Risk Reduction for Food and Nutrition Security Framework Programme. It aims to guide the implementation, scaling up and acceleration of FAO's DRR work at local, national, regional and global levels and consolidate its technical cross-sectorial expertise on DRR in the wider context of resilience building.

"The goal of the FAO's DRR for Food and Nutrition Security Framework Programme is to enhance the resilience of livelihoods against threats and emergencies to ensure the FNS of vulnerable farmers, fishers, herders, foresters and other at risk groups." (FAO, 2013: viii)

The Framework Programme consists of four pillars, which integrate all agricultural sectors and promote cross-sectoral collaboration. These four pillars are closely linked to the priority areas of the Hyogo Framework for Action 2005-2015 (HFA).

Pillar 1 – 'Enable the environment': good governance and institutional strengthening

The objective of pillar 1: is "to support the enabling environment of FAO's member states, with appropriate legislation, policies and institutional frameworks for DRR for FNS in agriculture, livestock, fisheries/aquaculture, forestry and natural resource management and to strengthen the institutional capacities to implement these initiatives." (FAO, 2013: iv)

National DRR laws, policies and institutional mechanisms are required to support the implementation of appropriate actions at local level. DRR interventions should be integrated into poverty reduction and development programming and policies, and close coordination amongst institutions at different levels are key to avoid overlaps and promote synergies and complementarities, including between humanitarian and development actors to ensure sustainability of actions.

Pillar 2 – 'Watch to safe guard': information and early warning systems

The objective of pillar 2 is to "strengthen and harmonize food and nutrition security information and early warning systems to better monitor the multiple threats and inform decision-making in preparedness, response, policy, advocacy and programming." (FAO, 2013: 32)

Monitoring emerging and existing threats, such as natural hazards, transboundary plant and animal pests and diseases, food safety hazards and economic crises (such as price volatility) is crucial to build resilient livelihoods. Improved monitoring, data collection and analysis will help small-scale farmers and other relevant stakeholders to take rapid decisions after an early warning. Capacity building is important to assure that the data is accurately collected and reliable, for early warning and forecasting, but also to monitor and analyze the various hazards that impact livelihoods.

Pillar 3 – 'Apply prevention and mitigation': agricultural practices and technologies that prevent and reduce the adverse impact of hazards

The objective of pillar 3: is "to reduce the underlying risks to food and nutrition security through the application of technologies, good practices and approaches in farming, fisheries/aquaculture, forestry and natural resource management for prevention, mitigation and livelihood diversification." (FAO, 2013: 50)

Appropriate agricultural prevention and mitigation measures include a range of technologies, practices and approaches that help to increase the resilience of rural communities and to prevent and mitigate the impact of future disasters. In this regard, it is important to support capacity development, strategic partnerships and policy development, taking into account that technologies and practices for DRR are always location and context-specific, and are dependent on local factors.

Pillar 4 – 'Prepare to respond': improve preparedness for disaster response and recovery

The objective of pillar 4 is to "strengthen capacities at all levels – in preparedness – to improve response to, and recovery from, future threats to food and nutrition security, and to reduce their potential negative impacts on livelihoods." (FAO, 2013: 60)

When people and communities are well-prepared to respond to and recover from emerging threats or crises, the adverse impact on their lives and livelihoods can be reduced. At the community level, preparedness can be improved through the implementation of appropriate technologies and practices, as well as well-functioning early warning systems. Timely and effective disaster response requires leadership, coordination and awareness-raising at all levels, among both humanitarian and development actors. It also requires operational capacities and technical know-how on DRR and management for agriculture and food and nutrition security.

Besides the four pillars, the Framework Programme includes four cross-cutting issues: Capacity Building, Knowledge Management and Communication, Strategic Partnerships and Gender Equity.

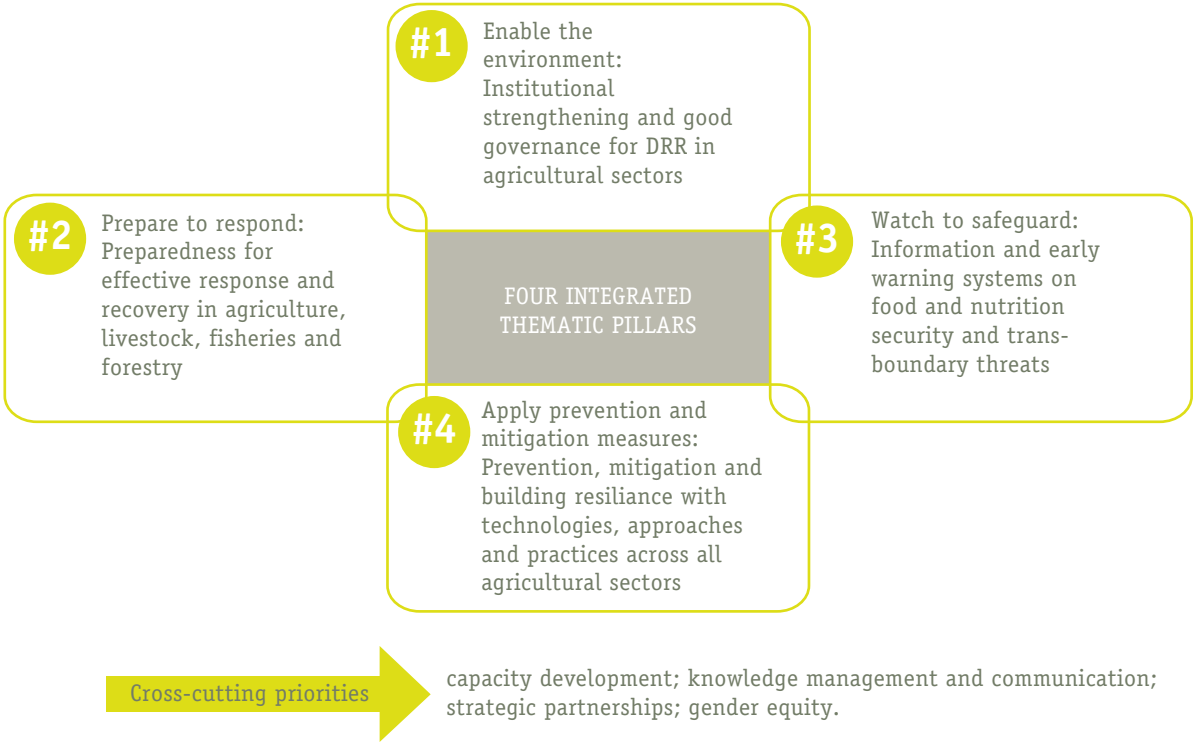

Figure 1: DRR for FNS Framework Programme
Source: FAO, 2013a

4. FAO's Framework Programme in Southern Africa

Main disasters and threats in southern Africa

Various disasters impact the lives and livelihoods of small-scale farmers, herders, fishers and foresters throughout southern Africa:

Natural disasters, such as droughts, floods and cyclones are the main natural disasters in southern Africa, and have an enormous potential to inflict severe damage to agriculture production, destroy production assets like equipment or infrastructures, disrupt market access and highly affect food and nutrition security, food safety and farmers' income. In the last 20 years, these weather-related events have resulted in substantial numbers of affected people and economic losses. The 1992 drought, for example, affected over 86 million people throughout 10 countries. Around 5 million people were affected by cyclones Eline and Hudah in 2000 in Madagascar and Mozambique. Four years later cyclone Favio and extensive flooding severely affected 200 000 people and agricultural production in Madagascar where in some locations 80 percent of crops were lost.[4]

As a result of climate change the region is likely to experience more severe weather patterns, including more drought episodes, which will have a great impact on rural communities that are largely dependent on rain-fed agriculture. The following section outines the hazards to which southern Africa is exposed.

4 http://www.fao.org/newsroom/en/news/2007/1000518/index.html; http://www.fao.org/docrep/004/x7009e/pays/soaf0004.htm

Food chain emergencies of transboundary threats, such as transboundary plant, animal, aquatic and zoonotic pests and diseases. *Transboundary* plant pests and animal diseases can easily spread between countries and reach epidemic proportions; where control/management, including exclusion, are needed, addressing these threats requires cooperation between several countries. Transboundary plant pests and diseases include locusts or armyworms and cassava brown streak and mosaic diseases. Transboundary animal diseases include foot-and-mouth disease that affects cattle and Rift Valley fever or *Peste des Petits Ruminants*, which affect small ruminants.

Food chain emergencies resulting from transboundary threats reduce the productivity of crops and animals and may have severe consequences for food safety and public health in the case of food contamination or zoonosis (animal diseases that can also affect humans, such as Brucellosis or Rift Valley fever). Food-borne illnesses are also a cause of malnutrition, due to the consumption of unsafe food.

Environmental degradation: The degradation of land, natural water catchments, forests and coastal marine and inland aquatic systems, undermine nature's defense capacity against natural hazards, aggravating the impact of disasters and further contributing to ecosystem degradation, erosion, desertification and biodiversity loss. Environmental degradation may negatively affect agricultural productivity, food security, food safety and civil protection, as people often settle in areas highly exposed to flood risk or land and water degradation.

Socio-economic crises, such as volatility in agricultural commodity markets and soaring food prices. On several occasions over the past decade, food prices rapidly increased as a result of poor harvests and other factors such as food commodity speculation and the expansion of bio-fuel crops. The global food crisis of 2007–2008 had a significant impact on the prices of the main staple cereals, which further aggravated malnutrition in the region and impoverished vulnerable communities. In 2010, the soaring food prices triggered riots in food importing countries, such as in Mozambique.

Other main social threats that have a macroeconomic impact on some countries in southern Africa are the high levels of chronic malnutrition and HIV/AIDS infection.

Protracted crises are prolonged emergencies that are characterized by high levels of food insecurity. Throughout the region, armed, political and social conflicts and violence have occurred (political crisis in Madagascar and Zimbabwe) or are still active (e.g. the Kivu conflict in the DRC).

Pillar 1 – Enable the environment: good governance and institutional strengthening

At regional level, southern Africa has made progress over the last years in terms of developing regional structures and establishing DRR policies and plans. For instance, the Southern Africa DRR Plan 2012–2014 was developed to allow comprehensive disaster programming, and the Southern African Development Community (SADC) has increased its involvement in DRR to ensure the coordination of regional preparedness and response programmes for transboundary hazards and disasters, by setting up a Regional Platform for DRR as well as provide food security, meteorological information and alerts on political instabilities and conflicts. Challenges remain including limited funding and coordination of regional institutional frameworks for DRR.[5]

At national level, efforts in DRR are uneven, although institutional structures, such as national disaster management authorities and DRR national platforms are established in most of the southern African countries.[6] National platforms are country-owned fora

5 http://www.sadc.int/themes/disaster-risk-management/

6 According to UNISDR, the following countries have officially declared national platforms for DRR: Botswana, Comoros, Democratic Republic of Congo, Lesotho, Madagascar, Malawi, Namibia, Seychelles, South Africa, Zambia. http://www.preventionweb.net/english/hyogo/national/list/?pid:23&pih:2

where DRR stakeholders (public and private, national and international) meet to exchange information, knowledge, experience, analyses and coordinate DRR activities.

Most of the countries also have legal frameworks, policies and national plans and strategies for DRR, although efforts should be done to assure the full implementation of these policies. National strategies and plans have also been developed and established in important sectors that are concerned by DRR, such as food security, nutrition, social safety-net programmes, poverty reduction, sustainable natural resource management and sustainable development.

However, efforts need to be enhanced to link these existing strategies with DRR plans and strategies.

The Southern African Regional Interagency Standing Committee (RIASCO) identified the following main challenges to humanitarian and DRR interventions in the region:

- Uneven human resource capacities in national disaster management authorities;
- High dependence on external funding; and
- Limited institutional and operational capacity for urban risk management in rapidly expanding cities, which among others constraints risk management planning.[7]

Recommendations

The following section outlines recommendations to build capacity in countries at various levels related to three areas, namely legal and policy frameworks on DRR, institutional structures and coordination and institutional capacity development of risk reduction in and across agriculture-related sectors.

Legal and policy frameworks on DRR

Both legislation and policies for DRR are essential, as they provide the formal basis for implementing as well as enforcing DRR strategies, plans and activities by any institutions.

7 Holloway et al., 2013

Agriculture and food and nutrition security sectors (agriculture, livestock, fisheries and aquaculture, forestry, natural resource management, food safety and consumer protection) should be included in the national DRR laws, policies and strategies, likewise DRR considerations should be taken into account in agricultural and rural policies.

Institutional structures and coordination

DRR institutions and structures are needed to support and implement DRR laws, regulations and activities. The involvement of all relevant stakeholders, as well as adequate cooperation and coordination among agencies at different levels, are needed to effectively implement all efforts to reduce the impact of disaster to food and agricultural sectors. Some recommendations are:

- **Ensure relevant representation of line ministries in the national and local DRR structures.** It is very important that agriculture-related line ministries, e.g. agriculture, livestock, fisheries/aquaculture, forestry and natural resource management, are involved in national and local DRR structures, due the substantial impact of disasters on the food and nutrition security of agriculture-dependent communities.
- **Facilitate strategic coordination and partnerships among humanitarian and development actors.** Strategic coordination and partnerships help to ensure effective DRR and reduce any potential overlap in the work of both humanitarian and development actors.
- **Promote resource mobilization and investment programming for DRR.** Preventive DRR interventions are often under-funded, and there is a strong need to advocate the inclusion of DRR within the national government budgets and international funding agendas to ensure proper funding; this advocacy should be supported by evidence that funds invested in preventive DRR will reduce the needs of a response after a disaster.
- **Ensure that institutional structures own and support DRR's implementation.** National institutions should lead the implementation of DRR.

- Promote partnerships among community-based organizations, universities/research centers and extension services for DRR. Partnerships and involvement of key stakeholders are important for the identification, selection, testing and validation of agriculture good practice options for DRR, which are location and context-specific.

- Strengthen traditional institutions and knowledge, and promote the exchange of knowledge, information and experience between communities. To build upon traditional knowledge of rural communities, promote the exchange of information, knowledge and experiences, will help communities to improve DRR strategies. Fostering partnerships between government and communities helps to strengthen institutional collaboration to ensure that DRR is effectively implemented and supported at the local level.

Institutional capacity development for risk reduction within and across agriculture-related sectors

Institutions require adequate human resources, with the technical capacities to implement DRR activities. Capacity building is often required to improve the implementation of DRR actions. To achieve this, some recommendations are:

- Strengthen the capacity of line ministries to deliver national legislation, policies and strategies on DRR through the provision of technical advice, human resources and expertise, training, practical tools and services.
- Support decentralized DRR actions and strengthen the capacities at sub-national level through involvement of local authorities, extension services and community-based organizations to deliver DRR activities and interventions.
- Promote and support community-based DRR approaches and local planning. Communities are first responders during an

emergency and, therefore, need to be fully involved in designing, planning, implementing and monitoring DRR actions for these actions to be effective.

- Promote investment in knowledge management and dissemination of gender-sensitive DRR at the global, regional, national and sub-national levels. DRR interventions should include gender sensitive approaches that take into account women's and men's specific vulnerabilities, needs and capacities.
- Promote and support sustainable natural resource management practices, such as wetland management, sustainable fisheries, land and soil management, efficient energy use, and natural resources tenure rights security.
- Promote and support sustainable land use planning to reduce risks, including urban/territorial development. Inappropriate land use planning can exacerbate risks; therefore, sustainable land use planning needs to be promoted.

The case study below provides an overview of institutional frameworks and structures in South Africa. It outlines the progress that has been made to promote an enabling environment, specifically with the inclusion of DRR into its agricultural plan and policies, although challenges and constraints remain.

BOX 1: LEGISLATIVE FRAMEWORKS AND INSTITUTIONAL STRUCTURES FOR DISASTER RISK MANAGEMENT IN SOUTH AFRICA

South Africa, prone to natural hazards including droughts, floods, cyclones and fires, has been at the forefront of establishing disaster risk management legislation and institutional structures at all levels. In 2002, it established the Disaster Management Act (DMA) along with the 2005 National Disaster Management Framework, which provides the legal framework that promotes prevention, mitigation and preparedness for disaster response and recovery as well as outlines the institutional structure for disaster risk management at national, provincial and municipal levels.

At the core of this institutional structure is the National Disaster Management Center (NDMC), which is the main body that develops, coordinates, implements and monitors legislation, policies and cross-sectorial activities at all levels. Disaster management centers also exist in each province and municipality and their exact roles and responsibilities regarding planning, implementation, monitoring, communication and coordination of activities with other key actors are described in the DMA.

South Africa included risk management activities into its 1998 agricultural policy, such as the promotion of technologies and practices to reduce risk and the collection of climate trends and market information. It started to systematically integrate disaster risk management as a strategic goal in its agricultural plans from 2008 onwards;* similarly agricultural sectors featured strongly in the 2005 drought plan. This mainstreaming is highly important as disasters severely affect small-scale farmers whose livelihoods are largely dependent upon agriculture.

Despite the establishment of legislation, the advancement compared to other countries in the region of the inclusion of DRR into agricultural sectorial plans and policies as well as the establishment of institutions at all levels, constraints exist in the effective functioning of the system. Limited financial resources, which in turn restrict the implementation capacity of institutions, in particular at the local level as well as the lack of communication and coordination between the disaster management centers at different levels, are among the challenges. However, DRR is fully driven and owned by the South African government, which should be applauded and further stimulated, because having these legislative frameworks and institutional structures in place is a prerequisite for implementing proactive measures that help to prevent and mitigate the impact of disasters.

Source: Van Niekerk and Visser, 2010; SALGA, 2011

* See South Africa's Strategic Plan for the Department of Agriculture, 2008/09 – 2010/11; the Sectorial Disaster Risk Management Plan, 2012; and the Strategic Plan for the Department of Agriculture, Forestry and Fisheries, 2012/3 – 2016/7.

Pillar 2 – Watch to safe guard: information and early warning systems

There have been improvements in the collection of information on disasters and emergencies at national and regional level, although the efforts are uneven throughout the region: only Mozambique, Malawi and Madagascar systematically collect information.[8]

There remain many challenges at regional and country level regarding the monitoring of natural hazards, climate conditions, economic crises and political conflicts and their effects on food and nutrition security. These limitations refer to the scope, data collection methodologies and user applications, institutional structures, capacity, coordination and communication.

Regional and national food security information systems mainly focus on natural events affecting food security and less on the impacts of long-term trends like climate change and economic crises and their effects on food and nutrition security. Besides limitations in terms of scope, additional challenges of these systems include inaccuracy of food security data caused by the use of official and unofficial data sources; the lack of consensus between countries on the use of indicators and the inconsistent measurement of different food security dimensions due to use of different methodologies by countries.

8 UNECA, 2011; Holloway et al., 2013

In terms of the use of information, it seems that there is a gap between the information collected and the data users' needs. Moreover, information is not timely provided in order to facilitate decision-making, it is poorly disseminated and does not reach vulnerable communities due to the lack of communication strategies. In general, it is observed that institutions have limited capacity at the national and decentralized levels to collect, analyze, report and communicate food security and hazard information. In many countries in the region it is unclear which institutions are responsible for food security issues.

The 2013 Southern African Regional Interagency Standing Committee (RIASCO) study identified challenges related information and early warning systems including:

- The lack of comprehensive and constantly updated risk assessment and analysis, which limits planning and effective DRR actions to address priority needs;
- Weak information and knowledge management systems, especially in high risk areas; and
- Uneven and often limited bilateral communication between neighbouring countries on transboundary threats, including cholera outbreaks and floods.[9]

9 Holloway et al., 2013 and SADC, http://www.sadc.int/themes/disaster-risk-management/

Global initiatives on early warning systems (EWS) can be useful tools to provide standard and periodic information to assess and monitor threats and provide timely alerts. Some of these global early warning systems, in which FAO participates, are active in southern Africa, and have been very useful for countries to report on threats based on internationally recognized methodologies and indicators that can be compared amongst countries in the region, as well as improve the collection and verification of information and facilitate the decision making process at national and regional levels. Some of these global EWS include:

- The Global Early Warning System for Major Animal Diseases (GLEWS), a joint collaboration between FAO, World Organization for Animal Health (OIE) and the World Health Organization (WHO), disseminates coordinated alerts on transboundary animal diseases. GLEWS has been a very useful tool to monitor the spread of animal diseases and help governments take emergency measures to control outbreaks, e.g. foot-and-mouth disease, Rift Valley fever or *Peste de Petits Ruminants*.
- The Global Information and Early Warning System on food and agriculture (GIEWS) is another useful tool, which has significantly helped to mitigate the impact of plant or insect plagues, as well as monitor macro-economic trends on cereal flows. GIEWS' contributions to monitoring the soaring food price crisis, or the outbreaks of locust or armyworm in Southern Africa, have been very helpful to governments in taking decisions.
- The Integrated Food Security Phase Classification (IPC) consists of a set of standardized tools and procedures, which aim to establish the severity and magnitude of food insecurity situations within and among countries and over time. Accurate and timely food security information and monitoring may help to reduce, predict and prepare for food insecurity situations as well as help decision-makers to take informed actions. The IPC implementation is undertaken in two stages: so far IPC stage 1 awareness raising and consultations have been held in Angola, Botswana, Madagascar, Namibia and Zambia and in-country training and analysis workshops (stage 2) have been realized, in addition to stage 1, in Madagsacar, Malawi, Mozambique, South Africa, Swaziland, Zimbabwe and Lesotho.

Important efforts have also been dedicated to the implementation of community-based EWS, such as the monitoring of river levels with gauges or the transmission of information through mobile phones (see *Community-based Early Warning Systems* in the present series).

Recommendations

Accurate and timely information and early warning messages can support hazard-prone and vulnerable communities to take informed and appropriate decisions, which can potentially help them to prevent and/or mitigate a hazard from turning into a disaster.

Improved monitoring of traditional and emerging threats

- **Statistical baselines; multi-hazard risk mapping and analysis of agriculture-related livelihoods; vulnerability and risk assessment and analysis.** Statistical baselines are essential to monitor the level of food and nutrition insecurity, both acute and chronic, based on accurate and reliable data. Multi-hazard risk analysis and mapping are also important to understand which areas are vulnerable to specific types of hazards and risks, including gender disaggregated data and analysis, to evaluate and monitor people's coping capacity to design future interventions and inform policy.
- **Weather monitoring and seasonal forecasting (rainfall, vegetation index, yield forecast, etc.).** Timely and accurate meteorological data can mitigate the impact of disasters, allowing farmers to take decisions in terms of early or late planting, type of crops or varieties to cultivate, among others. Capacity building is needed to facilitate data collection, monitoring and analysis, as well as to disseminate this information for decision-making.
- **Monitoring of transboundary animal diseases, plant pests and diseases, and threats to food safety.** Animal diseases and plant pests and diseases can have a devastating effect on the livelihood of small-scale farmers and herders. Prevention

measures should be mainstreamed in all the productive activities for the most common diseases and pests, but when an outbreak occurs, timely information is fundamental for decision-making both at institutional level (quarantine, restrictions on movement of livestock, animal and vegetal products) as well as at famers'/herders' level (protection measures on-farm, avoidance of buying and moving animals, early harvest, harvest of green products).

- Food price monitoring. Monitoring and dissemination of food prices and trends is very important for small farmers to take appropriate decisions on the sale or storage of their harvest. The prices of main commodities (usually cereals and cassava for southern Africa) may double between the harvest period (when there is a surplus in the market) and the lean period (when farmers have often depleted their stocks and are obliged to buy food). In southern Africa the price of main commodities is influenced by the international prices, as well as the speculation on agricultural products made by middlemen or intermediaries at different levels; however, governments can mobilize national grain reserves and restrict the exports of main commodities to counteract or minimize the soaring of food prices. The monitoring of food prices is closely linked to the monitoring of animal and vegetable production, and the impact of hazards or weather conditions on the expected harvest.
- Simulation and modelling the impact of shocks on household food and nutrition security. Each household has a different coping capacity to recover from a shock through the use of savings, sale of assets or coping mechanisms (providing labour to work on other people´s land, consumption of less preferred food, reduction of number of meals). Under extreme stress, these coping mechanisms can lead to social and environmental problems (poaching, over-exploitation of natural resources, migration). Simulating and modelling the impact of shocks on the household´s food and nutrition security helps to assess on the foreseeable extent of the shock and to design appropriate interventions and facilitate decision-making.

Harmonized monitoring, analysis and communication of the multiple threats to FNS

Harmonized monitoring and analysis is desirable and necessary in order to compare data among different countries. Effective communication through various means is essential, as different disasters affect various sectors, for example outbreaks of cholera occur after floods or cyclones due to contamination of food and water.

- Integrated monitoring and early warning, across: sub-sectors, different levels and multiple threats. At present monitoring and early warning primarily focus on agriculture production, but since disasters and new threats like rising food prices also affect agricultural sub-sectors a comprehensive multi-hazard analysis and monitoring are needed to enable appropriate action for food and nutrition security.

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- Improved communication products to help inform actions. Improved communication products, which promote multi-hazard risk analyses, help to support the monitoring of location-specific risks. Through the development of targeted policy briefs, early warning updates and alerts, targeted users and decision-makers can be informed of the multiple threats that affect food and nutrition security in their area, country, region or the world.

In 2013, Mozambique experienced devastating floods, which displaced and affected many people. The case study below describes the issuing of alerts by government to reduce the impact of the disaster by improving preparedness for response.

BOX 2: THE ISSUING OF ALERTS TO IMPROVE PREPAREDNESS FOR RESPONSE TO THE 2013 FLOODS IN MOZAMBIQUE

Mozambique experienced extensive flooding in early January 2013, which killed over 110 people, temporarily displaced over 185 000 and destroyed and damaged crops and infrastructure including houses, roads and bridges. The disaster had extensive impacts, even though this country is frequently affected by natural hazards.

By mid-January, the authorities issued an orange alert due to heavy rainfall, which resulted in nine deaths and affected over 18 000 people, to increase monitoring and strengthen preparedness; the following week an institutional red alert was issued and response actions were initiated, which were coordinated and led by the National Disaster Management Institute (INGC). The government mobilized approximately US$10 million through the Contingency Plan Funds for response activities, however, it was anticipated that this would not be sufficient and requested at the end of January US$30.6 million from the international community to support 150 000 people in the southern province of Gaza for a period of six months.

By early March, the number of people affected increased to over 475 000, with over 1 300 reported cholera cases. UN organizations, national and international non-government organizations provided relief and recovery assistance. By the end of April almost all humanitarian relief needs were financially covered, but only very limited funds were received and available to support early recovery activities, which are crucial to help these people recover and rebuild their lives and livelihoods.

This case study has shown that the government of Mozambique is aiming to increase the issuing of timely alerts so that people can improve their preparedness and to make funds available through established contingency plans and mechanisms to initiate response activities. As a result of a good early warning system and the activation of contingency and response plans, the impact of these floods, even if devastating for material goods, was relatively small in terms of the number of people who died.

Sources: OCHA, 2013; United Nations Resident Coordinator's Office, 2013

Pillar 3 – Apply prevention and mitigation: agriculture practices and technologies for disaster prevention and mitigation

One of the strategies to build the resilience of farming communities is the promotion of improved agricultural practices and technologies to reduce risks to disasters as well as to adapt to climate change.

After some of the catastrophic natural hazards in southern Africa – floods in Mozambique, cyclones in Madagascar – significant efforts have been dedicated to adapting the agricultural and food and nutrition security sectors and increasing the resilience of small-scale farmers. As a result, extensive knowledge has been accumulated, and fruitful cooperation with governments has allowed the testing and dissemination of good DRR practices at field level.

FAO has contributed to this process, working closely with agricultural line agencies as well as universities, research institutes, NGOs, extension workers and farmers to identify, select, test and validate these agricultural good practices and technologies. Although these are locally specific, some general concepts and recommendations can be advanced, such as the use of drought-resistant, flood-tolerant or short-cycle crop varieties, cyclone or flood-resistant agricultural infrastructures, integrated farming systems, irrigation techniques, soil protection, water use or livelihood diversification.

Specific challenges related to the implementation of good practices and technologies for DRR in agriculture in the southern

Africa region include those related to limited adequate information and knowledge of practices and technologies that mitigate the impact of disasters; limited institutional capacity and coordination among different key stakeholders; and limited financial resources.

Recommendations

The following section outlines some of the most important agriculture-related DRR practices and technologies, which can be considered by DRR field practitioners in the formulation of DRR programmes:

Agriculture

- Adjustment of cropping calendars involves analyzing the impact of various hazards during crop cultivation periods and adapting the timing of cultivation to prevent and reduce losses. In southern Africa, the peak risk period for cyclones and floods is between early January and early March, and drought and dry spell periods may happen throughout the year. Early planting may reduce the impact of hazards, as crops will be sufficiently developed to better cope with stressed conditions. Late planting, just after the period of risk, may give good results under irrigation, preservation of residual moisture and use of short cycle varieties.
- Appropriate crop and variety selection. The selection of a crop (or a mix of crops within a farming activity) can reduce the impact of natural hazards. Some crops are more resistant to dry spells or drought (cassava, millet, sorghum), while others are more resistant to floods (rice) or other hazards. Regarding the selection of appropriate varieties, local varieties and ecotypes are better adapted to local conditions, and will be naturally more resistant to the common hazards in a certain area. Extensive research has been undertaken on improved seed varieties, short cycle varieties, drought resistant varieties, disease and pest resistant varieties, and flood or saline tolerant varieties, which have been released by research institutions and private seed companies. There are important differences in the availability of these improved varieties depending on the country and its legislation and regulations. In general, improved varieties of the main cultivated cereals (maize and rice) exist, but sorghum and millet are more difficult to find, as are pulses (for more information see the *Appropriate Seed Varieties for Small-scale Farmers* and *Management of Crop Diversity* briefs in the present series).

- Conservation agriculture. Some of the principals of conservation agriculture, based on reduced soil disturbance (minimum tilling), soil protection (crop rotation or intercropping) and preservation of residual moisture (use of organic mulch, such as straw and leaves to cover the soil), can have a significant positive effect in case of natural hazards. A better soil structure and sufficient soil moisture will reduce the impact of droughts and dry spells, soil erosion and risk of downstream flooding will also be reduced; and pest and disease outbreaks will be less harmful when crop rotation is implemented.
- Crop and livestock diversification. Different crops or animal species have different susceptibilities to be affected by hazards. Pests and diseases are often specific for a certain crop or animal species (e.g. mosaic disease affects cassava, African swine fever only affects pigs), although sometimes they can affect different species (e.g. Brucellosis or *Peste de Petits Ruminants* can affect several species of animals, some storage pests affect different cereals). Some crops or animals are more resistant to certain disruptive events, for example cassava is less affected by drought, rice is less affected by flooding and goats are more resistant to drought. Crop and livestock diversification will reduce the risk of total failure in the case of a disruptive event. This is intimately linked to livelihoods diversification, which may also include other, non-farming activities.

- Climate proofing agricultural infrastructures. In hazard prone areas, the planning and construction of agricultural infrastructures (e.g. warehouses, seed and grain storages, animal shelters, genebanks, irrigation schemes, pumping stations, markets, slaughterhouses) need to take into account good construction practices in order to reduce the risk of severe damage done by climate-related hazards, such as cyclones, heavy rainfall or floods. Some of the main considerations are structural (e.g. elevated platforms, cyclone-proof architecture, reinforced irrigation channels and wells), but associated also risks need to be taken into account during the identification of the location for the installation or construction of the facilities (for more information see the *Appropriate Seed and Grain Storage Systems for Small-scale Farmers* brief in the present series).
- Integrated pest management (IPM), aims to reduce the impact of pests throughout the agricultural cycle (from pre-harvest to storage of processed agricultural products). IPM means the careful consideration of all available pest control techniques and subsequent integration of appropriate measures that discourage the development of pest populations and keep pesticides and other interventions to levels that are economically justified and reduce or minimize risks to human health and the environment. IPM emphasizes the growth of a healthy crop with the least possible disruption to agro-ecosystems and encourages natural pest control mechanisms. The implementation of appropriate IPM measures will significantly reduce pre-harvest and post-harvest losses throughout the value chain (e.g. crop production, harvest, drying, processing and storage).
- Strengthening seed systems and seed saving mechanisms. Improving farmers' access to quality seeds is fundamental to maintain a balanced on-farm agricultural production, which also includes the production of local crops and varieties. Strengthening seed systems, both informal (for local seed) and formal (for commercial seed), through the implementation of appropriate activities of seed multiplication at community level, seed saving systems such as seed pass-on programmes, proper storage of seeds and the conservation of genetic resources in local genebanks, will be crucial to reduce the impact of hazards. An increased availability to different and better seeds and planting materials will facilitate a more balanced agricultural production, as well as providing more means for an early recovery after a shock.
- Land use and soil management. The implementation of preventive measures to protect agricultural land, which can be highly exposed to hazards, such as steep slopes exposed to erosion or lowlands subject to flooding, will reduce the impact of these hazards. Some traditional activities, include terracing to reduce soil erosion on steep slopes, or the maintenance of irrigation and drainage channels in flood-prone areas, can be highly effective.

Livestock:

- Agro-silvopastoral systems combine the growing of crops, trees and the grazing of animals on the same land. These systems have several benefits including the provision of feed for livestock, the increase in soil fertility due to increase of organic matter from the use of animal manure and trees reduce the impact of natural hazards, like high winds and rainfall. It also helps to diversify farmers' livelihoods through the cultivation of crops and raising of animals, reduce the risk of total production failure and may generate additional income from the sale of trees, crops and animals.
- Fodder conservation provides a supply of fodder for on-farm use when there is a shortage of feed. The use of dry or wet fodder for animal consumption is very important to increase the resilience of small-scale herders under stress situations, mainly droughts, but also floods. Fodder conservation is useful when free ranging in commonly used pastures is restricted due to animal disease outbreaks.
- Grazing and pasture resource management aims to increase the nutritious quality of pastures through the improvement of the species that form the pasture, and to improve the management of pastures in order to increase the carrying capacity (with improvements, such as soil amendments of fertilizers)

and reduce the impact of hazards. Some of the good practices in pasture management include the limitation of the grazing animals depending on the capacity of the pasture throughout the year or the reserve of certain pastures to the dry periods and as an eventual insurance in case of major shocks.

- Vaccination of animals helps to control and prevent the outbreak and spread of animal diseases. Animal vaccinations need to be conducted strictly in accordance with national policies and regulations, and should be led by the national veterinary authorities and strategies on animal health, as the wrong use of vaccines may lead to serious consequences, like the introduction of foreign virus strains into a region.

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Water:

- Use of residual moisture after floods. Depending on the nature of the soil, appropriate soil moisture conservation activities can be implemented to restart agronomic activities after floods using the residual moisture in the ground as the main water to be used by the replanted crop. This can be further promoted through the use of short cycle varieties, mulching, and supplementary irrigation or other practices that improve the soil structure or reduce water evaporation.
- Agronomic and irrigation techniques. The use of water can be maximized by the use of good agronomic techniques, such as planting on furrows or ridges, planting pits or box ridges, as well as irrigation techniques, such as the use of shallow wells, treadle pumps, river diversions, irrigation channels or drip irrigation installations (for more information see the *Irrigation Techniques for Small-scale Farmers* brief in the present series).
- Rainwater harvesting and storage techniques reduce the impact of dry spells and drought through the capturing and utilization of rainwater. An example of a rainwater harvesting practice is rooftop rainwater collection, often used for household consumption and for the cultivation of vegetables at the homestead.

Land:

- Land use and territorial planning involves appropriate use and planning of land, such as restrictions for the cultivation of crops or grazing of animals on fragile lands that are prone to degradation, such as landslides and land sinking. An important issue to take into account in southern Africa is land tenure rights, which protect and ensure people's access to, use of and control over land. Community participation in territorial planning is a key aspect to reduce the losses of natural hazards, mainly due to floods and dry spells.

Forestry:

- Afforestation/reforestation focuses on the (re)establishment of a forest cover, which helps to reduce the impact of natural hazards, such as landslides and soil erosion, mitigate global warming through the uptake of carbon by the trees and contribute to the improvement of biodiversity. A practice with particular interest for DRR is the afforestation of river banks to prevent erosion caused by flash floods.
- Agro-forestry combines trees and shrubs with crops and/or livestock. The impacts of extreme weather events, like cyclones

and heavy rains can be reduced through the use of trees and shrubs as shelterbelts, windbreaks and live fences. An additional benefit is that agro-forestry also stabilizes soils, prevents erosion and slows land degradation. This practice can generate additional income and diversify production, thus reducing the risk of total production losses.

- Integrated fire management is a holistic approach, where prevention, preparedness, suppression and restoration measures are undertaken to manage fire on all vegetation types. Prescribed burning is a DRR technique through which controlled burning is undertaken during the cooler months to reduce fuel buildup and thereby reducing the risks of fires.
- Improved cook stoves and alternatives to wood energy support the preservation of biodiversity, the reduction of deforestation and in turn the reduction of the impact of natural hazards that a deforested area is more prone to, such as heavy winds and landslides.

Fisheries and aquaculture:

- Implementation of the Code of Conduct for Responsible Fisheries, including the application of the ecosystem approach to fisheries and aquaculture and of the voluntary guidelines for securing small-scale fisheries.
- Development and implementation of good aquaculture practices to reduce the exposure of aquaculture against natural hazards as well as minimize environmental damage.

The southern-most districts of Malawi are particularly affected by droughts and floods each year. FAO has developed a programme to identify, select, test and validate good agricultural practices and technologies to increase the resilience of rural communities, which is described in the following case study.

BOX 3: INCREASING RESILIENCE OF SMALL-SCALE FARMERS IN FLOOD AND DROUGHT PRONE AREAS IN MALAWI

Malawi is prone to natural hazards, such as floods and droughts, which usually happen in late January to early March in the southern districts of the country (Nsanje and Chikwawa). The country is also one of the poorest in Africa and the world, where the majority of the small-scale farmers are dependent on rain-fed agriculture, high malnutrition levels are prevalent, and approximately 7 percent of the population is affected by HIV, which has socio-economic effects on people's food and nutrition security (UN Aids, 2012).

Farmers generally do not perceive floods as a major problem, because once the water has receded, the residual moisture allows them to replant, with high chances of obtaining a harvest. Dry spells, on the other hand, have a more severe negative impact on crop production and food and nutrition security, as they can occur throughout the country, at any time in the growing cycle. Dry spells are expected to increase due to climate change.

FAO, in collaboration with the agricultural line ministries at various levels, universities and research institutes, non-governmental organizations, extension officers and farmers associations, is implementing an ambitious programme to identify, select, test and validate good agricultural practices and technologies that can be very helpful to increase the resilience of rural communities to floods and cyclones, therefore reducing the losses linked to the impact of disasters on people's livelihoods and contribute to their food and nutrition security.

FAO works through existing community structures, such as the Village Civil Protection Committee (VCPC), and with the support of the extension services to ensure local ownership of the interventions and long-term sustainability. Community demonstration plots are used to train farmers and increase their knowledge of these agricultural practices.

The DRR programme implemented in Malawi, for instance, has proved that when early planting (late October-early November) is combined with short cycle varieties, losses can be reduced and production increased. This is because short cycle varieties mature more quickly and therefore become stronger and are better able to resist the impact of erratic rains, floods and dry spells; furthermore, plants spend less time in the field, shortening the hazard-exposure period. The use of an improved short cycle varieties, such as the variety of millet *'Nyankhombo'*, showed to be more resistant to drought than the local varieties and doubled the yield in all study areas compared to local varieties.

Other good agricultural practices, like mulching, conservation agriculture, small irrigation through shallow wells and treadle pumps, planting pits, furrows and box ridges, can further help to mitigate the impact of dry spells and support hazard-exposed small-scale farmers. The strengthening of community based organizations and initiatives, such as farmer´s associations, clusters of farmers, seed pass-on programmes or community managed agricultural infrastructures and equipment (irrigation schemes, storage facilities), has proven to significantly help to increase the resilience of these communities.

Pillar 4 – Prepare to respond: preparedness to improve disaster response and recovery

Contingency plans outline the roles and responsibilities of key stakeholders at all levels as well as procedures to follow when a disaster happens. The implementation of preparedness measures to improve disaster response and recovery involves developing interdisciplinary preparedness and contingency plans. These plans should include the food and agriculture sectors and identify specific and related measures to reduce the impact of natural hazards such as floods and droughts.

Governments across the region are taking the lead to coordinate the contingency planning process at national level with support from other international partners. National contingency plans generally exist and few countries, such as Mozambique and South Africa, have sub-national contingency plans. Some countries developed contingency plans that address multi-hazards, for instance Malawi, whereas others like Madagascar developed contingency plans specifically for floods and drought.

Agriculture-related emergency response and recovery measures aim to rapidly rebuild agricultural capacities. These interventions include relief operations mainly focused on distributions of agricultural tools and equipment, such as seeds, fertilizer, fishing nets or vaccines and veterinary supplies. However, some considerations on prevention need to be also included in this response and recovery phase, and efforts should be channeled to assure the principle of

'Building Back Better', assuming that natural hazards in prone areas will happen again. Recovery interventions should aim to increase local capacities and disseminate practices that will minimize the need for external support in the future.

In recent years, there has been growing interest and practice in the use of vouchers and cash transfers in crisis risk management, humanitarian and transition programming, as well as in development and social protection programmes, and there are experiences in several countries in southern Africa.[10]

This series elaborates guidelines on how to integrate emergency responses with prevention mechanisms in several aspects of agriculture geared towards DRR and increasing resilience. Topics addressed include strengthening the informal seed sector in hazard prone areas; improved hazard-proof construction of agricultural infrastructures, such as irrigation schemes or storage systems; the strengthening of farmers´ technical and organizational capacities through Farmer Field Schools; the promotion of local seed multiplication; and improving local-level capacities to cope with recurrent natural hazards.

Challenges that remain encompass the limited and regular updating of contingency plans, limited inclusion of specific agricultural preparedness measures, and often resource constraints (human, technical and financial) to effectively improve preparedness for disaster response and recovery. There is also a need to include the local levels in consultations and in participatory planning so that the measures and actions are well-known and understood by those who are required to implement life-saving actions.

The RIASCO study identified challenges regarding regional preparedness in southern Africa. The Southern Africa Regional Climate Outlook Forum (SARCOF) process to undertake preparedness planning is seasonally focused, instead of planning for less expected, smaller and/or more recurrent and widely impacting emergencies, including those with longer duration periods of over three months, or emerging hazards, such as severe economic shocks that affect food, which should also be considered and included.[11]

Recommendations

The impacts of hazards can be reduced through improved preparedness for response. This goes hand in hand and mutually reinforces an enabling institutional environment, information and early warning systems, which contribute to the effectiveness of implemented prevention, mitigation and preparedness measures.

10 Further reference can be found on the FAO Policy on Cash Based Transfers (Nov 2012) and Guidelines for Input Trade Fairs and Voucher Schemes (April 2013)

11 Holloway, et al., 2013

Agricultural practices to strengthen preparedness for response and recovery at national and local level

- Establish seed and grazing fodder reserves. Sufficient seed and fodder reserves are particularly important during shortages, to facilitate replanting after a shock as an early recovery measure for the former and to prevent de-stocking of animals in the case of the latter. A well-functioning community seed or grain bank can increase and ensure farmers' access to seeds and food in times of need.
- Establish safe storage, animal shelters and food processing facilities. The protection of seeds, harvests and agricultural inputs and equipment in hazard-resistant safe storages, are highly important preparedness measures in a hazard-prone area. Livestock shelters to protect animals in time of shocks and the protection of food processing facilities are also important aspects to take into account as preparedness measures against possible hazards.
- Establish vaccine banks to ensure the rapid supply of emergency stock of vaccines. In areas that are endemic to animal diseases that cause significant losses, national and regional authorities may consider establishing vaccine banks and vaccination campaigns as a preventive measure, but also as a way to control a declared outbreak.
- Stockpile agricultural inputs. Ensuring farmers' access to agricultural inputs (tools, fertiliser, fishing gear, etc.) helps to increase their coping capacity to quickly recover from a disaster.

- Promote community based preparedness and response planning to include location specific early warning mechanisms or demarcation of evacuation routes and emergency grazing reserves.

National and local preparedness planning

- Support the link between early warning and early action: The capacities of national institutions need to be reinforced to trigger a timely action after an alert has been released by an EWS. This involves the coordination between different institutions (civil protection, extension services, research centers, meteorological information, etc.) as well as between institutions and stakeholders at national and local levels.
- Support local and national preparedness/contingency plans. Effective preparedness and contingency plans outline key stakeholders' roles and responsibilities, coordination mechanisms and procedures to follow during an emergency event. Agriculture and food and nutrition security sectors need to be integrated in these multi-sectorial plans; for example, a preparedness/contingency plan for floods should include specific agriculture actions, such as moving livestock to safe locations to reduce losses.
- Provide guidance on viable operational and financial components of national contingency plans. Sufficient operational and financial capacity to respond and recover from a disaster is essential to respond to a crisis.
- Support multi-hazard risk analysis and its integration into preparedness planning and development programming. Multi-hazard risk analysis helps to understand the interaction of various risks at different spatial scales and levels. The integration into preparedness planning and development planning is highly beneficial as adequate and effective interventions can be designed that address and reduce all identified risks.

BOX 4: CONTROLLING THE SPREAD OF THE LOCUST PLAGUE IN MADAGASCAR IN 2013

Madagascar is recurrently affected by locust plagues, but the infestation of locust in 2012–2013 has been one of the worst in the past 60 years. By mid-2013 locusts had already infested over half of the island's cultivated land and pastures, especially affecting the southwestern region. This locust infestation led to huge losses that exceeded a quarter of Madagascar's food crop production. This is disastrous for a country where more than three-quarters of the population depend on agriculture for their livelihoods, and where the food security was already precarious as it has been severely affected by a long period of political instability and economic crisis that started in 2009.

- By the end of 2012, the Ministry of Agriculture of Madagascar requested technical and financial support from FAO to help control the spread of locusts as well as to assist with the coordination and implementation of the response to the locust plague. Timely response is essential in such a rapid onset crisis, in order to minimize the losses and save the livelihoods of millions of small-scale farmers dedicated mainly to rice production and cattle rearing – both activities severely touched by the locust plague that creates significant losses in crops and pastures.
- Together with the government, FAO is currently implementing a three-year locust programme (2013–2016) totaling US$41.5 million, which involves large-scale aerial campaigns to treat and protect a total of 2.14 million hectares as well as strengthening national capacities to survey, analyze and control locust outbreaks and monitor the impact of treatments on crops, pastures, human health and the environment.
- A national locust emergency plan developed in 2012 established a national coordination unit within the Ministry of Agriculture in Antananarivo and a regional coordination unit in Tuléar to help with the management of the crisis.
- A locust risk management plan and a locust risk prevention plan are also being prepared.
- Until the end of January 2014, extensive aerial surveys have been undertaken in the invasion and outbreak areas: approximately 270 000 hectares have been identified as heavily infested and a total of 79 584 hectares have been treated and protected.
- The rapid response to control this locust infestation has been crucial to mitigate the impact of the crisis and reduce the effect on the food security situation of an important fraction of the Malagasy population.

Source: FAO, 2013c

5. Conclusion

Southern Africa is prone to various hazards, including floods, cyclones, droughts, plant and animal pests and diseases and economic and political shocks, which significantly affect the livelihoods of millions of small-scale farmers, herders, fishers and foresters. More than this, these crises may undermine the improvements made in the development of many countries in southern Africa, as they often have macroeconomic repercussions.

With climate outlooks indicating an increase in the frequency and intensity of natural events, it is likely that agriculturally dependent households in hazard-prone areas will be even more severely affected in the future. The impact of natural hazards in the agriculture and food and nutrition security sectors affect mainly the crop production, but also the agricultural infrastructure and access to markets, increasing the vulnerability of rural communities, exacerbating the persistent high poverty levels, constraining the development of an important part of the population and leading to inequalities and social and economic tensions.

Disaster risk reduction can provide viable options to increase the resilience of these rural communities to prevent and mitigate the effects of hazards, be better prepared and facilitate an early recovery after the shock.

This brief has identified key DRR areas and outlined recommendations in the areas of good governance and institutional strengthening; information and early warning systems; agricultural practices and technologies for disaster prevention and mitigation, as well as preparedness measures to improve disaster response and recovery.

The objective of FAO DRR programme in Southern Africa is to build the resilience of rural communities involved in the agriculture, livestock, fisheries, forestry and natural resource management sectors in hazard-prone areas, and help them to better adapt to adverse situations.

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