

AGRICULTURE, LIVESTOCK, FISHERIES & FORESTRY



PDNA GUIDELINES VOLUME B



# CONTENTS

■ INTRODUCTION	1
■ ESTABLISHING THE ASSESSMENT PROCESS	2
■ BASELINE INFORMATION AND AGRICULTURAL SECTOR OVERVIEW	4
■ ASSESSMENT OF THE DISASTER'S EFFECT ON THE AGRICULTURAL SECTOR	6
■ GOVERNANCE	10
■ SOCIAL ASSETS	11
■ HUMAN ASSETS	12
■ ESTIMATING THE ECONOMIC VALUE OF THE EFFECTS OF THE DISASTER	14
■ ASSESSMENT OF DISASTER IMPACT	17
■ CROSS-SECTORAL THEMES	20
■ SECTOR RECOVERY STRATEGY	24
■ IMPLEMENTATION ARRANGEMENTS	31
■ ANNEX 1: EXAMPLES OF PRE-DISASTER BASELINE INFORMATION AND INFORMATION RESOURCES	32
■ ANNEX 2: PDNA AGRICULTURAL SECTOR CHAPTER SUGGESTED ANNOTATED OUTLINE	38
■ ANNEX 3: SAMPLE KEY INDICATORS TO ASSESS EFFECT ON AVAILABILITY OF/ACCESS TO GOODS AND SERVICES	39
■ ANNEX 4: REFERENCES	44



## INTRODUCTION

This chapter is part of the PDNA Guidelines Volume B for the Productive Sector. It provides guidance for those working in the Agricultural Sector on conducting a post-disaster needs assessment, including analysing the effects and impact of a disaster, identifying recovery needs and creating a recovery strategy.

In this chapter, the Agricultural Sector is divided into four main sub-sectors, namely: 1) Crops; 2) Livestock (both production and animal health); 3) Fisheries and Aquaculture (including capture fisheries); and 4) Forestry.

This chapter is underpinned conceptually by a Sustainable Livelihoods Framework, which is a people-centred approach that allows flexible assessment and planning and can facilitate a comprehensive assessment. A Sustainable Livelihoods Framework consists of four key elements:

- Vulnerability context: shocks, trends, etc.;
- Livelihood assets and activities: human, natural, financial, social and physical capital;
- Structures and processes: institutions, policies, social processes, etc.; and
- Livelihood strategies and outcomes: increased income, reduced vulnerability, improved food security, etc.

Livelihoods are understood as the capabilities, assets - both material and social - and activities required for a means of living. A livelihood is considered sustainable when it can cope with and recover from stresses and shocks, maintain or enhance its capabilities and assets and provide net benefits to other livelihoods locally and more widely, both now and in the future, while not undermining the natural resource base.

Livelihood assets constitute critical resources (agricultural inputs, equipment, natural resources, social networks, etc.) used by households to produce certain livelihood outcomes (increased income or well-being, reduced vulnerability, improved food security, etc.). These exist in a context characterised by institutions and policies (governance structure) affecting people and their livelihoods, from the extended family and local community to the larger context of the country and beyond, and the risks and vulnerabilities (vulnerability context) which include external social, economic and political forces and shocks to which people and their livelihoods are subject.

These guidelines also follow an ecosystem perspective that takes into account the natural resource base upon which livelihoods depend. The sector recovery plan proposed would ensure the integrated management of land, water, forests, wetlands, soils and other resources that sustain livelihoods and promotes conservation and sustainable use in an equitable way.

This chapter is organised as follows:

- Section 2 provides an overview of the assessment process for the Agricultural Sector.
- Section 3 offers guidance on how to develop the sector overview and pre-disaster baseline for the Agricultural Sector report;
- Section 4 guides users on how to define and estimate the four types of disaster effects assessed in a PDNA: (i) destruction of infrastructure and assets; (ii) disruption of production and service delivery; (iii) disruption of governance; and (iv) emerging risks and vulnerabilities. The section also describes how to address cross-cutting issues such as gender, environment, livelihoods and employment, when estimating these effects;
- Section 5 gives guidance on how to estimate the economic value of effects of the disaster, including the total cost of damage to infrastructure and physical assets, as well as loss due to changes in financial flows as linked to disrupted services and production, governance and increased risks;
- Section 6 shows how to analyse the disaster's impact on the Agricultural Sector. It includes creating a medium and long term projection of the effects based on the assessment, the sector development plans, lessons from past experiences and the emerging concerns that derive from the events. This analysis forms the basis of the recovery strategy;
- Section 7 discusses how the Agricultural Sector links to other cross-cutting sectors through production and delivery of goods and services and how effects in the Agricultural Sector may influence the recovery strategy and timetable for recovery and reconstruction in other sectors;
- Section 8 provides guidance on developing an Agricultural Sector recovery strategy. This includes: (i) formulation of the sector recovery vision; (ii) definition of reconstruction and recovery needs to both restore and resume to pre-disaster levels and to build back better and increase resilience; (iii) prioritisation and sequencing of the recovery needs; and (iv) implementation arrangements, including partnerships, coordination and management arrangements.

At the end are annexes with further information and useful references.

## ESTABLISHING THE ASSESSMENT PROCESS

Conducting a PDNA is the process of analysing the effects and impact of a disaster on a set of sectors for the purpose of identifying recovery needs and developing a comprehensive, multisectoral recovery strategy. The PDNA process covers three main sectors: 1) social; 2) infrastructure; and 3) productive (of which Agriculture is a sub-sector) along with several cross-cutting themes that are addressed across all sectors.

It is important to note that from the onset of the PDNA, it will be necessary to hold consultations with assessment teams from other sectors, such as Nutrition and Livelihoods, in order to avoid double counting and ensure the information gathered at the sector level is comprehensive and well integrated into the final outcome of the PDNA process, which is the combined multisectoral PDNA report and recovery strategy (see section 1.7 of PDNA Guidelines, Volume A).

A PDNA consists of the following four main elements:

1. Collection of pre-disaster and post-disaster data and information;
2. Assessment of the disaster's effects;
3. Assessment of the disaster's impacts; and
4. Preparation of a recovery strategy that determines the recovery needs for all sectors.

For the Agricultural Sector, the main variables to assess are summarised in the two tables below.

The Assessment of Disaster Effects (Sections 4 and 5 of this Chapter)

Damages	
<b>Effect 1: Damage to infrastructure and physical assets</b>	The quantification of partial or total destruction of public and private infrastructure and physical assets both in terms of number of units and their monetary value.
Losses	
<b>Effect 1: Disruption of service delivery and availability/ access to goods and services</b>	<p>Availability: the availability and quality of goods and services needed for agricultural, livestock, fishery/aquaculture and forestry production.</p> <p>Access: household access to basic goods and services essential to agriculture-based livelihoods and food security (livelihood opportunities, value chains and markets, agricultural services, inputs, credit and loans, etc.).</p>
<b>Effect 2: Disruption of governance and social processes</b>	<p>Assessing the impact on governance/policy environment, including government capacity for response/recovery in agriculture.</p> <p>Estimating the effect on livelihood assets: human, social and political.</p>
<b>Effect 3: Increased risks and vulnerabilities</b>	<p>Assessment of immediate risks to livelihoods and food security that may deteriorate unless addressed.</p> <p>Identifying the underlying risks and the measures needed in the recovery process to protect agricultural livelihoods, reduce vulnerability and build resilience.</p>

The Assessment of Disaster Impact (Section 6 of this Chapter)

<b>Macro-economic impact</b>	<p>Estimating the likely impact of the disaster on macro-economic variables, particularly:</p> <ul style="list-style-type: none"> <li>• gross domestic product (GDP);</li> <li>• balance of payments (BoP);</li> <li>• fiscal sector (budget); and</li> <li>• inflation.</li> </ul> <p>Includes disaster-induced changes in agricultural exports, increased imports, higher than normal government expenditure and lower tax revenue.</p>
<b>Human development impact</b>	<p>Estimating the human development impact (at the macro and micro levels), particularly the impact of the disaster on:</p> <ul style="list-style-type: none"> <li>• poverty (particularly rural poverty);</li> <li>• overall levels of food and nutrition security;</li> <li>• Millennium Development Goal 1 (the eradication of poverty and hunger); and</li> <li>• household and personal income.</li> </ul>

A comprehensive Assessment of the Agricultural Sector combines the use of quantitative primary data, such as for quantifying the extent of physical damage to infrastructure and assets caused by the disaster, with the use of primary qualitative and quantitative information to assess the implications of such damage on livelihoods and food security or to examine how access to basic agricultural goods and services has been affected. This implies the use of a variety of assessment methods, including primary data collection techniques such as sample surveys, participatory rural appraisal techniques, key informant interviews, group discussions, participant observations and other methods.

To conduct the Agricultural Sector Assessment, the PDNA Agricultural Sector Team will work in close collaboration with the High-Level Team and the PDNA Coordination Team (see section 3.5 of Volume A for further information on the PDNA Team structure and description of the primary roles and responsibilities of each team). The Agricultural Sector team should be composed of the following experts or a combination thereof:

- agricultural economist;
- civil and agricultural engineer;
- agricultural extension specialist;
- agronomist;
- livelihoods specialist;
- livestock specialist;
- fisheries and aquaculture specialist;
- food technologist and/or food and nutrition specialist;
- forestry specialist;
- watershed management specialist, depending on the kind of disaster and area affected;
- social scientist – sociologist, social planner, gender expert.

However, the team composition will vary according to the type and scale of the disaster and the extent of its likely impact on the Agricultural Sector. These specialists should have some previous training and experience in livelihood assessments.

## BASELINE INFORMATION AND AGRICULTURAL SECTOR OVERVIEW

In order to gauge the full extent of a disaster's impact on livelihoods and food and nutrition security, it is necessary to understand the main characteristics of the Agricultural Sector prior to the disaster. This is needed in order to be able to compare the pre-disaster and post-disaster conditions.

Baseline information used to formulate the Agricultural Sector overview includes descriptions of:

- The people (farmers, fisher folk, and pastoralists) and their principal livelihood activities;
- Infrastructure and livelihood assets related to agriculture (including physical assets and

productive equipment and inputs used to sustain agricultural livelihoods), as well as land ownership arrangements;

- Production of, delivery of and access to agricultural goods and services;
- Governance and decision-making processes linked to and supporting the Agricultural Sector (including institutions, social organisation and the policy environment); and
- Pre-existing risks and vulnerabilities (including existing preparedness plans).

Baseline information can be gathered from official statistics on demography, employment, land ownership, agricultural production, cropping patterns, livestock numbers, licensed fishers and fish farmers, fishing season etc. It can also be found in reports and studies on livelihoods from academic and research institutions, government, the United Nations and other institutions. Other sources are sector development plans, agricultural censuses, household surveys (on food security, nutrition, etc.), participatory rural appraisal exercises, livelihood zoning/profiling, wealth classifications, seasonal calendars and risk maps. Baseline information is a key contribution of the government to the recovery process and the ownership of that information at the national and local levels should be recognised and respected.

**Annex 1** contains a detailed list of baseline information and resources that may be used to collect information for the Agricultural Sector during a PDNA. For more detailed guidance on developing baselines, refer to Volume 2 of The Livelihood Assessment Toolkit, FAO/ILO (2009): [www.fao.org/fileadmin/user\\_upload/emergencies/docs/LAT\\_Brochure\\_LoRes.pdf](http://www.fao.org/fileadmin/user_upload/emergencies/docs/LAT_Brochure_LoRes.pdf).

Below are more details of the categories that are useful in a baseline.

**General pre-disaster conditions in the affected areas.** This will include topography, demographics, basic economic and social structure, socio-economic conditions (such as poverty rates, Human Development Index), and the past state of food and nutrition security.

**Livelihood portfolios for the socio-economic groups and agro-ecological zones in the affected areas and their key interactions.**

- The main agricultural systems: farming sectors/systems, including land use and access (smallholders, subsistence, agri-business, rain-fed, irrigated, agro-silvo-pastoral, pastoral, capture fisheries or aquaculture, forests and trees), their interactions and proportional contributions to overall production;
- Relative importance of the Agricultural Sector in the broader socio-economic context (contribution of agriculture, fisheries, livestock and forestry to GDP, employment, exports, household income, etc.);
- The characteristics of employment (farming, fishing, wage labour, self-employment, etc.), employment and unemployment figures, occupational wages, etc.;
- The main crops produced (staple and cash crops, annual and perennial);
- The cropping calendar, including scale, timing, duration and location of main and minor harvests;
- An inventory of livelihood assets (see below);
- Land use, land tenure and access rights to fishing and forestry resources;



- Energy needs for cooking, heating, construction and production;
- Household reliance on wood-based biomass for their livelihood activities.

### **The main livelihood assets for the average household prior to the disaster.**

- Physical: agricultural infrastructure, farm machinery, equipment, tools, livestock, seeds, energy, fishing vessels, market infrastructure and processing facilities, stocks, etc.;
- Natural: access to farmland, water, forests, fisheries resources, etc.;
- Financial: savings, income, credit, loans, remittances;
- Human: labour power, knowledge, education, skills, health, etc.;
- Social: community organisations, social networks, cooperatives, kinship, trading linkages, etc.;
- Political: power relationships, access to and influence over government processes and decision-making.

### **The institutional and policy environment**

(it is important to ensure recovery planning and needs are aligned to national laws and policies for the sector).

- Relevant agricultural and food security policies and national plans and natural resource management plans;
- Institutions and organisations supporting livelihoods (private and public);
- Contingency plans;

Disaster risk reduction and management policies and strategies, including what past and ongoing support there has been for disaster preparedness work in communities, and how effective preparedness activities have been in ameliorating the effects of the disaster.

**Risks and vulnerabilities**, including existing preparedness plans.

## **ASSESSMENT OF THE DISASTER'S EFFECT ON THE AGRICULTURAL SECTOR**

The section provides guidance on how to define and describe the effects of the disaster on the Agricultural Sector. The assessment of the disaster's effects should include:

1. A general description of the disaster event, its geographical scope, population affected, evolution to date and distinct consequences on the Agricultural Sector (section 4.1);
2. Damages - destruction and damage of infrastructure and physical assets (section 4.2);
3. Losses - changes in economic flows arising from the disaster linked to: (i) disruption of service delivery and production of and access to goods (section 4.3); (ii) disruption of governance and decision-making processes (section 4.4); and (iii) emerging risks and vulnerabilities (section 4.5). The latter may include information on emergency responses taken to address the risks.

These effects can be expressed in both quantitative and qualitative terms and must be presented according to the country's geographical divisions as presented in the census and by other key sociological characteristics where relevant (sex, age, ethnicity, religion, ability, disability of the given population).

The effects should also address cross-cutting issues (including gender, governance, environment, Disaster Risk Reduction, and livelihoods and employment) either across the description of the effects or in a separate paragraph. For further guidance on cross-cutting issues considered in a PDNA, consult the relevant PDNA Guidelines, Volume B.

## POST-DISASTER STATUS OF THE AGRICULTURAL SECTOR

The description of general post-disaster conditions in the Agricultural Sector includes the overall post-disaster scenario and distinct consequences of the disaster on the Agricultural Sector). Below are some considerations of post-disaster conditions in the Agricultural Sector.

- Geographic areas affected in the sector, including geographic variations (e.g., urban/rural);
- Population affected, number and percentage (farmers, fisher folk, pastoralists, forest dependent populations, etc.) disaggregated to the extent possible by gender/age/marginalized groups;
- Migration and internal displacement of fishers, farmers, pastoralists, etc.;
- Seasonal considerations (timing/duration of planting, harvest, rainy season, etc.);
- Particular population groups most affected or most vulnerable (small-holder farmers, wage workers, self-employed, female-headed households, etc.);
- Overall level of food insecurity, number of food-insecure, percentage of total, malnutrition rates;
- How long the disaster is expected to affect livelihoods and food security;
- Post-disaster energy access and availability of sources of fuel.

## DAMAGES

Damages are the effects of the disaster on infrastructure and physical assets, in this case on key agriculture-related infrastructure and assets. The assessment quantifies affected assets as either partially damaged or totally destroyed (see section 5 for guidance on how to estimate the economic value of damages).

Physical assets refer to productive livelihood assets and include the basic infrastructure and producer goods needed to support agriculture-based livelihoods, such as equipment, inputs and tools used for agricultural, livestock and fisheries production. These assets enhance people's capabilities to live and to make a living. They can be privately owned by households (such as tools, livestock or farm infrastructure) or they may be public assets used by households (such as roads, irrigation reservoirs and major canals).

The table below lists some of the physical assets to be considered in the damage assessment for each of the agriculture sub-sectors. In order to avoid double counting, it is important to check the country-specific system of national accounts and be aware which items may be accounted for and assessed by other sectors or productive sub-sectors (e.g., Industry, Services, Infrastructure), rather than the Agricultural Sector. Items for which this may be the case in the table below have been noted accordingly.

## Some of the Assets that Typically Could Sustain Destruction

Crops	Livestock	Fisheries and aquaculture	Exploited trees and forests*
<ul style="list-style-type: none"> <li>• Agricultural land (e.g., soil erosion, sedimentation, salinisation)</li> <li>• Stored agricultural inputs</li> <li>• Farm buildings, sheds, storage facilities, seed laboratories</li> <li>• Farm equipment and machinery</li> <li>• Equipment/materials for seed processing, home-based food processing and preservation</li> <li>• Irrigation systems and infrastructure</li> <li>• Irrigation equipment (e.g., engines, electric motors, pumps)</li> <li>• Drainage systems, equipment and infrastructure</li> <li>• Internal farm roads</li> <li>• Perennial trees (e.g. plantations)</li> <li>• Research, training and extension centres</li> </ul>	<ul style="list-style-type: none"> <li>• Animal deaths or disappearance</li> <li>• Animals slaughtered because of endangerment as a direct result of the disaster and therefore do not reach the market. (Note: The by-products of the slaughtered animals (e.g. dairy, eggs, meat) are part of the production process and should be considered a loss).</li> <li>• Pasturelands</li> <li>• Livestock sheds</li> <li>• Storage buildings</li> <li>• Stored feed and fodder</li> <li>• Livestock equipment and machinery</li> </ul>	<ul style="list-style-type: none"> <li>• Fisheries enforcement and monitoring, control and surveillance (vessels, buildings)</li> <li>• Fishing vessels and engines (marine and inland)</li> <li>• Fishing gear (marine and inland)</li> <li>• Aquaculture production (ponds, cages, tanks and farm buildings)</li> <li>• Aquaculture hatcheries and nursery units</li> <li>• Aquaculture inputs (fish larvae, lime, therapeutants)</li> <li>• Aquaculture feed mills and storage facilities (may be accounted for by the industry sector)</li> <li>• Post-harvest assets (ice plants, freezers and storage buildings, etc.)</li> <li>• Major fisheries infrastructure (ports, landing facilities, harbours, markets, etc.)</li> <li>• Fuel supply</li> <li>• Boat construction and repair facilities (may be accounted for by the industry or services sectors)</li> <li>• Fishing gear supplies</li> <li>• Shore-based infrastructure</li> </ul>	<ul style="list-style-type: none"> <li>• Area of forests</li> <li>• Standing timber</li> <li>• Firebreaks and watch towers</li> <li>• Access roads</li> <li>• Forestry equipment and machinery</li> <li>• Fire management equipment</li> </ul>
<p>Note: this list of typical assets that could sustain destruction is indicative, but not fully inclusive.</p> <p>* Only forests under exploitation and the corresponding timber are accounted for in the agricultural assessment; natural/non-exploited forests are assessed by the Environment Sector.</p>			

Sources: 1) Damage, Loss and Needs Assessment Guidance Notes (DaLA), Global Facility for Disaster Reduction and Recovery (GFDRR); and 2) Assessment and Programme Formulation Guidelines for Agriculture Emergencies (APF), FAO.

Agro-industry is an important link between the agricultural and the Industrial Sectors of an economy. Its importance to the economy varies largely depending on whether the Agricultural Sector is subsistence, semi-commercial (or semi-subsistence) or commercial. Many low-income developing countries will have a combination of commercial and subsistence agriculture. The partial or total destruction of physical assets in agro-industry are also estimated, such as processing plants, warehouses, transport facilities, access roads, buildings, stocked raw material and processed products. This estimation is done by the PDNA Productive Sector team under manufacturing. Should the Agricultural Sector have collected any such information, they should pass it to the Productive Sector team to avoid double counting. Production losses in the Agricultural Sector also affect the level of production in the agro-industrial sector, as well as the supply chain. The Agriculture Team should estimate reductions in the production of raw materials that will not reach processing agro-industries as a result of the disaster.



## EFFECT ON AVAILABILITY OF AND ACCESS TO GOODS AND SERVICES

In addition to the damage caused by the disaster to physical, natural and financial assets, disasters typically affect the supply and availability of inputs and the functioning of markets. Declines in supplies and higher market prices will have negative consequences for livelihoods and food security.

The PDNA, therefore, evaluates the effects of the disaster on service delivery, including the performance of markets and the availability and quality of goods and services needed for agricultural, livestock and fisheries production, at three different levels:

1. Sectoral level - measures disaster effects on assets and production of the sector;
2. Macroeconomic level - measures disaster effects on overall production of goods and services, the balance of exports and imports, and revenues and expenditures of the government; and
3. Personal or household level - where income decline and increased expenditures are used to estimate the disaster impact at micro levels.

At the same time, the assessment considers the factors which influence the capacity of households to access basic goods and services essential to livelihoods and food security. This includes evaluating access to livelihood opportunities, markets, agricultural services, inputs, credit and loans, and other access considerations such as the price of agricultural inputs, food, fuel and basic commodities.

Coping strategies are also considered in relation to their ability to assist households in meeting their basic livelihood needs. Examples of the core indicators considered for each sub-sector during the assessment can be found in **Annex 3**.

## EFFECT ON GOVERNANCE AND SOCIAL PROCESSES

Governance and social processes refer to livelihoods-related governance institutions, policies and procedures, and social organisations and networks that shape livelihoods. They operate at all levels, from household and community to national levels, in both the private and public spheres. Governance and social processes represent external factors that influence livelihoods, including access to assets and services and to power and decision-making, and they influence levels of empowerment and vulnerability.

The assessment of governance and social processes identifies the key government institutions and policies affecting livelihoods, as well as formal and informal social networks and socio-cultural and ethnic considerations linked to livelihoods. The assessment also evaluates the impact of the disaster on these and the implications for food

security. It is important to understand which governance and social processes are present in affected areas, how they operate and support livelihoods, how they have been affected and how they may enable or disable livelihood recovery. The social organisation of the local landscape is assessed also to understand the local capacity for recovery and to identify collaboration and partnership arrangements that may be part of the recovery effort.

A starting point is to examine the social, cultural and political context of the areas affected, including past crises, the demographic breakdown, social arrangements, ethnic groups, intra-group linkages, local leadership and authority. A second step is to map existing institutions and social organisations in affected areas (both formal and informal), the functions they perform or services they provide in relation to livelihoods during normal conditions and to which particular groups they provide these services (pastoralists, fishing communities, men or women, ethnic groups, etc.). Examples of institutions and social organisations to consider are:

- Government institutions: Ministry of Agriculture, Ministry of Natural Resources and/or Environment, local government offices, etc.;
- Private sector: labour unions and professional organisations;
- Financial institutions: rural banks, micro-credit lending institutions, saving schemes;
- Socio-cultural: kinship, marriage, inheritance, ethnic or religious groups, women's organisations;
- Social networks: farmer cooperatives, community-based organisations or non-governmental organisations, exchange labour groups;
- Vocational: technical or vocational schools, farmer field schools, agricultural extension, etc.; and
- Political organisations: political parties, etc.

## GOVERNANCE

The local landscape is assessed in terms of the nature and extent of the impact caused by the disaster on governance, including the effect on the Ministry of Agriculture and other relevant government institutions, and the policy environment. In many cases, the burden will increase on all levels of government to continue service provision and manage the recovery process. Considerations during the assessment include:

- The impact on infrastructure, equipment, human resources, public services, information systems;
- Policy and regulatory implications of the disaster and for the recovery process;
- The knowledge, skills, resources, accountability systems and reporting systems that need to be strengthened to sustain livelihood recovery;
- Identifying institutions and networks that can enable livelihood recovery;
- How the capacity of relevant government ministries can be strengthened to support livelihood recovery;
- Identifying collaboration and partnership opportunities; and
- Laws, regulations and policies relevant to livelihoods and food security.



## SOCIAL ASSETS

Social assets refer to the social resources available and used by people which contribute to meeting their livelihood objectives. These are developed through networks, both vertical (patron/client) and horizontal (between individuals with shared interests), through membership to formal groups with shared or agreed rules, norms and sanctions, and through relationships of trust, reciprocity and exchange that facilitate co-operation, reduce transaction costs and may provide the basis for informal safety nets among the poor.

Mapping social networks and other forms of social capital helps to identify the formal and informal institutions and networks which influence livelihoods and community life. Strong social networks can strengthen resilience and adaptive capacity. The extent to which households can or cannot rely on family, kinship, community resources, cooperatives, traditions of hospitality and mutual support influences their coping capacity or level of vulnerability. The assessment considers:

- Types of social networks on which people rely in normal times: consider close family or kin, clan or tribe, farmer cooperatives, fisheries and aquaculture trade groups, seed extension groups or services, community-based organisations, non-governmental organisations, women's groups, charity, religious or political groups, and any other mutual-support mechanism;
- Types of support these networks provide, such as gifts, loans, credit, seeds, extension, training, etc.;
- Membership and access to these networks by social group (who benefits); and
- The impact of the disaster on their membership, ability to provide continued or new forms of support, geographic outreach, infrastructure, equipment, human resources, leadership and management, etc.

The assessment examines the social dynamics and power relationships in affected areas in relation to livelihoods, changes in these dynamics caused by the disaster and how these need to be addressed or can help support the recovery process. Examples might be existing leadership and power structures, access to – and influence over local and higher-level government processes, possible tensions among ethnic or religious groups, gender roles and gender relations, competition over scarce resources, tensions between internally displaced persons and local populations, etc.

# HUMAN ASSETS

Human capital represents the skills, knowledge, health status and ability to work of people that together enable people to pursue their livelihood strategies and objectives. The assessment considers the human capital of the affected population (women, men, children, elderly, etc.) and how these have changed as a result of the disaster, particularly the effect on people’s ability to make a living and on their level of food security. Considerations in regard to human assets are below.

- Household composition: changes in the number of family members (e.g., out-migration and its impact on available household labour) and composition of households, including considerations of gender, age and disability.
- Local knowledge: forms of knowledge (e.g., farming techniques, policies, new service delivery systems), the purpose it serves, how it is shared, loss of knowledge due to death, illness, displacement or migration, effect on knowledge managers (e.g., farm extension workers), etc.;
- Skills: the skills people have (farming, carpentry, teaching, etc.) and how they are learned and shared, the loss of skills and demand for new skills due to the disaster;
- Information: information considered valuable to livelihoods, sources of information (e.g., networks), effect of disaster on the availability and access to this information, particular types of information lacking, etc.;
- Health: the post-disaster health status of the population (illness, morbidity, death, disability, etc.);
- Gender: changes in the roles and responsibilities of women and men, girls and boys (e.g., male migration, increased work for women, child labour);
- Education: levels of education, changes in the school attendance of children.

Sample Of Key Indicators To Assess Effect On Governance And Social Processes	
<b>Crops</b>	<p><b>Seeds</b></p> <ul style="list-style-type: none"> <li>• The institutional arrangement in the country for coordinating seed industry functions, how it operates, how it has been affected, and how it may be strengthened to support recovery.</li> <li>• Seed policy and other regulatory frameworks, how they are implemented, implications the disaster has for these, and how they may support or hinder recovery.</li> <li>• The impact of disaster on the national and local capacity for plant breeding, seed extension and seed quality control.</li> </ul> <p><b>Irrigation</b></p> <ul style="list-style-type: none"> <li>• Ownership, management and governance arrangements of irrigation system, how they have changed as a result of the disaster.</li> <li>• Water user-associations, their roles, responsibilities, management and main issues that impeded effective functioning.</li> <li>• Current or potential conflicts with regards to irrigation system and water.</li> </ul>

<p><b>Livestock</b></p>	<ul style="list-style-type: none"> <li>• The impact of the disaster on key government offices, typically the section responsible for livestock within the Ministry of Agriculture (e.g., the veterinary department), but also the local administration, Forestry Department – who are often responsible for rangelands, the Land and Water Departments, and the Department of Health in the case of public health, zoonoses and cold-chain facilities.</li> <li>• The customary institutions and arrangements relating to livestock production and natural resource management.</li> <li>• The management, rights of use and obligation issues relating to pastures and grazing.</li> <li>• Social networks, associations, cooperatives, community-based organisations and other key actors in the affected areas, their role, capacities, and needs.</li> <li>• The role of the private sector in the animal health delivery system, and how their participation can be promoted and used to supply needed goods and services.</li> <li>• The indigenous coping strategies and spontaneous recovery strategies that should be supported or avoided depending on their negative or positive effect.</li> <li>• The security situation and implications for livestock production, markets, and other functions, including key protection issues facing livestock owners.</li> <li>• Rights of access or potential conflict and the implications for livestock movement and migration.</li> <li>• What are the policy and/or legal constraints affecting livestock related interventions (e.g., livestock movements or export bans, slaughter laws, taxation policy, licensing regulations, etc.)?</li> <li>• Main elements of the government strategy to develop the livestock or other sub-sectors (e.g., poultry), and implications for the recovery process.</li> <li>• The roles of different household members with regard to livestock care and management, including use and disposal rights with particular reference to gender.</li> <li>• Differences in coping strategies between male and female-headed households, ethnic groups, and other population groups.</li> <li>• Capacity building and training considerations to support governance and social networks.</li> </ul>
<p><b>Fisheries/ Aquaculture</b></p>	<ul style="list-style-type: none"> <li>• The key government institutions concerned with fisheries/aquaculture at national and local levels, and how these have been affected by the disaster (infrastructure, services, management and coordination, equipment, etc.)</li> <li>• How existing fisheries and aquaculture support offices, staff, finances and equipment can be used to address the effects of the disaster and the additional support they need to carry out their role.</li> <li>• Fisheries and aquaculture policies and management initiatives that could impact or support recovery.</li> <li>• The role of the private sector in the sub/sector and how their participation can be promoted and used to supply needed goods and services.</li> <li>• Key social organisations and networks associated with fisheries/aquaculture (producer groups, trade associations, women’s groups, non-governmental organisations, etc.), the way they have been affected and the role they can play in the recovery of the sub-sector.</li> <li>• How community leadership and organisation has been affected.</li> <li>• The policy and legislative implications of the disaster, and the elements of policy and management that may need to change to support recovery</li> <li>• The knowledge, skills, resources, systems, policies, regulations, accountability systems and reporting systems that need to be strengthened to support recovery.</li> <li>• The coping and adaptive strategies adopted by fisher folk, and which/how they can be supported.</li> <li>• The specific role of different population groups (women, men, ethnic groups, etc.) in fisheries/ aquaculture (boat building, net and equipment provision and repair, fish capture, processing and marketing) and how these roles have changed.</li> </ul>



<b>Forestry</b>	<ul style="list-style-type: none"> <li>• The role of key government institutions linked to forestry, how they have been affected in terms of infrastructure, human resources, equipment, information systems, and how their capacity can be strengthened.</li> <li>• Key community forest associations, forest user groups and other community based organisations or non-governmental organisations at national and local levels, how these have been affected by the disaster, and the capacity building needs to help support them in recovery.</li> <li>• Policies and laws that are conducive to sound forest management that can support recovery.</li> <li>• The policies and incentives (or lack thereof) that lead to deforestation and forest degradation and other unsustainable land use patterns and unsustainable forest resource use.</li> </ul>
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## EFFECTS ON RISKS AND VULNERABILITIES

A key element of the assessment is to identify immediate risks to livelihoods and food security, particularly new potential threats that may deteriorate conditions if the necessary measures are not taken in a timely manner. Priority mitigation and preparedness measures are identified to avoid another disaster or the further deterioration of current livelihood conditions. Below are some indicators to assess:

- Additional hazards such as further landslides, an approaching hurricane season, fire risk, etc.;
- Climate forecast, such as the forthcoming season (e.g., anticipated snow, rains, heat, dry season);
- Secondary shocks, such as fish disease resulting from inappropriate supplies for restocking or loss of processed fish due to prolonged lack of market access;
- Environmental risks, such as further deforestation, soil erosion, potential forest fire, etc.;
- Social and political risks, such as upcoming elections, potential conflict between social groups;
- New vulnerabilities created by the disaster that may present additional threats;
- Population groups (economic, social, geographic) that are especially vulnerable or food insecure.

## ESTIMATING THE ECONOMIC VALUE OF THE EFFECTS OF THE DISASTER

This section gives guidance on how to estimate the economic value of the assessed effects of the disaster (section 4) – referred to as damages and losses - by extracting from the effects those elements that have financial implications, either in terms of damaged infrastructure and physical assets or from loss due to changes in financial flows as linked to disruption of service production/delivery and access to goods and services, disruption of governance and social processes, and increased risks and vulnerabilities.

### ESTIMATING THE ECONOMIC VALUE OF TOTAL AND PARTIAL DESTRUCTION OF INFRASTRUCTURE AND ASSETS (DAMAGES)

In addition to quantifying the damage in terms of total number of partially and fully destroyed public and private physical assets and infrastructure, the PDNA also estimates the monetary value of damage, which is expressed as repair and replacement and costs. Damage is estimated on the basis of the original characteristics of the item and the unit construction prices prevailing at the time of the disaster or the prevailing market price (for animals).

The damage to fully destroyed physical assets is estimated by multiplying the number of destroyed units with the replacement cost (e.g., for sheds and buildings) or current market price (in the case of dead animals, poultry and fish). The estimation of damage to fruit trees that are destroyed is the cost of replanting a destroyed tree and nurturing it over several years until it matures and begins producing again. It is also necessary to estimate the value of damage to destroyed farm roads.

Damage to partially destroyed physical assets can be estimated by multiplying the number of partially damaged units by their average unit cost of repair or rehabilitation (based on the original characteristics and the unit construction prices prevailing at the time of the disaster).

The value of the total damage from the disaster can then be estimated by aggregating the values of fully destroyed assets and those of partially destroyed assets.

## **CHANGES IN FINANCIAL FLOWS AS LINKED TO SERVICE, PRODUCTION, GOVERNANCE AND RISKS (LOSSES)**

Losses are calculated in terms of the changes in economic flows arising from the disaster effects. Losses include damage to infrastructure and physical assets, disruption of access to goods and service, disruption of governance and social processes and increased risks and vulnerabilities. Losses also include unexpected expenditures to meet humanitarian needs during the post-disaster emergency phase. Losses occur until full economic recovery and reconstruction is achieved, in some cases lasting for several years, and may vary in value over time.

## **ECONOMIC VALUE OF CHANGES ON SERVICE DELIVERY, PRODUCTION OF GOODS AND ACCESS TO SERVICES AND GOODS**

Typical losses for the Agricultural Sector include the decline in production of agriculture, livestock, fisheries/aquaculture and forestry and possible higher costs of production in them and lower revenues and higher operational costs in the provision of services.

In the case of permanent fruit trees that are destroyed, the Agricultural Sector Team will have to estimate production losses, which will occur over the several years required for new trees to mature and begin producing again (as an example, coconut trees require about eight years and coffee trees require at least five years).

To estimate production loss in the Livestock sub-sector, two scenarios are likely: 1) full production loss due to death of animals; and 2) partial production loss due to a decline in yield that is caused by stress, lack of shelter, food shortage and health problems attributed to the disaster.

For estimating production loss in the Fisheries sub-sector, three scenarios are likely: 1) partial to full production loss in aquaculture ponds; 2) full production losses in inland capture fisheries; and 3) full production loss in marine capture fisheries.

Other losses are the unexpected expenditures to meet humanitarian needs during the post-disaster emergency phase. Losses are expressed in current values.

## The Typical Effects Of A Disaster That Can Be Classified As Losses In The Agricultural Sector

Crops	Livestock	Fisheries and Aquaculture	Trees and Forests (only exploited forest areas – not natural or unexploited – are to be included)
<p><b>Crop production losses</b> to be estimated first as a quantity not produced (in tons or kilogramEs) and multiplied by the unit price paid to farmers (farm-gate price) under normal/pre-disaster conditions:</p> <ul style="list-style-type: none"> <li>• Loss of standing full annual crop</li> <li>• Loss of standing full perennial crop.</li> </ul> <p>Crop yield decline:</p> <ul style="list-style-type: none"> <li>• Decline in standing annual crop yields</li> <li>• Decline in standing perennial crop yields.</li> </ul> <p>Crop output quality decline (main as well as by-product).</p> <p><b>Higher production costs:</b></p> <ul style="list-style-type: none"> <li>• Higher use of inputs required</li> <li>• Higher use of irrigation required.</li> <li>• Cost of replanting crops affected by a disaster during the growing stage (if there is still time to replant and obtain the harvest during the same calendar year without negatively interfering with the normal planting of the next crop) should be added as a higher cost of production for the calendar year under analysis.</li> </ul>	<p><b>Production loss:</b></p> <p>Production losses due to death of animals</p> <ul style="list-style-type: none"> <li>• loss of milk production</li> <li>• loss of meat production</li> <li>• loss of egg production</li> <li>• loss of honey production</li> <li>• loss of wool production</li> </ul> <p>Production losses due to disease or illness of animals (may occur only during the year of the disaster, if the animals are given adequate veterinarian attention):</p> <ul style="list-style-type: none"> <li>• loss of milk production</li> <li>• loss of meat production</li> <li>• loss of egg production</li> <li>• loss of honey production</li> <li>• loss of wool production</li> </ul> <p><b>Higher production costs:</b></p> <ul style="list-style-type: none"> <li>• Higher use of inputs (e.g., feed)</li> <li>• Veterinary cost (medicine and consultation fees) for ill animals</li> <li>• Higher cost for livestock owners in either renting other animals and/or using machinery (in case of loss of draft power due to stress or death of animals used for draft purposes)</li> </ul>	<p><b>Production and income loss:</b></p> <ul style="list-style-type: none"> <li>• Loss due to decline in fish yield for aquaculture</li> <li>• Loss due to decline in fish catch.</li> </ul> <p><b>Higher production costs</b></p> <ul style="list-style-type: none"> <li>• Higher input cost for aquaculture</li> <li>• Higher production cost due to equipment rental</li> <li>• Higher cost of fuel to reach fish after their migration to other areas.</li> </ul> <p>Lack of ability to sell production due to disrupted market chains.</p> <p><b>Also:</b></p> <ul style="list-style-type: none"> <li>• To what extent have fishing operations lost income as a result of damaged vessels, gear and infrastructure?</li> <li>• To what extent have fishing operations increased in cost (because of fuel, labour, repair cost increases)?</li> <li>• To what extent has the frequency of fishing decreased because of the lack of shore based infrastructure?</li> <li>• How has access to seasonal fish stocks been affected?</li> <li>• How have selling prices of fish affected incomes?</li> <li>• To what extent have aquaculture operations lost income as a result of damaged ponds/cages, gear, feed and seed, and infrastructure?</li> <li>• To what extent have aquaculture production costs increased?</li> <li>• To what extent have breeding cycles of farmed species been disrupted?</li> <li>• How have selling prices of fish affected incomes?</li> </ul>	<p><b>Production loss:</b></p> <p>Loss of timber and of other non-wood forest products (as the national accounts do not include fuelwood products in the forestry sector, any losses on this item are to be accounted for under the environment sector).</p> <p><b>Higher production costs:</b></p> <ul style="list-style-type: none"> <li>• Costs for replanting or protecting</li> </ul>

Source: Data on crops, livestock and fisheries obtained from DaLA.

Note: Table includes most typical effects classified as losses, but is not limited to these. For further reference on estimating physical damage refer to: 1) Damage, Loss and Needs Assessment Guidance Notes (DaLA), GFDRR; and 2) Assessment and Programme Formulation Guidelines for Agriculture Emergencies (APF), FAO.



## ECONOMIC VALUE OF CHANGES TO GOVERNANCE

Aggregate at current value.

## ECONOMIC VALUE OF CHANGES TO RISKS AND VULNERABILITIES

Aggregate at current value.

# ASSESSMENT OF DISASTER IMPACT

## MACROECONOMIC IMPACT

A disaster may have macroeconomic impacts which may last for several years. These impacts depend on the type and severity of the disaster. The socio-economic impact analysis includes an estimation of the disaster's likely effects on economic performance and the temporary macro-economic imbalances that may arise, as well as the temporary decline in employment, income and well-being of affected individuals and households. To measure the impact on macroeconomic variables, analyses are usually made of the post-disaster performance on four of the main aggregates:

1. Gross domestic product (GDP);
2. Balance of payments (BOP);
3. Fiscal sector (budget); and
4. Inflation.

Based on the damage and loss estimates, the assessment team estimates the likely impact on these four macroeconomic variables: 1) disaster-induced changes in agricultural GDP; 2) reduced agricultural-related exports; 3) increased agricultural-related imports; and 4) higher than normal government expenditure and lower tax revenue related to the Agricultural Sector. The possible impact on overall inflation would be estimated once the post-disaster impact data from all sectors becomes available.

Specifically, the following estimations should be made by the Agriculture Assessment Team and provided to the Macroeconomic Team:

- Gross value of production that will not be obtained because of the disaster in each of the agriculture subsectors (crops, livestock, fishery and forestry), in the calendar year of the disaster and in subsequent calendar years;

- Gross value of higher costs of production that will be incurred as a result of the disaster in each of the subsectors, again in the current and subsequent calendar years;
- Amounts and cost of the above-normal imports of agriculture, livestock, fishery and forest products that may have to be imported to counterbalance the production losses caused by the disaster,
- Amounts and cost of the below-normal exportable production that will not happen due to the losses in production, for which export prices (and not farm-gate prices) are to be used;
- Amount and value of imported materials and equipment that reconstruction of destroyed sector assets will require due to the lack of domestic production caused by the disaster, and whose estimation would require using international export plus transport unit prices (not farm-gate prices);
- Any additional current expenditure that the government will have to make in the sub-sectors of Agriculture, Livestock, Fishery and Forestry as a result of the higher costs of production due to the disaster, including:
  - the government's share, if any, in the provision of inputs, such as seeds for replanting, fertilizer, pesticides or irrigation water to ensure production recovery;
  - the government's share in the cost of importing food when required;
- Amount of tax revenues that will not be collected by the government because of the lower level of production achieved after the disaster, or if food is required to be imported and the food imports are to be exempted from import duties.

It is important to note that once production losses have been estimated, if the results reveal that a sizable fraction of food products have been lost due to the disaster, the assessment should also a food balance sheet, which is also an essential input for the estimation of recovery needs ( covered later in this chapter).

Food balance sheets present a comprehensive picture of the pattern of a country's food supply during a specified reference period. The food balance sheet shows for each food item - i.e. each primary commodity and a number of processed commodities potentially available for human consumption - the sources of supply and its utilisation. For further guidance, see: Food Balance Sheets, A Handbook, FAO (2001).

### Box 2.1: The Food Balance

A food balance is an account of the food supply and consumption pattern over a specific period of time, usually one year, in a country or a smaller geographical area of the same.\*

The food availability side of the balance is represented by the total quantity of foodstuffs produced in a country, adding the quantity of food imports and exports, and adjusted by the change in food stocks. On the food utilisation or consumption side, the components include the amounts used to feed livestock, for seed purposes, any losses during storage or transportation, and the amounts available for human consumption.

An example of an annual food balance for a food product is shown in the table below, using tons as a unit.

Availability	5,385	Utilisation	5,385
Domestic production	3,950	Animal feed	2,654
Importation	1,658	Seed	87
Stock variation	103	Processing	86
Exports	-326	Human consumption	2,335
		Other uses	223

\* The Food and Agriculture Organisation (FAO) of the United Nations has a data base in its website showing the annual food balance for most foodstuffs in each country of the world, and includes data up until 2007. More recent information may be obtained from the FAO office in the affected country.

Source: Volume 3 of the GFDRR DaLA Guidance Notes.

## HUMAN DEVELOPMENT IMPACT

Disasters can also have a lasting socio-economic and human development impact which should be assessed during the PDNA when appropriate, and particularly depending on the severity of the disaster. The main considerations include impact at the macro and micro level, such as:

- Impact on poverty (particularly rural poverty);
- Impact on overall levels of food and nutrition (the Agricultural Sector team should provide an estimation of the number of persons that will fall into food insecurity as a result of the event);
- Impact on Millennium Development Goal 1 (the eradication of poverty and hunger); and
- Impact on household and personal income.

Any disaster that significantly affects agriculture and the rural population has serious consequences for rural poverty, particularly for small and marginal farming and landless rural households. Populations affected by disasters may experience significant loss of employment and income, a deterioration of livelihood options and opportunities, decline in the provision of and access to critical services and other negative effects which may increase the size of the population living below the poverty line (in the affected areas and in the country as a whole). The assessment team should estimate the effect on national and regional poverty levels over time and by rural and urban sectors, as well as the criteria for determining poverty levels. When assessing the human development impact, consider the following:

- Main sub-sectors and systems affected (farming, fishing, agro-silvo-pastoral, forests, etc.);
- Comparative impacts on agriculture, fisheries and aquaculture, livestock, forestry;
- Relative importance of the impact on the sector in the broader socio-economic context;
- Share of employment/income lost in the sector;
- Share of damage and loss in the agriculture, fisheries, livestock and forestry sub-sectors;
- General condition of livelihoods-related environmental and natural resources; and
- Spontaneous recovery efforts.

Higher disaster-induced poverty will also affect the time line to achieve Millennium Development Goal 1 at provincial and national levels.

To estimate the human development impact of the disaster it is useful to:

- Analyse the performance on human development components before the disaster, utilizing a pre-crisis baseline (pre-disaster human development trends, including key challenges, and the salient features of the policies implemented pre-crisis that influenced the condition of human development for affected populations); and
- Project/forecast human development performance into the future (both for the year in which the disaster occurred and for the following year/s) based on past performance had the disaster not occurred, utilizing clearly stated assumptions.

# CROSS-SECTORAL THEMES

Below are some of the particular considerations relating to cross-cutting issues in the Agricultural Sector. The assessment should indicate how these issues can be addressed in the recovery process, and should establish cross-sector arrangements as required with other sector teams to ensure that these issues are adequately addressed in the recovery strategy.

## DISASTER RISK REDUCTION

### RESILIENT LIVELIHOODS AND BUILDING BACK BETTER

The recovery strategy for agricultural livelihoods should not only redress the damages caused by the disaster, but also build resilience to future shocks. To achieve this, the assessment identifies underlying risks and the measures that need to be taken during the recovery process to protect agricultural livelihoods, reduce vulnerability and improve the resilience of farmers, herders, fishers and foresters against similar crises. The negative impact of natural hazards and other threats can be effectively reduced, mitigated or prevented by ensuring that recovery investments and strategies promote sustainable models of food production and the application of appropriate agricultural technologies and practices which raise yields and increase resilience against production failure.

### TECHNOLOGIES AND PRACTICES THAT BUILD RESILIENT LIVELIHOODS

A starting point is to understand the threat environment, such as the natural hazards, plant pests and animal diseases that typically threaten livelihoods in the affected areas (or new relocation zones), based on available hazard/risk maps and historical information from previous disasters. Given the inter-connectedness between disasters, the environment and livelihoods, the assessment will need to consider the environmental conditions of the affected area and the connection between natural resources and livelihoods. This includes evaluating the disaster's impact on ecosystem degradation, such as increased soil erosion, declining rangeland quality, salinization of soils, deforestation and biodiversity loss, and the extent to which this impact has an adverse effect on livelihoods (reducing the availability of goods and services to sustain livelihoods, loss of arable land, shrinking economic opportunities and livelihood options, etc.). Part of this information may be obtained or exchanged with the PDNA sector team covering the environment. When appropriate, the assessment and recovery strategy may need to consider climate change and necessary adaptation measures.

The assessment identifies appropriate technologies and practices that can be effective in protecting livelihoods against these known threats. This includes considering local knowledge and positive coping strategies that can be supported in the recovery process. Measures identified are integrated into the sector's recovery strategy and reflected in the national recovery strategy. Examples include:

- The promotion of crop, livestock and fish varieties that are more resilient to stress (floods, droughts or saline conditions);
- Development of efficient seed delivery systems;
- Resilient animal breeding;
- Fodder conservation;
- Practices such as conservation agriculture; and

- In some cases, resilient recovery can be achieved by diversifying livelihoods or promoting other more sustainable livelihood strategies.

Natural resources management technologies and practices should also be considered, particularly those that redress the underlying drivers of risk and make livelihoods more resilient. Examples include:

- Enhanced management and conservation of water to increase water use efficiency and productivity (rainwater harvesting, water storage and conservation techniques);
- Agro-forestry systems that make use of trees and shrubs as shelterbelts, windbreaks and live fences; and
- The restoration of degraded grasslands through grazing management and re-vegetation.

## THE SAFE LOCATION AND DESIGN OF AGRICULTURAL INFRASTRUCTURE

Another element contributing to building back better agricultural livelihoods is the safe location and design of new agricultural infrastructure built during the recovery process. To achieve this it will be necessary to assess the following:

- Infrastructure at risk or exposed to risk (irrigation networks, harbours, storage facilities, energy facilities, etc.);
- If it is safe and sustainable to farm, fish or raise livestock on the same land;
- If it is safe to rebuild the community in the same location or if there is a need to support resettlement, where and how;
- Potential land tenure obstacles that should be addressed to secure safe land and safe housing;
- Introduction of coastal and lakeshore zoning to reduce future risk;
- How shore-based infrastructure can be improved to offer greater protection in the future;
- If future fishing or farming should be reduced or re-directed to reduce pressure on scarce resources;
- Design considerations for infrastructure, such as irrigation systems, fishing vessels, livestock shelters, etc.; and
- Laws, policies, regulations and management practices that may need to change to support more sustainable and resilient crop, livestock and fish production, such as the management of forests and other natural resources.

## STRENGTHENING DISASTER RISK REDUCTION AND MANAGEMENT

In some cases, there may be opportunities in the recovery process to strengthen the overall capacity of countries and communities in disaster risk reduction and to reduce their vulnerability and strengthen their resilience to future disasters. In such cases, the PDNA may identify key areas of need that can be integrated into the Agricultural Sector recovery strategy. In addition to the technologies, practices and other measures that should be integrated into recovery to build resilient livelihoods (noted above), the assessment may consider the following:

### **The enabling environment in disaster risk reduction for food security**

- Strengthen the institutional mechanisms and legal and policy environments that enable and facilitate strategies and financial investments in risk reduction for the Agricultural Sector.



- Strengthen the capacity of line ministries to deliver national legislation, policies and strategies on disaster risk reduction through technical advice, human resources and expertise, training, practical tools and services.
- Integrate disaster risk reduction into rural and agricultural development policies and plans.
- Develop Agricultural Sector-specific national strategies on disaster risk reduction across agriculture, fisheries/aquaculture, forestry and natural resource management.
- Support policies, laws and management systems that can improve the resilience of the Agricultural Sector in the future.

### **Food security information systems and early warning**

- Enhance food security information systems, such as statistical baselines, livelihood profiles, vulnerability and risk analysis, etc., and their links to policy-making on livelihoods.
- Improve early warning systems and communication related to agricultural livelihoods and food security (crop forecasting, food price monitoring, monitoring of plant pests, animal diseases, fish disease and biosecurity risks, wild fires, etc.) and natural hazards such as drought, floods, storms, etc.
- Strengthen links between early warning, preparedness and response mechanisms, including decision-making processes.

### **Preparedness**

- Improve national and local preparedness planning in the Agriculture, Fisheries and Aquaculture, Livestock and Forestry Sectors.
- Promote agricultural practices to strengthen preparedness at national and local levels.
- Strengthen the capacity and capabilities of relevant ministries and departments in preparedness and planning for emergencies.

## **THE ENVIRONMENT AND NATURAL RESOURCES**

Sustainable environmental management is central to successful agricultural livelihoods, since agriculture depends on environmental resources such as arable land, pasture and water. Coordination with the team assessing the environment is necessary to complement recovery actions and avoid overlaps in the assessment of agriculture-related natural resources and environmental concerns.

## **HEALTH**

Coordination and information sharing with the Health Sector Team is important given the close links between health, food security and nutrition. Assessing post disaster food losses and quantifying the food balance, and subsequently estimating possible food imports, are all inputs for the estimation of the food security position and nutrition levels of the population.

## **GENDER AND SOCIAL EQUITY**

Social equity is a key consideration in post disaster recovery because disasters affect different groups of people in different ways and an equitable response is necessary. Recovery processes have the potential to reinforce social inequities or contribute to greater equality between differentiated social groups, such as those based on age, ethnicity or gender.

Gender is particularly important because women and men have different resources available to them and different coping strategies, which need to be understood and recognised in the recovery plan. The elderly and the young (for example, orphans and other vulnerable children, elderly- and child-headed households) are particularly exposed to hazards, because of their relative lack of mobility and dependence on others, and have particular levels of sensitivity to disasters when they occur. Similarly, the risk of exclusion of these groups from relief and recovery is high and they will often require special efforts and approaches.

The World Health Organisation estimates that between 7 and 10 percent of the world's population lives with disabilities of one form or another. These groups are extremely vulnerable in the face of disasters and require high levels of attention and support in order to recover from the loss of care and the stable environment on which they normally depend.

Socio-economic class and caste structures, ethnic origin and language may have important implications for the status of communities and their relationships with outside institutions. Fishing, farming and pastoral communities can often be associated with particular socio-economic groups, ethnicities or languages, and this may affect their levels of participation in, or exclusion from, decision-making and local institutions. This may also influence their vulnerability to disasters and their capacity to take part in rehabilitation efforts.

## **HIV/AIDS**

People living with HIV and AIDS (PLHIV) are subject to social exclusion and rejection. For example, they may be excluded from using communal water sources or sent away from their village, which has an obvious negative impact on their livelihoods. When a disaster occurs, PLHIV are even more vulnerable because their already fragile coping mechanisms are disrupted.

PLHIV are also highly susceptible to other diseases, including those that pass from livestock to people ('zoonoses'). Zoonotic diseases include forms of tuberculosis (TB), toxoplasmosis and others. TB is particularly damaging because it is a major killer of women of reproductive age and the leading cause of death in HIV-positive people (one third of AIDS deaths worldwide). Therefore, special attention should be paid to the potential impacts of an emergency on PLHIV and their particular needs should be taken into account when planning interventions. Interventions should build on current coping strategies used by HIV/AIDS-affected households and take into account the 'coping stage' of affected families.

Disasters also increase the risk of new HIV cases, as there may be food shortages or increased exposure to disease, as well as conflicts over scarce resources, such as grazing and water. Such situations can result in livelihoods being disrupted and, at times, with people fleeing to more secure areas. When law and order deteriorate in an emergency, there may be a rise in crime and gender-based violence, which may further exacerbate women's vulnerability and increase the spread of HIV/AIDS.

## **EMPLOYMENT AND LIVELIHOODS**

The Employment and Livelihoods Assessment Team estimates the decline in personal income as one measure of the disaster's impact on the human development index. Estimates of agricultural production losses and higher production costs are inputs for estimating employment and income decline.

Agricultural production losses and other effects of the disaster may result in lower employment in the sector in the short and medium term. This decline in employment is estimated for each of the agricultural sub-sectors, ex-

pressed in terms of person months. Due to important differences in data sources and estimation methodology, impact on employment is usually analysed separately for the agricultural and non-Agricultural Sectors. The table below summarises the calculations by sector.

Sector	Estimate calculation
<b>Farming sector</b>	<ul style="list-style-type: none"> <li>• Estimate the percent of total damage to crops, plus a percentage of partial damage, as a proxy for the proportion of farms losing most of their crops.</li> <li>• Multiply the above result by the percentage of farms providing the main source of income to the respective households.</li> <li>• Use the above result as a proxy for the number of farmer households turning their labour force to the labour market.</li> </ul>
<b>Farm wage labourers</b>	Assumed to be affected in the same proportion as farmers.
<b>Fisheries wage workers</b>	For households that depend also on fisheries, boat owners are assumed to be affected as a function of the estimated number of boats lost, based on reports from local authorities. Fish workers should also be estimated.
<b>Seasonal farm workers (casual labour)</b>	Estimated as a function of the ruined crop area at a rate of the number of person-days per hectare per each different crop (values are provided by agricultural specialists).
<b>Non-farm sector</b>	The estimation is done based on affected establishments and average number of people employed per category of establishment (micro to large). It is assumed that physical damage to establishments is approximated by the physical damage to houses, on the basis of field reports and observations.
<b>Industrial establishments</b>	Apart from direct physical damage to premises and equipment, industrial establishments can be affected by loss of electricity. Loss of power supply may cause a stop in production for varying lengths of time. Estimates of the length of time during which the factories are stopped leads to estimates of the number of workdays lost.
<b>Commercial establishments</b>	Commercial establishments may also be stopped for varying lengths of time, from one day at least to more than one month in the case of destroyed establishments that cannot restore their premises or inventory. Likewise, the number of jobs affected (workdays lost) is estimated on the basis of the average number of employees per establishment and an estimated average length of closure.
<b>Self-employed</b>	It can be estimated that the self-employed have their livelihoods damaged or destroyed at the same rate of all damaged or destroyed houses in the affected area.

Source: Livelihood Assessment Toolkit. FAO/ILO.

## SECTOR RECOVERY STRATEGY

The recovery strategy for the Agricultural Sector follows the guiding principles, objectives and consultative process of the overall PDNA as outlined in Volume A (Section 3.7). The recovery strategy must be aligned to national laws and existing sector development policies and strategies. In addition, current best practices should be adopted. As such development of the sector recovery strategy will include the following core components:

1. The agreed vision and guiding principles for the sector recovery process (section 8.1);
2. An outline of reconstruction and recovery needs to restore and resume the Agricultural Sector to pre-disaster levels, along with build back better measures to strengthen resilience of the government and communities and reduce risks and vulnerabilities to future disasters (section 8.2);
3. An outline of results-based recovery plan for the Agricultural Sector (section 8.3); and
4. An outline of implementation arrangements (section 8.4).

## VISION AND GUIDING PRINCIPLES

The vision describes the desired long-term recovery outcome in the Agricultural Sector, which should include measures to improve sector performance and build resilient livelihoods, such as through appropriate agricultural technologies and practices.

Guiding principles for agricultural recovery should be defined to inform the sector recovery strategy and guide the recovery process in an effective, transparent and accountable manner. These should be agreed to within the sector team under the leadership of the government.

Below are some examples of recovery guiding principles.

- Respond to the needs and priorities of the affected population;
- Focus on the most vulnerable and most affected;
- Restore capacities and capabilities;
- Support spontaneous recovery processes;
- Ensure national ownership and leadership of the agriculture recovery strategy;
- Work in partnership with civil society, donors, non-governmental organisations, the World Bank and other United Nations agencies;
- Maintain synergies with humanitarian actions and development goals;
- Take into account and support national strategies on agriculture and rural development, poverty reduction, food security and sustainable development;
- Reinforce national and local plans for disaster risk reduction in the Agricultural Sector.

## RECONSTRUCTION AND RECOVERY NEEDS

This section describes the main considerations for estimating post-disaster reconstruction and recovery needs in the Agricultural Sector (reconstruction and recovery needs should be considered and estimated separately). The following lists of needs may not apply to all disaster situations, but the guidance presents the usual reconstruction and recovery needs, which should be in direct relation to the assessment results.

### RECONSTRUCTION NEEDS

Reconstruction needs are quantitative estimations of destroyed physical assets that need to be rebuilt, or repaired. In terms of reconstruction needs, the draft chapter should include the items below.

- The estimated cost of reconstruction of destroyed physical assets. This is a combination of the value of the damage and additional costs to improve quality, introduce modern production technology and to reduce disaster risks. Needless to say, these needs have a value higher than the estimated damages.
- The estimated cost of replacing animal stocks that died due to the disaster. (Note that the replacement cost would be higher than the value of the dead animals if disaster-resistant varieties are introduced to reduce risk. Also note that in the absence of sufficient funding for these

purposes, replacement of the animal stock may be left to the natural course of things; i.e. letting the stock recover naturally, which would have no cost, but would generate production losses over a longer period.)

- The cost of restoring the lands that were affected through erosion, siltation or other processes, so that they may return to their pre-disaster quality and levels of productivity.
- The costs of replanting forests under exploitation so that they may achieve the pre-disaster level of sustainability. (It should be noted that in the absence of sufficient funding - as was mentioned for the case of replacing animal stock - forests under exploitation may be left as they are after a disaster until they achieve natural recovery. In addition, in order to avoid double accounting, note that replanting of natural forests is not considered under the Forestry sub-sector but under environment.)

## RECOVERY NEEDS

Recovery needs include the restoration of the three sub-categories below order to resume agriculture, livestock and fisheries production (agricultural infrastructure, provision of inputs such as seeds, fertilizer, pesticides, farm machinery and equipment, etc.).

1. Service delivery and production and access to goods and services:
  - Restore service delivery and production capacity;
  - Ensure access to services and goods; and
  - Build back better in terms of service delivery and production of goods and access to goods and services.
2. Governance:
  - Restore and/or strengthen governance capacity, including disaster risk management; and
  - Build back better in governance and disaster risk management.
3. Risks:
  - Address pre-existing and new risks related to the disaster; and
  - Build back better by reducing risks and vulnerabilities to future disasters.

Recovery needs in the Agricultural Sector-including crops, livestock, fishery and forestry-are estimated as a direct function of production losses and higher production costs. Usually, the needs are a fraction of the value of production losses, which are the amounts required to re-start productive activities (in terms of the value of raw materials and inputs, or of working capital for the enterprises, or for the individual activities involved).

Estimating overall recovery needs in the Agricultural Sector should consider the issues below.

- The costs associated with recovery of crop production, such as inputs for planting the next crops (seeds, fertilizer, pesticides, etc.), which are usually expressed as a fraction of the value of production losses;

- Any financing required – through a combination of cash grants and/or soft-term credit lines provided through the appropriate channels (micro-credit institutions, the development bank and private commercial banks) – to refinance non-performing pre-disaster loans and to finance working capital for Agricultural Sector production (ensuring not to double account needs for replanting have been met);
- The higher-than-normal costs of providing veterinarian care to domestic animal stock and of artificial feeding of animals, when required;
- The costs of food assistance when the food balance reveals that post-disaster production would not suffice to meet people’s needs and that a food deficit would ensue; (It should be noted that not all cases of a food deficit means that food assistance is required. Some governments may opt for importing food to sell to the population without providing food assistance.);
- Any cost of required cash-for-work assistance would be estimated by the employment and income assessment team after production losses for all sectors have been completed.

Examples of recovery needs are found in the table below.

#### **Needs to resume service delivery and access to goods and services**

- The agricultural areas that need to be rehabilitated, hectares to rehabilitate (by crop)
- Agricultural inputs to be supplied to re-start agriculture (seeds, tools, fertilizers, etc.)
- Agricultural food products that may need to be supplied in the country
- Imports required due to restricted supply in-country
- Agricultural support services for agricultural rehabilitation, such as extension services, farming schools, technical expertise, human resources, capacity building training, etc.).
- Replacement of lost or damaged agricultural equipment
- Rehabilitation of irrigation networks
- Infrastructure and productive facilities that need to be repaired and rebuilt in agriculture, livestock and fisheries
- Rural micro/small enterprises that need recovery support
- Financial services to rehabilitate or introduce to support micro-enterprise recovery and development
- Employment opportunities for the affected population (and types)
- Needs to ensure livelihood diversification in rural areas
- Requirements to clean agricultural land and access roads to farms to resume agriculture
- Requirements to rehabilitate rural roads to open up agricultural areas
- Measures needed to restore access to food
- The measures needed to restore access to markets, employment and financing services (credit and loan schemes)
- Strategies to ensure that displaced persons and other vulnerable groups have access to agricultural inputs and supplies, employment, micro-enterprise development and financial services
- Measures needed for land reclamation in affected agricultural areas

### **Needs to restore governance and social processes**

- Resume minimal functioning of the Ministry of Agriculture
- Restore the capacity of the national, provincial and district agricultural offices
- Technical expertise and human resource requirements (staffing the Ministry of Agriculture)
- Repair or rebuild the infrastructure of the Ministry of Agriculture and supply office equipment
- Support rural cooperatives, farmer organisations, women's groups, etc.
- Additional support services needed, such as information systems, training, agricultural policy decisions, etc.

### **Needs to reduce risks and build back better**

Immediate risks

- Planting in the next planting season, which must be met to avoid further food insecurity
- De-contaminate agricultural land and soils

#### **Build back better**

- Spatial planning with risk reduction principles for agricultural recovery
- Resilient livelihoods, such as using improved agricultural technologies
- Protection of agricultural investments made in the recovery process (for example, dikes to protect farm lands from floods)
- Hazard-resilient design standards for agricultural infrastructure (including new farm buildings, irrigation investments, retrofitting of existing agricultural facilities, safe boat construction, etc.)

Care should be taken to avoid double counting recovery needs and costs. For example, cross-checking the needs identified in relation to livelihood governance and social processes with those estimated by the governance sector team, or the needs to restore natural assets (land, water, forests) with those that may be estimated also in the Environment Sector.

In relation to building back better, the recovery needs reflect the gaps between the pre-disaster situation and the post disaster situation, as well as the elements identified during the assessment as needed to build back better, but not including measures that address the full development objectives.

In addition to the above recovery needs, in particular cases other needs should be estimated as required. In the case of crops, this may include:

- In cases in which the disaster has caused significant production losses, especially in the case of food crops, disaster-induced food deficits are estimated on the basis of a food balance quantification, so that food import needs can be estimated and met through internal food re-assignments from food-surplus areas in the country, in-kind international donations or food acquisitions from abroad. If foods are imported, the value of such imports is estimated;
- The replanting of permanent trees and plantations which may be required to eventually recover the production levels of a plantation when permanent trees or plants have been destroyed.

In the case of livestock, recovery needs may need to be estimated for the following:

- Replacement of animal stocks destroyed by the disaster, and which are needed for the production of meat, milk, cheese and other similar products;
- Prevention and control of animal diseases; and
- Animal food provision and re-planting of pasture lands.

The estimate of the above recovery needs should inform the full recovery and reconstruction of the Agricultural Sector, from the macro to the household level.



## THE AGRICULTURAL SECTOR RECOVERY PLAN

The Agricultural Sector recovery plan should be formulated following a results-based model, and therefore include:

1. priority needs;
2. interventions required in the short-, medium- and long-term;
3. expected outputs;
4. recovery costs in the short-, medium- and long-term; and
5. intended outcomes.

The table below provides an example of how this may be done.

Example Of A Results-Based Recovery And Reconstruction Plan For Agriculture

Priority Recovery Needs	Interventions	Expected Outputs	Recovery Costs	Intended Outcomes
<b>To assist farmers affected by the disaster with the rehabilitation of farms</b>	<ul style="list-style-type: none"> <li>• Supply primary production inputs, training and marketing support.</li> <li>• Multi sector support for traditional small-scale irrigation.</li> <li>• Agricultural technical assistance and capacity building support.</li> <li>• Restore farmers' access to agricultural land.</li> <li>• Rebuild agricultural infrastructure.</li> </ul>	<ul style="list-style-type: none"> <li>• Agricultural input package (tools, seeds, fertilizers, training) supplied to 290,000 farmers.</li> <li>• Irrigation networks repaired to cover 15,000 ha of agriculture land.</li> <li>• Three training centres established and 340 government staff trained.</li> <li>• 450,000m<sup>3</sup> of debris cleared to open up agricultural areas.</li> <li>• 8 processing and 34 storage facilities rebuilt.</li> </ul>	\$7,650,000	To rehabilitate and develop the Agricultural Sector.
<b>To assist fishers affected by the disaster with the rehabilitation of the fisheries sector</b>	<ul style="list-style-type: none"> <li>• Supply primary fisheries production inputs.</li> <li>• Rehabilitate aquaculture production, such as fish and shrimp.</li> <li>• Repair damaged fishing harbours, ports and landing facilities, markets and processing facilities.</li> </ul>	<ul style="list-style-type: none"> <li>• Fisheries livelihood recovery package (vessels, fishing gear) supplied to 120,000 fishers.</li> <li>• 2,450 fish and shrimp aquaculture ponds rehabilitated.</li> <li>• 38 fishing harbours, 16 ports and 4 landing facilities repaired.</li> </ul>	\$5,330,000	To rehabilitate and develop the fisheries and aquaculture sector.



<p><b>To diversify and increase livelihood options for income generation</b></p>	<ul style="list-style-type: none"> <li>• Establish and support new community-led cooperatives providing savings and loan services.</li> <li>• Provide access to capital to engage in income-generating activities and mobilize savings for affected population.</li> <li>• Training and distribution of materials to enhance income generation.</li> </ul>	<ul style="list-style-type: none"> <li>• Three cooperatives established providing savings and loan services.</li> <li>• Mobilize savings for 1,500 households.</li> <li>• Training and inputs provided to 4,400 households to enhance income.</li> <li>• Five rural roads, two bridges and one drainage system rehabilitated.</li> </ul>	<p>\$10,900,000</p>	<p>Cooperatives, savings schemes and income generation support provided to enhance livelihood opportunities.</p>
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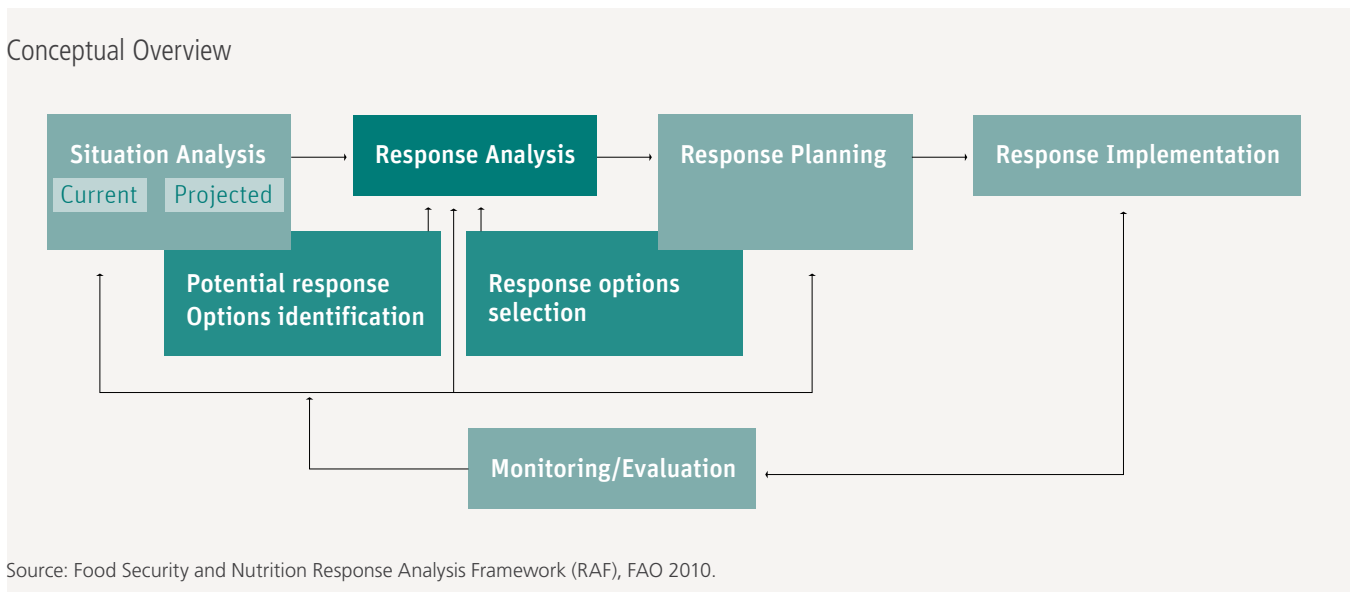
Adapted from sector recovery plans for Haiti and Aceh, Indonesia.

## PRIORITISING NEEDS

Recovery needs in the sector will need to be prioritised and sequenced (short-term, medium-term and long-term, as appropriate). Criteria may be developed by the sector team (or previously by the PDNA team) to guide the prioritisation process. This should include prioritising critical needs expressed by the affected population and government, but also prioritising vulnerable population groups, geographic areas most affected, conflict prevention and peace-building objectives when relevant, among others.

## INTERVENTIONS: RESPONSE ANALYSIS

To formulate appropriate livelihood interventions in the sector recovery strategy, it will be useful to conduct a response analysis which links the assessment results and situation analysis with response formulation and planning. The figure below presents a conceptual overview of a response analysis framework that may be used as a reference.



The response analysis framework provides the steps for revising and checking the assessment results and identifying entry points for appropriate responses as well as criteria for screening response options so that planners can come up with an ‘acceptable’ array of responses. Finally it applies a Response Analysis Matrix designed as a tool to generate discussion and consensus around the appropriateness and feasibility of different response options in meeting objectives.

## RECOVERY COSTS

Costs are calculated once recovery priorities have been identified with their corresponding interventions, outputs and final intended outcomes. Typically costs are calculated for each of the expected outputs and intended outcomes included in the recovery strategy.

The initial estimated costing of outputs should be done by the Agricultural Sector team, and are subsequently shared with other relevant sector teams to compare and ensure comprehensive coverage without double counting, as some interventions can address needs in more than one sector. To assist with this coordination among sectors, it is important that the various sector teams meet regularly during the assessment and planning process.

Unit costs may change due to a disaster. Given the possibility of increased demand and decreased supply, unit costs of items may increase significantly. In the absence of standard unit costs, the costing process generally used in planning projects can be used to estimate the costs. Standard project costs can be used for interventions, such as provision of skills training to a specified population group, or development of an information management system and other elements such as administration and logistics, among others.

# IMPLEMENTATION ARRANGEMENTS

## PARTNERSHIPS, COORDINATION AND MANAGEMENT

This section describes key partnerships, coordination and management arrangements for the recovery process of the Agricultural Sector, such as:

- Partnership arrangements within the agricultural cluster;
- Coordination arrangements between government, civil society, and the private sector;
- Inter-sectoral arrangements (with other clusters, such as food security, nutrition, and employment);
- Management arrangements within the government for the agricultural recovery process; and
- Inter-agency management arrangements (e.g., coordination unit or similar arrangements, support services to be established, such as offices, human resources, etc.).

## CROSS-SECTORAL THEMES

Describe how cross-cutting issues will be addressed during implementation, such as disaster risk reduction, the environment, gender, human rights, HIV/AIDS and any others deemed necessary. Describe also inter-sectoral considerations, such as:

- Other livelihood programmes;
- Employment schemes linked to agriculture;
- Food security, food distribution and nutrition; and
- Natural resources and the environment.

## LINKS TO DEVELOPMENT

This section outlines the ways in which the recovery of the Agricultural Sector will link with and support the country's agricultural development goals and priorities, aligning where possible the recovery process to the broader strategic development objectives for the sector. Consider the following:

- National objectives for meeting MDG1;
- National agricultural policies, poverty reduction and food security strategies; and
- United Nations development planning instruments (e.g., the United Nations Development Assistance Framework (UNDAF)).

## MONITORING AND EVALUATION

Include in this section the plan for monitoring and evaluation in the sector. Considering the following:

- What is to be monitored and evaluated;
- The activities necessary to monitor and evaluate;
- Who is responsible for monitoring and evaluation activities;
- When monitoring and evaluation activities are planned (timing);
- How monitoring and evaluation are carried out (methods); and
- What resources are required and where they are committed.

## KEY ASSUMPTIONS AND CONSTRAINTS

Identify key assumptions made to successfully complete the recovery of the Agricultural Sector and the major constraints likely to be encountered during the recovery process, including indicating how they might be overcome.

# ANNEX 1: EXAMPLES OF PRE-DISASTER BASELINE INFORMATION AND INFORMATION RESOURCES

## Socio-economic

- Population figures, by sex and age
- Number of households (urban/rural)
- Human development index
- Income poverty headcount
- Access to basic services (water & sanitation, health, etc.)
- Market price for basic commodities
- Main livelihood activities (farming, fishing, wage labour, self-employment, etc.), and numbers of people involved in these activities

## Livelihood Strategies

- Which groups produce which crops?
- How important is each crop to the livelihoods of the groups that produce it?
- What proportion of output is marketed?
- How do prices for different crops vary through the year?
- How predictable is seasonal price fluctuation?
- Are the price cycles of all crops correlated?
- What proportion of household food needs is met by own consumption and what portion is purchased?
- At what time of year is cash income most important?
- Do people have access to appropriate financial service institutions to enable them to save for the future? Does access to these vary by social group?
- How long and intense is the 'hungry period'?
- What effect do the 'hungry period' and other seasonal natural events (e.g., the advent of the rainy season) have on human health and the ability to labour?
- Has the length of the 'hungry period' been increasing or decreasing?
- How do income-earning opportunities vary throughout the year? Are they agricultural or non-farm?
- What percentage of energy needs is covered by fuel-wood and/or charcoal?
- How does remittance income vary throughout the year (e.g., falling off at times when it is most needed because of food price rises)?

## Agriculture

- Socio-economic importance of the Agriculture (crop) sub-sector
  - contribution to GDP;
  - contribution to employment;
  - contribution to household income
  - contribution to food security and nutrition;
  - contribution to exports
- Historical production by crops at the national level
- Average yield; and production.
- Historical production by crops and regions (or provinces or districts)
- Projected production by crops at the national and regional levels;
- The cropping pattern
- Land use: cultivable land (irrigated, rainfed), forest area

- Type of food crops and cash crops cultivated, amount planted
- Annual crop production estimates (hectares and yields)
- Calendar of production activities for permanent and seasonal crops
- Cropped areas for different products (seasonal, annual and permanent crops)
- Gross output for each product, for the past five years
- Unit yields for each crop, for the past five years
- Unit prices paid for each crop (at farm gate, wholesale and retail levels)
- Expected unit yields for each product
- Planting intentions by farmers, for each product
- Annual exports and imports of each product
- Most recent food balance
- Size of land farms
- Land tenure (ownership, rental, shared, etc.)
- What is the main source of farm power? Draught animals, small hand tractors, tractors, hand tools?
- What are the main sources of fertilizers? Mineral and organic fertilizers.
- What are the average rates of fertilizer use (N-P-K and organic) per unit of land by main crops?
- Crop rotation – technical judgment on the efficacy of existing crop rotations.
- Identify the farming roles played by men and women (field crops, kitchen gardens and other) in order to identify and address the separate needs of men and women in food and non-food crop production.

### **Seeds**

- What was the organisation of the farmers' seed system and especially what were their main seed sources (both formal and informal seed system must be considered)?
- Main varieties used (local or improved) and how farmers are usually accessing to them
- The institutional arrangement in the country for coordinating seed industry functions and how it operates
- Seed policy and other regulatory frameworks and how they are implemented
- What are the main types of seeds used in the area of concern? (Share of HYV, improved, local, etc)
- Are there traditional seed preservation and storage systems that are effective enough to revitalize?
- What are the main sources of seeds? (HYV, improved, local and other)
- Are there seed producing organisations? Do they supply adequate seeds? Are there reliable seed quality assurance mechanisms?
- Does a clear seeds regulatory framework exist? If so, is it applied at all levels?
- What are the main impediments to adapting high yielding varieties (HYV) and other improved varieties? (price, inadequate supply, uncertain quality, preference, storage, other)

### **Irrigation**

- Description of the irrigation system – source of water, intake structures, distribution networks (primary, secondary and tertiary canal system and type of canal lining, culverts and outlets), pumps and other machinery.
- Is water supply seasonal or permanent? When (season) is irrigation water not necessary?
- Which crops depend on irrigation mostly?
- Who owns the irrigation system?
- Who is responsible for management of various sections of the system?
- How is water distribution governed? Who has access rights, who does not, and how?
- Is water free or charged? If free, who pays for operations and maintenance?
- Had any environmental issues related to the irrigation system been identified prior to the disaster? If so, had any measures been considered to address some of the issues?

## Marketing

- The overall structure and performance of markets, including both wholesale and retail operations, in making food available to consumers throughout all zones
- The trade flows between areas and with neighbouring countries
- Share of crops sold in the market.
- Existing market price information systems
- How crops are sold: fresh or processed.
- Differences in roles and practice between men and women in relation to markets.
- Trade restrictions and/or food price controls are affecting market performance

## Employment (formal/informal) and Income

- (Un)Employment figures disaggregated by sex and age group
- Employment figures disaggregated by occupational category
- Employment figures disaggregated by sector: agriculture, fisheries, forestry
- Average wage and earnings for “tracker” occupations
- Informal-economy estimated figures
- Casual labour, seasonality, wages
- Other forms of income (remittances, pensions, etc.)

## Livestock

- Socio-economic importance of the livestock sub-sector
  - Contribution to GDP;
  - Contribution to employment;
  - Contribution to household income
  - Contribution to food security and nutrition;
  - Contribution to exports
- Type of livestock production (subsistence or commercial, specialized or diversified)
- The role of animals (transport, production, etc.) and pastures (fodder, feed)
- What are the main livestock production systems (crop-livestock, extensive pastoral, intensive/commercial, and other)?
- Livestock numbers by type
- Unit market prices paid to farmers for animals
- Annual or monthly production of milk, cheese, eggs, etc.
- Unit prices paid to producers for milk, cheese and eggs
- What are the main sources of feed for each production system? Prepare a feed calendar by production system.
- What are the main uses of livestock production (consumption, sale/income, trade, social, transport, draught, other)?
- What percentage of food is ‘normally’ derived from livestock?
- What percentage of income is ‘normally’ derived from livestock?
- Were there any management, rights of use and obligation issues with pastures prior to the disaster?
- What is the government strategy (actual or planned) to animal health service delivery?
- Identify source of medicine supply and its reliability
- Animal health services normally available (private, public, a combination of the two or none).
- What are the main diseases that usually threaten livestock in the area of concern?
- What role do different household members (men/boys and women/girls) play with regard to livestock production and management? (Note: different livestock species and ages; seasonal variations).
- What customary institutions and leaders are involved in livestock production and natural resource management and what is their role?
- What are the main coping strategies and indicators for ‘difficult times’ (for example famine foods; high livestock

slaughter or sales; migration; dispersal of household members; sale of other assets etc.)? Do these strategies have negative implications for future livelihood security?

### **Fisheries and Aquaculture**

- Socio-economic importance of the Fisheries sub-sector (contribution to GDP, to exports, to employment, to household income, to food security and nutrition)
- Type of fisheries (aquaculture, artisan fisheries, commercial fisheries).
- What are the different fisheries/aquaculture production activities and scales in the sector?
- What is the distribution of people, communities involved in fishing and aquaculture activities
- Number and capacity of boats and gear



- Annual or monthly production of fish and aquatic products
- Unit prices paid to fishermen (at dock prices)
- Number and capacity of aquaculture facilities
- Annual or monthly production in aquaculture
- Unit prices paid to fish farmers
- How do areas differ in terms of production systems, scale, species and methods?
- What different types of vessels, propulsion systems, fishing methods, equipment and approaches to fishing operations have been used?
- What infrastructure do they depend upon?
- How is fisheries-related infrastructure distributed around the region?
- What policies and management initiatives? How are capture fisheries managed? Access rights, responsibilities, quota system, licensing, quota trading, exclusion zones and other management arrangements.
- Chart capture seasons and if feasible by type and quantity of landed fish.
- Existing practices in fish handling, preservation, transportation, packaging and processing.
- What is the structure and organisation of fisheries and aquaculture livelihoods?
- How are these differentiated in terms of the stakeholder groups (gender, age, wealth and ethnicity)?
- Specific roles men/boys and women/girls in fisheries/aquaculture (fish capture, processing, sales, boat building and repair, etc.).
- Main outlet markets (direct sale at the farm, local market, national market, export other) and methods of transportation.
- What livelihood, coping and adaptive strategies do they adopt?
- What have been the past incidences of fish disease?
- What are the main processing activities that are carried out?
- Where is the post-harvest activity concentrated?
- Where are the main markets for fish and how do they operate?
- Sources of water for aquaculture and seasonality of supply if relevant.
- Main types of ponds used in aquaculture – by size of operation and type of infrastructure, tools and machinery used.
- Main sources of supply in aquaculture by type of production system (fertilizers, lime, seeds, fingerlings and other).
- Which species are common in aquaculture, and sources of input supply?
- How do fisher folk obtain price information from relevant markets on timely basis?
- Marketing association or producer groups, their roles and responsibilities.
- Public or private organisations that provide extension services.

## USEFUL RESOURCES FOR OBTAINING BASELINE INFORMATION

### NATIONAL RESOURCES

#### **National Bureau or Department of Statistics:**

Information relevant to the Agricultural Sector may be available from the main national statistics authority, as well as through statistics services available through line ministries for specific sub-sectors (e.g., Department of Agriculture, Fisheries, Livestock and Forestry).

#### **Country-specific national census:**

Surveys are conducted in general every ten years; some indicators could change significantly over a short period of time. Please find direct links to most of the country specific census statistics results on the following web page: [www.census.gov/population/international/links/stat\\_int.html](http://www.census.gov/population/international/links/stat_int.html)



**Demographic and Health Surveys (the DHS Program of USAID):**

[www.measuredhs.com/Where-We-Work/Country-List.cfm](http://www.measuredhs.com/Where-We-Work/Country-List.cfm)

**FAO:**

[faostat.fao.org/](http://faostat.fao.org/)

[www.fao.org/corp/statistics/en/](http://www.fao.org/corp/statistics/en/)

[faostat.fao.org/site/339/default.aspx](http://faostat.fao.org/site/339/default.aspx)

[www.fao.org/fishery/statistics/en](http://www.fao.org/fishery/statistics/en)

[kids.fao.org/glipha/](http://kids.fao.org/glipha/)

[www.fao.org/economic/ess/ess-capacity/countrystathome/en/](http://www.fao.org/economic/ess/ess-capacity/countrystathome/en/)

[statistics.amis-outlook.org/data/index.html](http://statistics.amis-outlook.org/data/index.html)

[www.fao.org/giews/english/index.htm](http://www.fao.org/giews/english/index.htm)

[firms.fao.org/firms/data-coverage/en](http://firms.fao.org/firms/data-coverage/en)

[www.fao.org/fileadmin/user\\_upload/emergencies/docs/LAT\\_Brochure\\_LoRes.pdf](http://www.fao.org/fileadmin/user_upload/emergencies/docs/LAT_Brochure_LoRes.pdf)

**International Household Survey Network:**

[catalog.ihsn.org/index.php/catalog](http://catalog.ihsn.org/index.php/catalog)

**Multiple Indicator Cluster Surveys (MICS):**

[www.childinfo.org/mics\\_available.html](http://www.childinfo.org/mics_available.html)

**UNICEF:**

[www.unicef.org/statistics/index.html](http://www.unicef.org/statistics/index.html)

**United Nations:**

[unstats.un.org/unsd/default.htm](http://unstats.un.org/unsd/default.htm)

**World Bank:**

[data.worldbank.org/country](http://data.worldbank.org/country)

**World Food Programme:**

[www.wfp.org/food-security](http://www.wfp.org/food-security)



## ANNEX 2: PDNA AGRICULTURAL SECTOR CHAPTER SUGGESTED ANNOTATED OUTLINE

This outline (see below) provides a general indication of expected contents of the Agricultural Sector chapter as part of the overall PDNA report. It is intended to be one of the technical annexes, part of which is to be included in the overall analysis and the main report. The various proposed sections of the template are subject to change if specific conditions prevailing in a particular case warrant alteration. Therefore, the template should not be considered as a fixed menu of topics and items to be covered but rather a flexible outline with some indication of the minimum requirement for the Agricultural Sector analysis, as part of the PDNA.

The exact format and length of the report is usually agreed upon at the start of a PDNA mission among all mission members. In principle, it is a good idea to keep the text for main report as brief as possible and include the additional relevant material as an appendix for the Agricultural Sector. However, government authorities or the mission may consider a more comprehensive assessment; in such cases it is advisable to include assessment details in an appendix to the main report and the summary findings would be part of this template.

All PDNA reports, where the World Bank, FAO or any other international organisation is a partner, are considered drafts unless technically cleared by the concerned departments of the respective organisations.

# ANNEX 3: SAMPLE KEY INDICATORS TO ASSESS EFFECTS ON AVAILABILITY OF/ACCESS TO GOODS AND SERVICES

## AGRICULTURE

### SERVICES

- Effect on access to agricultural services (technical support, extension, training, farm schools, etc.);
- Effect on access to key natural resources, such as farmland and water, including the effect on the management, rights of use and obligations relating to these resources;
- How the damage to agricultural land and access roads limit access to farms and the resumption of agricultural activities;
- Access to credit, saving schemes and other micro-finance services;
- Positive and negative coping strategies of the affected population (e.g., distress sales, reduced food consumption, etc.);
- Ownership of irrigation systems and how these may limit access;
- Changes in irrigation management and governance, and how it affects access rights by different population groups;
- Changes in the cost or price of water, and implications on access and overall agricultural production.
- Constraints in access to land, irrigation and water faced by specific population groups (ethnic, religious, gender, etc.);
- Changing impact on natural fuel sources, increased burden on forest resources.

### AGRICULTURE MARKETS

- The availability and supply of agricultural inputs needed for crop production (seeds, tools, fertilizers, fuel, feed, fodder, equipment, machinery, etc.);
- Types of inputs in short supply and potential alternative suppliers;
- Changes in market prices for agricultural commodities/inputs;
- Constraints that limit access to agricultural inputs (prices, employment, income, expenditures, etc.);
- The availability of food and basic commodities in markets to meet demand;
- Changes in market prices for staple foods, cash crops and basic commodities to assess households' access to these;
- The functioning of distribution channels for agricultural inputs;
- Trade flows or restrictions between affected areas and neighbouring areas/countries;
- The functioning of agriculture market information systems;
- The capacities and limitations faced by traders (e.g., access to markets);

- Seed system security—the availability of and access to seeds throughout the seed system (formal and informal system):
  - normal market seed supply channels;
  - seed quality offered on the market;
  - level of seed availability in markets, current and forecast;
  - the need to import seeds, potential suppliers and distribution channels, and government;
  - legislation or other agreements that limit/support the import of seeds;
  - the price of seeds, current and forecast, and effect on people’s access to these;
  - how farmers’ revenues have been affected by the crisis and how it may impact on access to seed; and
  - particular population groups that face barriers to accessing adequate seeds.
- How access to markets is limited by the disaster’s impact on basic infrastructure (access roads, transport, etc.).

## EMPLOYMENT

- Job losses in the Agricultural Sector (farm wage workers, seasonal farm workers, self-employed);
- The additional demand for jobs or supply of labour due to employment losses (e.g., small farmers who lost their harvest);
- Additional demand for employment or new livelihood opportunities to consider, including in non-farm activities such as reconstruction;
- Impact on other livelihoods that affect employment in agriculture.

## LIVESTOCK

### ANIMAL HEALTH AND LIVESTOCK PRODUCTIVITY

- Livestock mortality and morbidity rates;
- Conditions/changes in livestock shelter/enclosures;
- Level of livestock productivity (off-take of milk, blood, eggs etc.);
- Changes on daily and seasonal livestock movements;
- The availability and supply of water for livestock (quantity and quality) and seasonality of supply;
- Effect on access to key natural resources, such as grazing land, pasture and water for livestock, including rights of use and obligations relating to key natural resources;
- Coping strategies (e.g., high livestock slaughter, sales, migration and other) and how these strategies differ between different population groups (men, women, ethnic groups etc.);
- Changes in the use of livestock (food, income, social, draught, transport);
- Changes in management, rights of use and obligations with livestock and pasture.

### LIVESTOCK SERVICES

- Effect on livestock veterinary services (equipment, human resources, information systems, etc.);

- Effect on livestock extension services;
- Changes in the sources and supply of medicine and its reliability, and implications on the timely delivery of the required medicine for recovery interventions;
- The main obstacles to accessing adequate animal health services, including veterinary services, medicine and vaccines, and animal health information;
- How access to services is limited by the disaster's impact on basic infrastructure (access roads, transport, etc.);
- Changes in income normally derived from livestock which may affect access to services.

## LIVESTOCK MARKETS

- Effect on livestock traders and key livestock markets;
- The impact on livestock sales;
- Effect on the terms of trade between livestock and cereal prices;
- Changes in cross-border trade, movements, etc;
- Effect on the main sources of feed by type of production system;
- The impact of disaster on livestock prices;
- Changes in income derived from livestock which may affect the purchasing power;
- Access to markets by livestock traders;
- Access to credit and saving schemes;
- How access to markets is limited by the disaster's impact on basic infrastructure (access roads, transport, etc.).

## CAPTURE FISHERIES AND AQUACULTURE

### SERVICES AND PRODUCTION

- Effect on fisheries and aquaculture extension services and people's access to these;
- Effect on Fisheries Monitoring Control and Surveillance.
- Effect on fishery service provision (boat builders, engine repairs, gear manufacture and repair).
- Effect on ancillary services, such as ice supplies, fuelwood supplies, salt supplies, aquaculture inputs such as lime, feed etc.
- Effect on fisheries/aquaculture processing at the farm/community level.
- Effect on ponds for aquaculture, by size of operation and type of infrastructure, tools and machinery.
- The availability of access to water for aquaculture (quantity and quality) and seasonality of supply.
- Effect on fisheries/aquaculture post-harvest operations.
- Changes in safety at sea and service delivery efficacy.
- Design considerations for fishing vessels used.

- Considerations with the type of material used to build vessels and with local vessel repair.
- Effect on fisheries and aquaculture disease control services and access to these.

## MARKETS

- The supply and sources of inputs, by type of production system: feed, fertilizers, lime, seeds, fingerlings, fuel and other;
- Changes in the price of fishing/aquaculture inputs (feed, seeds, fuel, gear, vessels, etc.) and effect on access to these by the affected population;
- Effect on sales: fresh (no processing), processed (dry, frozen and other);
- Changes in the purchasing power of fisher folk;
- Access to credit and other micro-finance services;
- Access to fish markets and fish price information;
- Access to information on safety, fishing techniques, fishing gear and vessels;
- Effect on fish handling, preservation, transportation, packaging and processing, if any;
- Effect on fish outlet markets (direct sale at the landing site, local market, national market, export other) and methods of transportation;
- Effect on capture fisheries management: access rights, responsibilities, quota system, licensing, quota trading, exclusion zones and other management arrangements;
- Changes in infrastructure and transport which constrains access to services, markets, operations, processing facilities, etc;
- Changes in other markets that might have a knock-on effect on fish markets.

## EMPLOYMENT

- Job losses in the fisheries/aquaculture sector (wage workers, seasonal workers, self-employed), in particular women and youth (and other marginalized groups) involved in the sector) and small scale fishers;
- The additional demand for jobs or supply of labour due to employment losses;
- Additional demand for employment or new livelihood opportunities to consider, including in non-farm activities such as reconstruction;
- Impact on other livelihoods that affect employment in fisheries/aquaculture.

## FORESTRY

- Effect of disaster on forest-based livelihoods;
- Effect of disaster on the use of forest resources (e.g., increased demand);
- Availability and supply of seedlings for replanting or restoring damaged forest areas;
- Availability and supply of seedlings for household planting (e.g., fruit trees);
- Effect on technical, training and marketing support for small scale forest enterprises;

- Availability and supply of lumber for reconstruction;
- Effect on the consumption of fuel-wood and charcoal for cooking and heating;
- Constraints to people's access to forest resources (wood for energy use or housing, fuel-wood, and other inputs for forest-based micro-enterprises);
- Access to seedlings for replanting or restoring forest areas, and seedlings for household planting (e.g., fruit trees);
- Access to technical support, training and extension and to marketing support for small scale forest enterprises.

## ANNEX 4: REFERENCES

**FAO. 2011. Assessment and Programme Formulation Guidelines for Agriculture Emergencies (APF).** Provides detailed guidance on conducting damage and loss assessment as well as needs assessment, with numerous references to other guidance, practical templates and examples.

**FAO, ILO. 2009. The Livelihood Assessment Toolkit. A guide to livelihood assessments particularly aimed at sudden onset natural disasters.** It includes detailed guidance on developing livelihood baselines, as well as on Initial Livelihood Impact Appraisal (ILIA), and a Detailed Livelihood Assessment (DLA).

**FAO. 2011. A Response Analysis Framework for Food and Nutrition Security Interventions at Inter-Cluster and Cluster Level.** The RAF provides a rigorous and step-by-step analysis of the process to identify and select the best options to address immediate and medium to long term needs. The Guide is mainly designed to address food security and nutrition issues but can easily be adapted to other sectors and themes.

**FAO. 2011. Developing a Response Analysis Framework for Food Security Emergencies.**

**Global Facility for Disaster Reduction and Recovery (GFDRR). Damage, Loss and Needs Assessment Guidance Notes (DaLA).** Guidance on estimating damage and losses in post-disaster situations across all relevant sectors, including agriculture.

**FAO. 2009. Joint FAO/WFP Guidelines for Crop and Food Security Assessment Missions (CFSAM).** This is a relatively large document (320 pages) tailored to a specific output, the CFSAM. However, the document provides some practical and well-tested methodologies for assessing agricultural production, market analysis and estimating aggregate staple food balances.

[www.fao.org/WAICENT/faoinfo/economic/gjews/english/tools.htm](http://www.fao.org/WAICENT/faoinfo/economic/gjews/english/tools.htm)

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LEGS Project. 2009. Livestock Emergency Guidelines and Standards (LEGS). Can be downloaded at: [www.livestock-emergency.net/resources/download-legs/](http://www.livestock-emergency.net/resources/download-legs/).

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