INTRODUCTORY DOCUMENT

POST- DISASTER NEEDS ASSESSMENT METHODOLOGY IN THE AGRICULTURE SECTOR

GFDRR
Global Facility for Disaster Reduction and Recovery

This Document is developed with technical engagement of CARE International in Viet Nam, under the Capacity Building for Disaster Recovery Project in Viet Nam jointly implemented by the United Nations Development Programme and Viet Nam Disaster Management Authority in 2018-2019.

PREFACE

Every year, Viet Nam is heavily affected by disasters triggered by natural hazards. More than 70% of the population is at risk from various types of natural hazards such as floods, typhoons and droughts. Over the past two decades, such disasters annually kill more than 400 people and cause economic losses of 1-1.5% of GDP.

Disasters often cause damages and losses in the Agriculture Sector, including crops and plantation, livestock, aquaculture and salt production. The disaster damages and losses have negative impacts on the life and activities of farmers and communities, particularly those located in the in disaster-prone areas of Viet Nam.

Helping the Agriculture Sector to recover after large-scale disasters is essential to effective longer-term recovery. Currently, assessment of damages in the Agriculture sector is carried out in accordance with the Joint Circular No. 43/2015/TTLT-BNNPTNT-BKHĐT. The statistics and damage assessment according to the forms of this Circular have contributed to speeding up emergency assistance for people and communities, but there is room to further improve the systems in line with the Circular's indicators.

This Guideline on Post-Disaster Needs Assessment in the Agriculture Sector has been adapted [1]and tested in Viet Nam to assist disaster management agencies, local authorities and local organizations to carry out comprehensive assessment and planning of disaster recovery. It aims to support main stakeholders to undertake more effective damage, loss, and impact assessments as well as to prioritize the needs of households and communities as part of medium and long-term recovery planning.

The Viet Nam Disaster Management Authority and the United Nations Development Programme in Viet Nam are pleased to introduce this Guideline which we hope can be useful in helping make effective post-disaster recovery planning.

1 From The PDNA Volume B: Agriculture, Livestock, Fisheries and Forestry, issued by the European Commission, the United Nations Development Group and the World Bank in 2013.

ABBREVIATIONS AND ACRONYMS

ADB	Asian Development Bank
BOP	Balance of Payments
CBDRA	Community-based disaster risk assessment
CCNDPC	Central Committee for Natural Disaster Prevention and Control
DMWG	Disaster Management Working Group
DRR	Disaster Risk Reduction
GDP	Gross Domestic Product
Ha	Hectare
HH	Households
L/INGOs	Local and International non-governmental organisations
MARD	Ministry of Agriculture and Rural Development
NDPC	Natural Disaster Prevention and Control
PCNDPC	Provincial Committee of Natural Disaster Prevention and Control
PDNA	Post-disaster Needs Assessment
UN	United Nations
UNDP	United Nations Development Program
VDMA	Viet Nam Disaster Management Authority
VND	Viet Nam Dong
WB	World Bank

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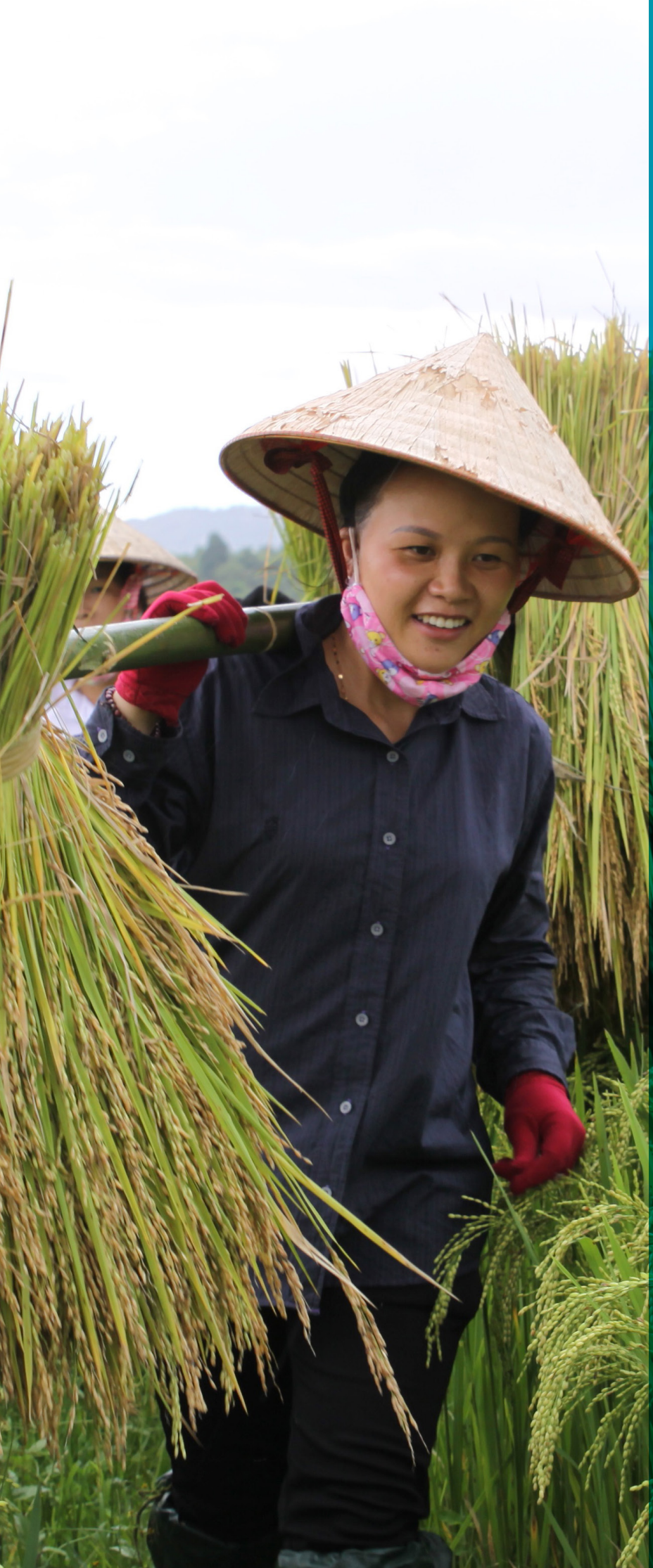


PART 1
POST-DISASTER NEEDS ASSESSMENT IN THE AGRICULTURAL SECTOR

1. Introduction
2. Preparation
3. Main contents and scope

1. INTRODUCTION

The Post-Disaster Needs Assessment (PDNA) for the Agriculture Sector aims to provide an understanding of the sector context and baseline situation in the affected area, the effects and impact of a disaster on agriculture, the recovery needs of the affected population, and how to formulate a sector recovery strategy.

In Viet Nam, according to the Joint Circular No.43/2015/TTLT-BNNPTNT-BKHĐT, the Agriculture Sector comprises four main sub-sectors namely:

1. Agriculture;
2. Livestock;
3. Fisheries and aquaculture; and
4. Salt production.

At the national level, the Ministry of Agriculture and Rural Development (MARD) manages the Agriculture Sector.

2. PREPARATION

2.1 Agriculture Sector PDNA members

The Viet Nam Disaster Management Authority (VDMA), as the Standing Office of the Central Steering Committee for Disaster Prevention and Control, will make clear the purpose, members and requirement for an assessment of the Agriculture Sector. (hereafter is referred to as a PDNA team).

All the members of the PDNA team for the Agriculture Sector should clearly understand their roles and responsibilities for information and data collection, as well as the assessment method and approach according to the ToR prepared by the VDMA.

The Agriculture Sector PDNA team should have local knowledge and previous disaster assessment experience.

The multidisciplinary team should be gender balanced with collective expertise[2] in the following areas:

- Agricultural economics
- Civil and agricultural engineering
- Agricultural extension
- Livelihoods
- Animal husbandry
- Fisheries and aquaculture
- Food technology and nutrition
- Salt production
- Watershed management (depending on the disaster and area affected)
- Social science and gender

2.2 Identify stakeholders

Stakeholders involved in the Agriculture Sector should include:

At the national (or central) level:

- The Central Committee for Natural Disaster Prevention and Control (CCNDPC); the UN Disaster Management Team; the European Union Delegation; the World Bank, ADB and other major donors and development partners; members of the Disaster Management Working Group (DMWG) – comprising local and international non-governmental organisations (L/INGOs), the Viet Nam Red Cross, Viet Nam Women's Union, and other concerned agencies;
- Representatives of significant private sector corporations and companies involved in Agriculture production and trading;

2 *A suitable number of team members who can cover all relevant areas of expertise, 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.*

- Service providers, academic institutions, corporate and financial sector organisations engaged in the Agriculture Sector.

At the provincial level:

- The Provincial Standing Offices for the Provincial Committee of Natural Disaster Prevention and Control (PCNDPC) – including the Department of Agriculture and Rural Development and the Department of Planning and Investment – as well as members of the Viet Nam Red Cross and Viet Nam Women's Union;
- Provincially-based private sector companies involved with agriculture services and equipment supply.

At the district, commune or ward, and village level:

- The district, commune or ward level Natural Disaster Prevention and Control (NDPC) focal points;
- District and commune focal points for Agriculture, Planning and Finance and mass organisations;
- A representative number of men, women, boys and girls from the disaster-affected population; religious leaders and ethnic minorities;
- Leaders of the local emergency response teams.

3. MAIN CONTENTS AND SCOPE

Volume A provides a detailed explanation and guidance for each element of a PDNA. The Agriculture Sector follows steps explained in Section V Summary of PDNA Process and includes:

1) **Analysing context and baseline information**: Describes the characteristics of the Agriculture Sector through the collection of baseline information on the sector to:

- compare pre- and post-disaster situations;
- provide qualitative and quantitative data to estimate the disaster effects on agriculture; and
- provide a robust basis to analyse the disaster impact on agriculture.

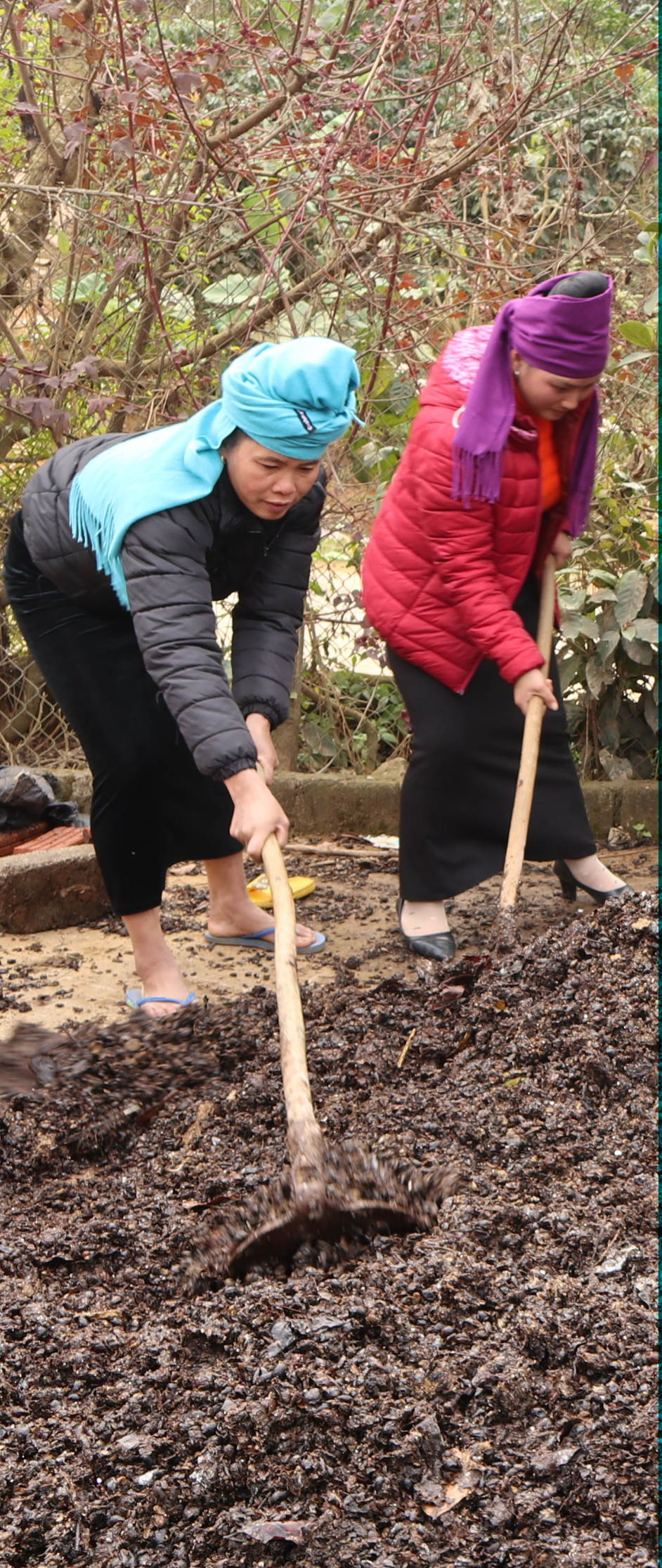
2) **Assessing disaster effects**: Quantifies and provides monetary values of the disaster effects on the Agriculture Sector looking at four dimensions:

- damage and disruption to the agriculture-related infrastructure and physical assets;
- changes in economic flows in income and revenue in the sector as a result of the disaster;
- the extent to which the disaster has affected governance and social processes; and
- increased risks and vulnerabilities relating to the Agriculture Sector.

3) **Assessing disaster impacts**: Analyses the likely impact of the disaster effects on the Agriculture Sector on the broader economy and society, as well as the estimation of the human development impact at both macro- and micro levels.

4) **Defining recovery needs**: Measures the immediate and recurring risks the population face, quantitative estimates of destroyed physical assets that need to be rebuilt, or repaired, and the restoration of the four sub-sectors to resume agriculture production activities, and identifies what is required for building back better.

5) **Developing a recovery strategy**: Develops a recovery and reconstruction strategy to address the needs of the affected people in the Agriculture Sector.



PART 2
CONDUCTING A PDNA IN THE AGRICULTURAL SECTOR

1. Analysing context and baseline information
2. Assessing disaster effects
3. Assessing disaster impacts
4. Defining recovery needs
5. Developing a recovery strategy

1. ANALYSING CONTEXT AND BASELINE INFORMATION

1.1 Baseline data

Pre-disaster context such as demographic, socio-economic, geographic, ethnic and cultural knowledge should be collected and updated every year before the disaster season by government authorities at all administrative levels (i.e. commune, district, provincial, and national), particularly in the disaster-prone provinces of the country.

Other context information helpful to understand different dimensions of analysis and the impact assessment are presented in Table 1 below:

Table 1. Context information to be collected

Pre-disaster
Institutional and policy environment • Relevant agricultural and food security policies, national plans, and natural resource management plans • Institutions and organisations supporting livelihoods (private and public) • Guidelines and regulations for the Agriculture Sector disaster response and recovery
Risks and vulnerabilities • Hazard maps, showing high-risk areas • Risks and vulnerabilities as recorded in CBDRA reports • Contingency plans • Overall
Macro-level situation • The overall economic stability of the province, and the nation • The budget of the province related to agriculture versus another sector • Exports of agricultural products/and value • The relative importance of the Agricultural Sector in the broader socio-economic context (contribution of agriculture, fisheries/aquaculture, livestock and salt to GDP, employment, exports, and household income)
The human and social situation • Socio-economic stability • Livelihoods and livelihood assets of different socio-economic groups, especially of vulnerable people • Main agricultural systems: farming sectors/systems, including land use and access (smallholders, subsistence, agri-business, rain-fed, irrigated, pastoral, capture fisheries or aquaculture,), their interactions and proportional contributions to overall production; • Seasonal calendar • Food security issue • Nutrition issue • Access to finance and resources.

Sources: *Agriculture census, population census, and macro-economic reports.*

Baseline information should provide an overview of the Agriculture Sector including:

- **Agriculture:** average area, yield, and farm gate prices for seasonal crops, permanent crops, and horticulture, and ornamental plants;
- **Livestock**: number of animals, the average production and selling cost (farm gate price) for products, for example for dairy (milk) or egg-laying chicken, and the price for purchasing livestock, for example, the cost of a dairy cow, pig and poultry broilers (meat);

- **Fishing and aquaculture**: number of boats and ponds, average production and selling price; and
- **Salt production:** area under salt cultivation, average production and selling price.

It also comprises a description of:

- Importance of agriculture sub-sectors to overall local revenue;
- The people who work in the Agriculture Sector and their main livelihoods;
- Infrastructure and livelihood assets related to agriculture including productive equipment and inputs, as well as land ownership (private or public/government owned);
- Seasonal calendars;
- Governance and decision-making processes in the Agriculture Sector (including institutions, social organizations, and the policy environment);
- Pre-existing risks and vulnerabilities (e.g., risk and vulnerability maps, number of disasters and type in the past, existing contingency plans, and SOPs).

Note: *for each sub-sector, the baseline data is divided into two parts:*

- Baseline data on production;
- Baseline data on infrastructure and physical assets.

1.2. Sources of information

- Most recent Population and Housing Census, from the General Statistics Office and Provincial Statistics Office;
- Most recent rural, agricultural and fishery census;
- Existing five-year and annual provincial socio-economic development plans and reports from the Department of Planning and Investment;
- Annual plans and reports of the provincial Department for Agriculture and Rural Development;
- Poverty lists of the commune, district and provincial People's Committees, and other data available from the provincial Department of Labour and Social Affairs;
- Data from the provincial Viet Nam Women's Union, Farmers' Association, and Viet Nam Red Cross; and any other data from other organizations working in agriculture;
- Most recent disaster risk assessment, or community-based disaster risk assessment (CBDRA) carried out under Decision 1002 (the National Community-based Disaster Risk Management Programme, under MARD);
- State and commercial banks in the disaster-affected provinces and at the national level.

1.3. Methods of data gathering

- Primary data collection: using participatory tools, such as semi-structured interviews, Focus Group Discussions with men and women separately; key informant interviews, direct observation; and household surveys;
- Secondary data review, e.g. reports, reference materials, documents.

1.4 Recording baseline data

The following tables are summarising the baseline information needed for each agriculture sub-sectors:

Table 2. Baseline information on crop production (at the province, district or commune level) [3]

Crops	No. of HHs	Area cultivated (ha)					Productivity (t/ha)					Farmgate Price (VND/ Unit)
		2014	2015	2016	2017	2018	2014	2015	2016	2017	2018	
Seasonal crops												
Rice												
Corn												
Soybean												
Sweet potato												
Cassava												
Other												
Permanent crops												
Pepper												
Coconut												
Coffee												
Other												
Horticulture												
Vegetables												
Flowers												
Ornamental plants												
Other												
Fruit trees												
Oranges												
Mangoes												
Bananas												
Other												

3 Depending on the level of the disaster and data availability.

Table 3. Baseline information on crop infrastructure and physical assets

Items	Unit	Quantity	Average replacement cost (VND/Unit)	Estimated time for replacement (month)
Physical assets				
Permanent crops	ha			
Pepper				
Coconut				
Coffee				
Other				
Fruit trees	ha			
Oranges				
Mangoes				
Bananas				
Other				
Other physical assets				
Storage buildings	m2			
Other				
Equipment and machinery				
Tractor				
Hand tractor				
Thresher				
Other				
Stocks and raw materials				
Rice				
Corn				
Seeds				
Fertilizer				
Pesticides				
Other				
Public assets and infrastructure				
Irrigation system				
Irrigation channels	km			
Pumping station				
Other				
Inner field road	km			
Other infrastructure				

Note: *In Agriculture Sector PDNA, permanent crops and fruit trees are considered physical assets.*

Table 4. Baseline information on livestock production (at the province, district, or commune level) [4]

Livestock	No. of HHs	Total number of stock					Average productivity per year (e.g. kg, l)					Farmgate price (VND/Unit)
		2014	2015	2016	2017	2018	2014	2015	2016	2017	2018	
Breeding purpose/female/male animals												
Milking Cows												
Pigs												
Chickens												
Ducks												
Honey												
Other												

Note: *Table 4 only lists the breeding animals.*

Table 5. Baseline information on livestock infrastructure and physical assets [5]

Items	Unit	Quantity	Average replacement cost (VND/unit)	Replacement/recovery time (month)
Physical assets				
Storage buildings				
Pasture				
Animal pens/shed				
Other				
Equipment and machinery				
Stored feed and fodder				
Livestock equipment and machinery				
Beehives				
Honey processing machine				
Milking machine				
Egg hatchery equipment				
Other				
Stocks and raw materials				
Veterinary supplies				
Other				
Breeding purpose/female/male animals				
Milking Cows				
Pig				
Chicken				
Ducks				

4 Depending on the level of the disaster and data availability.
5 Including productive equipment and inputs.

Items	Unit	Quantity	Average replacement cost (VND/unit)	Replacement/recovery time (month)
Honey				
Other				
Meat purpose animals				
Cows				
Buffalo				
Horse				
Pig				
Deer				
Sheep				
Goat				
Chicken				
Duck				
Geese				
Other				

BASELINE DATA ON FISHERIES AND AQUACULTURE

Table 6. Baseline information on fishery and aquaculture production

Aquaculture	No. of HHs	Total surface (ha)					Average productivity per year (ton/ha)					Farmgate price (VND/ton)
		2014	2015	2016	2017	2018	2014	2015	2016	2017	2018	
Shrimp												
Shrimp farming in a rice field												
Extensive shrimp farming												
Intensive shrimp farming												
Traditional fish raising in small ponds												
Catfish farming												
Crab												
Bivalve												
Fisheries	**No. of HHs**	**Total surface area (ha)**					**Average productivity per year (ton/year)**					**Price at harbour (VND/Ton)**
		2014	2015	2016	2017	2018	2014	2015	2016	2017	2018	
Boat with an engine < 20CV		N/A										
Boat with an engine 20-90CV		N/A										
Boat with an engine > 90CV		N/A										

Table 7. Baseline information on fishery and aquaculture infrastructure and physical assets

Items	Unit	Quantity	Average replacement cost (VND/unit)	Replacement time (month)
Physical assets				
Ice plants/freezers/ storage buildings				
Aquaculture ponds, cages, tanks				
Other				
Equipment and machinery				
Fishing boat with an engine < 20CV				
Fishing boat with an engine from 20-90CV				
Fishing boat with an engine >90CV				
Communication equipment sets for fishing boats				
Aquaculture equipment (gear, nets)				
Other				
Stocks and raw materials				
Aquaculture stocks (Lime, fish larvae and feeds)				
Other				
Public assets and infrastructure				
Fisheries infrastructure (ports, landing facilities, harbours, markets)				
Aquaculture feed mills and storage facilities				
Aquaculture hatcheries and nursery units				
Other equipment				

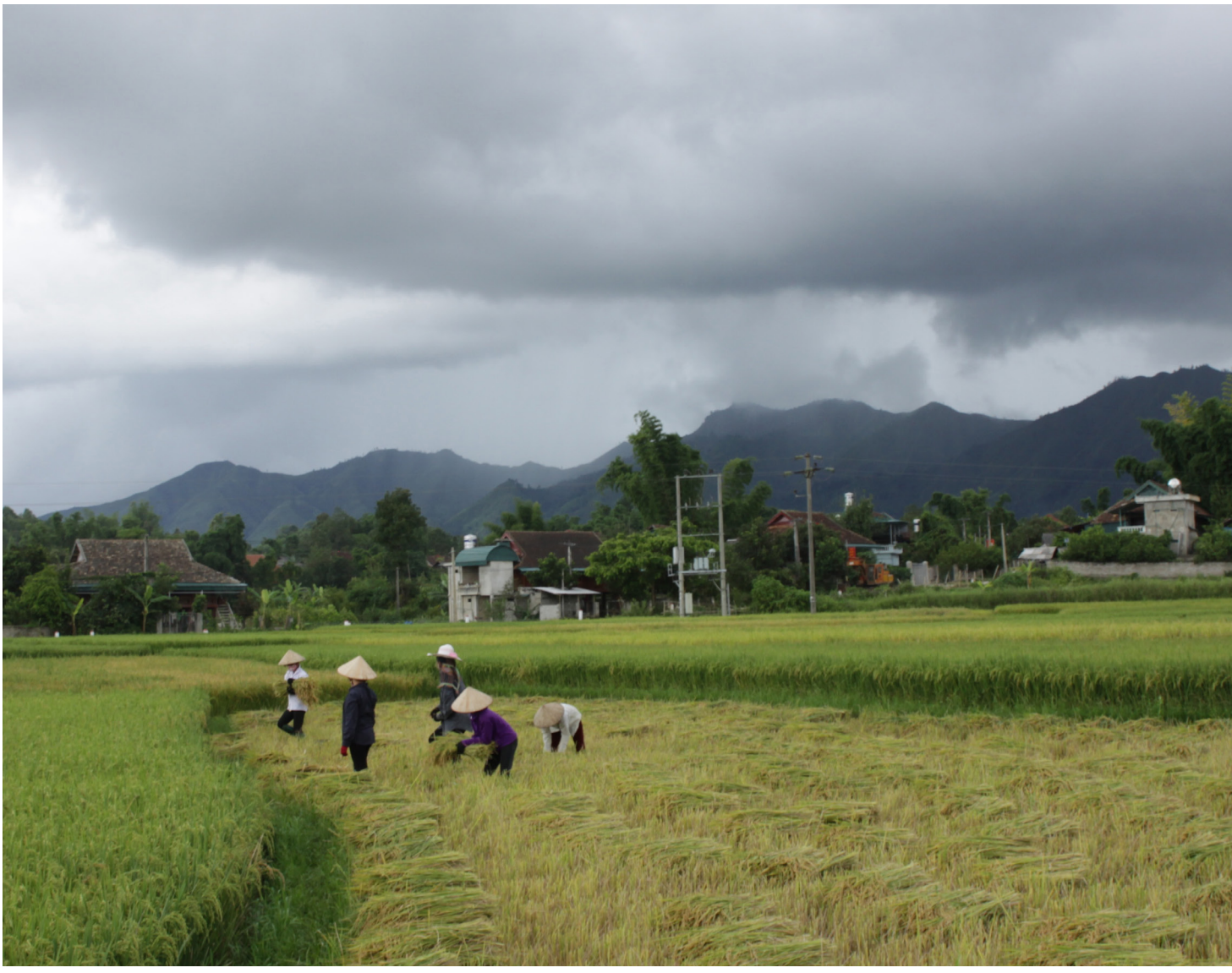
Table 8. Baseline information on salt production

Salt	No. of HHs	Total surface (ha)					Average productivity per year (ton/ha)					Farmgate price (VND/ton)
		2014	2015	2016	2017	2018	2014	2015	2016	2017	2018	
Salt production field												

Table 9. Baseline information on salt infrastructure and physical assets

Items	Unit	Quantity	Average replacement cost (VND/unit)	Replacement time (month)
A detailed list of salt assets				

Note about filling the information in the tables above: *The data can be collected from the Agricultural Department, including the sections for the crop, animal husbandry, extension centre, and fishery. Unit cost is the average price of the item.*



2. ASSESSING DISASTER EFFECTS

2.1. Disaster damage to agriculture-related infrastructure and physical assets

Disaster damages in the Agricultural Sector are evaluated by quantifying the damaged infrastructure and physical assets as totally or partially destroyed.

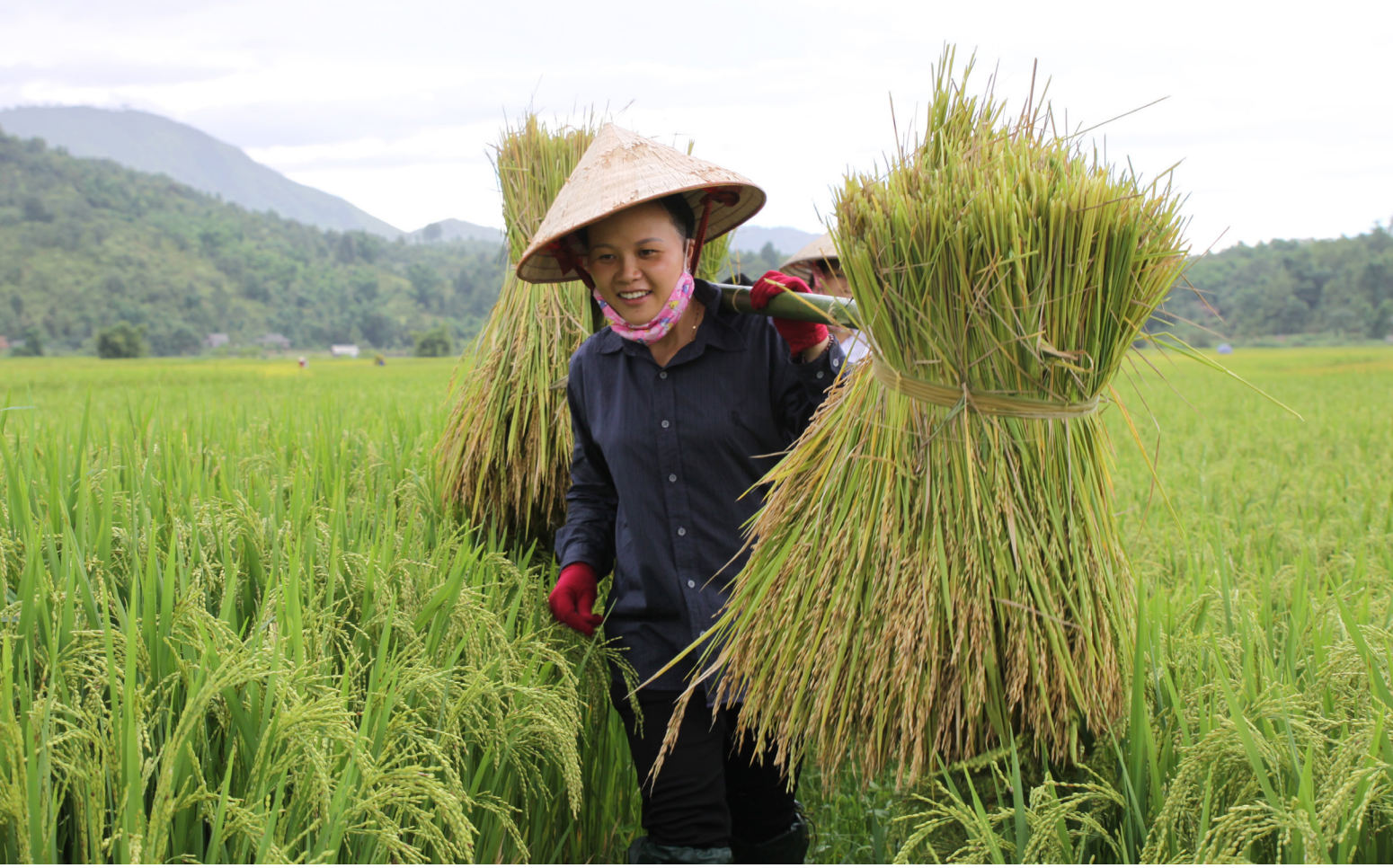
The following table shows typical assets considered in the Agriculture Sector and its subsectors:

Table 10. Typical infrastructure and physical assets in the agriculture subsectors

Crops (seasonal and permanent)	Livestock	Fisheries and aquaculture	Salt production
• Agricultural land • Stored agricultural inputs • Farm buildings, sheds, storage facilities, seed laboratories • Farm equipment and machinery • Equipment/materials for seed processing, home-based food processing, and preservation • Irrigation systems and infrastructure • Irrigation equipment • Drainage systems, equipment, and infrastructure • Internal farm roads • Perennial trees • Research, training and extension centers	• Farmed animal • Pasturelands • Livestock sheds • Storage buildings • Stored feed and fodder • Livestock equipment and machinery	• Fishing vessels and engines (marine and inland) • Fishing gear (sea and inland) • Aquaculture production (ponds, cages, tanks and farm buildings) • Aquaculture hatcheries and nursery units • Aquaculture inputs (fish larvae, lime) • Aquaculture feed mills and storage facilities (may be accounted for by the industry sector) • Post-harvest assets (ice plants, freezers and storage buildings) • Significant fisheries infrastructure (ports, landing facilities, harbours, and markets,) • Fuel supply • Boat construction and repair facilities (may be accounted for by the industry or services sectors) • Fishing gear supplies • Shore-based infrastructure	• Salt fields • Canals to lead salt water to salt production fields • Salt production tools • Salt storage
Note: *- This list of typical assets that could sustain destruction is indicative, not fully inclusive.* *- The by-products of the animals, e.g. dairy, eggs, and meat, are part of the production process and should be considered as a loss.*			

In line with the definitions provided in the Joint Circular No. 43/2015/TTLT-BNNPTNT-BKHĐT in four categories of:

(1) Total destruction: **over 70% which cannot be repaired;**
(2) Severe destruction: **from 50% to 70%;**
(3) Heavy destruction: **from 30% to 50%;**
(4) Partial destruction: **less than 30%.**



Estimating the monetary value of damage to the Agriculture Sector

The Agriculture Sector PDNA team should estimate the **monetary value of the disaster effects on agriculture-related infrastructure and physical assets (in millions VND**), using:

- **Replacement cost**: for **totally destroyed or over 70%** agricultural infrastructure, assets and stock to rebuild to a pre-disaster condition, with no improvements, at market prices before the disaster;
- **Repair cost:** applicable to all three remaining categories (**destruction less than 70%)**, using a percentage in line with the levels of damage to restore the infrastructure and physical assets to a pre-disaster condition.

In addition to quantifying the damage caused by the disaster on the total number of partially and totally destroyed physical assets and infrastructure, the PDNA also estimates the monetary value of repairing and replacing those assets.

The monetary value of the damage is estimated based on the original characteristics of the item and the unit cost prevailing at the time of the disaster or the prevailing market price (for animals).

Please refer to **Table 10** to identify typical infrastructure and physical assets in the Agriculture Sector.

The monetary value of the damage is estimated by using this formula:

i) In case of **partially destroyed assets or infrastructure (PDA/I):**

Damage monetary value = No. of PDA/I * Repairing cost

Wherease the repairing cost is based on the original characteristics and unit cost prevailing at the time of the disaster

ii) In case of **totally destroyed infrastructure or assets (TPA/I):**

Damage monetary value = No. of TDA/I * Replacement cost

Wherease the replacement is calculated at the current market price.

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.

Damage for specific crops, livestock, fisheries and salt is recorded from **Table 11 to Table 14**.

2.1.1 Damage to the crop sub-sector

Table 11. Calculating the damage to the crop sub-sectors

Item	Unit	Destruction of less than 30%			Destruction from 30% to 50%			Destruction from 50% to 70%			Destruction of over 70% (totally destroyed)			Total cost (million VND)
		Quantity	Average repair unit cost	Estimated repair cost million VND	Quantity	Average repair unit cost million VND	Estimated repair cost million VND	Quantity	Average repair unit cost million VND	Estimated repair cost million VND	Quantity	Average replacement unit cost million VND	Estimated replacement cost million VND	
		A	B	C = A x B	D	E	F = D x E	G	H	I = G x H	K	L	M = K x L	N=C+F+I+M
Physical assets														
Permanent crops	**ha**	NA												
Pepper		NA												
Coconut		NA												
Coffee		NA												
Others		NA												
Fruit trees	**ha**	NA												
Oranges		NA												
Mangoes		NA												
Bananas		NA												
Others		NA												
Other physical assets														
Storage buildings														
Other														
Equipment and machinery														
Tractor														

Item	Unit	Destruction of less than 30%			Destruction from 30% to 50%			Destruction from 50% to 70%			Destruction of over 70% (totally destroyed)			Total cost (million VND)
		Quantity	Average repair unit cost	Estimated repair cost million VND	Quantity	Average repair unit cost million VND	Estimated repair cost million VND	Quantity	Average repair unit cost million VND	Estimated repair cost million VND	Quantity	Average replacement unit cost million VND	Estimated replacement cost million VND	
		A	B	C = A x B	D	E	F = D x E	G	H	I = G x H	K	L	M = K x L	N=C+F+I+M
Hand tractor														
Thresher														
Other														
Stocks and raw materials														
Rice														
Corn														
Seeds														
Fertilizer														
Pesticides														
Other														
Public assets and infrastructure														
Irrigation system														
Irrigation channels	km													
Pumping station														
Other														
Inner field road	km													
Other infrastructure														
TOTAL														

Note:

- Damage of permanent crops and fruit trees is the cost for re-planting (it means that it is totally destroyed – over 70%).

- For other 3 categories of destruction, the monetary value of loss is estimated in terms of reduction in productivity of the permanant crops or fruit trees.

2.1.2 Damage to the *livestock sub-sector*

Table 12. Calculating the damage to the livestock sub-sector

Item	Unit	Destruction of less than 30%			Destruction from 30% to 50%			Destruction from 50% to 70%			Destruction of over 70% (totally destroyed)			Total cost (million VND)
		Quantity	Average repair unit cost	Estimated repair cost million VND	Quantity	Average repair unit cost million VND	Estimated repair cost million VND	Quantity	Average repair unit cost million VND	Estimated repair cost million VND	Quantity	Average replacement unit cost million VND	Estimated replacement cost million VND	
		A	B	C = A x B	D	E	F = D x E	G	H	I = G x H	K	L	M = K x L	N=C+F+I+M
Physical assets														
Storage buildings														
Pasture														
Animal pens/shed														
Other														
Equipment and machinery														
Stored feed and fodder														
Livestock equipment and machinery														
Beehives														
Honey processing machine														
Milking machine														

Item	Unit	Destruction of less than 30%			Destruction from 30% to 50%			Destruction from 50% to 70%			Destruction of over 70% (totally destroyed)			Total cost (million VND)
		Quantity	Average repair unit cost	Estimated repair cost million VND	Quantity	Average repair unit cost million VND	Estimated repair cost million VND	Quantity	Average repair unit cost million VND	Estimated repair cost million VND	Quantity	Average replacement unit cost million VND	Estimated replacement cost million VND	
		A	B	C = A x B	D	E	F = D x E	G	H	I = G x H	K	L	M = K x L	N=C+F+I+M
Egg hatchery equipment														
Other														
Stocks and raw materials														
Veterinary supplies														
Other														
Breeding animals killed														
Milking Cows		NA												
Pig		NA												
Chicken		NA												
Ducks		NA												
Honey		NA												
Other														
Meat purpose animals killed														
Cows		NA												
Buffalo		NA												

Item	Unit	Destruction of less than 30%			Destruction from 30% to 50%			Destruction from 50% to 70%			Destruction of over 70% (totally destroyed)			Total cost (million VND)
		Quantity	Average repair unit cost	Estimated repair cost million VND	Quantity	Average repair unit cost million VND	Estimated repair cost million VND	Quantity	Average repair unit cost million VND	Estimated repair cost million VND	Quantity	Average replacement unit cost million VND	Estimated replacement cost million VND	
		A	B	C = A x B	D	E	F = D x E	G	H	I = G x H	K	L	M = K x L	N=C+F+I+M
Horse		NA												
Pig		NA												
Deer		NA												
Sheep		NA												
Goat		NA												
Chicken		NA												
Duck		NA												
Goose		NA												
Other														
TOTAL														

Note: *Only dead animals are calculated as damage.*

2.1.3 Damage to the fishery and aquaculture sub-sector

Table 13 Calculating the damage to the fishery and aquaculture sub-sector

Item	Unit	Destruction of less than 30%			Destruction from 30% to 50%			Destruction from 50% to 70%			Destruction of over 70% (totally destroyed)			Total cost (million VND)
		Quantity	Average repair unit cost	Estimated repair cost million VND	Quantity	Average repair unit cost million VND	Estimated repair cost million VND	Quantity	Average repair unit cost million VND	Estimated repair cost million VND	Quantity	Average replacement unit cost million VND	Estimated replacement cost million VND	
		A	B	C = A x B	D	E	F = D x E	G	H	I = G x H	K	L	M = K x L	N=C+F+I+M
Physical assets														
Ice plants/ Freezer/ Storage buildings														
Aquaculture ponds, cages, tanks														
Other														
Equipment and machinery														
Fishing boat with an engine < 20CV														
Fishing boat with an engine from 20-90CV														
Fishing boat with an engine >90CV														
Communication equipment sets for fishing boats														
Aquaculture equipment (gears, nets)														
Other														

Item	Unit	Destruction of less than 30%			Destruction from 30% to 50%			Destruction from 50% to 70%			Destruction of over 70% (totally destroyed)			Total cost (million VND)
		Quantity	Average repair unit cost	Estimated repair cost million VND	Quantity	Average repair unit cost million VND	Estimated repair cost million VND	Quantity	Average repair unit cost million VND	Estimated repair cost million VND	Quantity	Average replacement unit cost million VND	Estimated replacement cost million VND	
		A	B	C = A x B	D	E	F = D x E	G	H	I = G x H	K	L	M = K x L	N=C+F+I+M
Stocks and raw materials														
Aquaculture stocks (Lime, fish larvae and feed)														
Other														
Public assets and infrastructure														
Fisheries infrastructure (ports, landing facilities, harbours, markets)														
Aquaculture feed mills and storage facilities														
Aquaculture hatcheries and nursery units														
Other equipment														
TOTAL														

2.1.4 Damage to the salt production sub-sector

Table 14. Calculating the damage to the salt production sub-sector

Item	Unit	Destruction of less than 30%			Destruction from 30% to 50%			Destruction from 50% to 70%			Destruction of over 70% (totally destroyed)			Total cost (million VND)
		Quantity	Average repair unit cost	Estimated repair cost million VND	Quantity	Average repair unit cost million VND	Estimated repair cost million VND	Quantity	Average repair unit cost million VND	Estimated repair cost million VND	Quantity	Average replacement unit cost million VND	Estimated replacement cost million VND	
		A	B	C = A x B	D	E	F = D x E	G	H	I = G x H	K	L	M = K x L	N=C+F+I+M
Physical assets														
List of equipment here														
TOTAL														

Note:

- The average replacement unit cost for totally destroyed permanent crops is identified as the average overall cost for replanting one hectare of permanent crop, including labour, inputs and seedlings.

- For assets which are partially destroyed, the repair cost is estimated.

- For assets which are totally destroyed, they must be replaced. Thus, replacement cost is used.

- Average repair unit cost can be based on the percentage of the replacement cost, according to the level of destruction.

- If livestock dies, they are considered as a totally destroyed asset thus 'damage' will be estimated as the replacement cost of the animal.

2.2. Disaster losses in the Agriculture Sector

Losses to Agriculture Sector should be assessed against the following aspects:

- Disruption of service delivery and availability/access to goods and services;
- Disruption of governance and social processes;
- Increased risks and vulnerabilities.

2.2.1. Disruption of goods and services

Typical losses for the Agriculture Sector include the decline in the productivity of agriculture, horticulture and fruit trees, livestock, fisheries and aquaculture, and salt production. Besides, the possibly higher costs of production, lower revenues, and higher operational costs to provide services.

Activities in agricultural sub-sectors may include:

- **Horticulture,** for example, fruits, vegetables, flowers, and ornamental plants;
- **Livestock,** for example, dairy, pork, and poultry;
- **Fishing and aquaculture;** and
- **Salt production.**

The following table shows typical effects contributing to loss, considered in the Agriculture Sector and its subsectors:

Table 15. Typical effects in the Agriculture Sector contributing to loss estimates

Crops (seasonal and permanent)	Livestock	Fisheries and aquaculture	Salt production
Production loss: • Loss of standing full annual crop • Loss of standing full perennial crop **Crop yield decline:** • The decline in standing annual crop yields • The reduction in standing perennial crop yields • Loss of yields due to replantation of long-standing trees	**Production loss:** • Production losses due to death of animals • Loss of milk/meat production **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):** • Loss of milk/meat/egg production • Loss of honey production	**Production loss:** • Loss due to decline in fish yield for aquaculture • Loss due to a decrease in the fish catch (build new or repair fishing boats and equipment)	**Production loss:** • Loss of salt from partially or totally damaged salt fields
Higher production costs: • Higher use of inputs required • Higher consumption of irrigation water needed • 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 usual planting of the next crop) should be added as a higher cost of production for the calendar year under analysis	**Higher production costs:** • Higher use of inputs (e.g., feed) • Veterinary cost (medicine and consultation fees) for ill animals • Higher price 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)	**Higher production costs:** • Higher input cost for aquaculture • Higher production cost due to equipment rental • The higher cost of fuel to reach fish after their migration to other areas. • Lack of ability to sell product due to disrupted market chains	**Higher production costs:** • Costs to rehabilitate salt fields; losses are estimated by the incomes that cannot be obtained due to the repair or replacement of the salt field for several months

2.2.2. Disruption to governance and social processes

Added or unexpected costs incurred by the government to continue service provision and manage the recovery process in the Agriculture Sector, for example:

- 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;
- Costs incurred by institutions and networks to enable agriculture recovery;
- Costs to enhance the capacity of relevant government ministries can be increased to support agriculture recovery.

2.2.3. Further risks and vulnerabilities

The additional costs to address immediate or new potential threats caused by the disaster, for example:

- Additional natural hazards – such as further landslides, an approaching typhoon season, fire risk;
- Climate forecast – such as the forthcoming season, e.g., anticipated rains, heat, dry season;
- Secondary shocks – such as disease in the coming season;
- Goods may not be transported to the market due to destroyed roads;
- New vulnerabilities – created by the disaster that may present other threats.

2.3. Estimating the monetary value of losses to the Agriculture Sector

Losses of agriculture are estimated as follows:

- Reduced or loss of yield of seasonal crops;
- Cost of replanting of annual crops (if there is still time for the season);
- Lost yield of permanent crops and fruit trees that have to be replanted (as an example, coconut trees need about eight years, and coffee trees require at least five years).

To estimate production loss in livestock, two scenarios are likely:

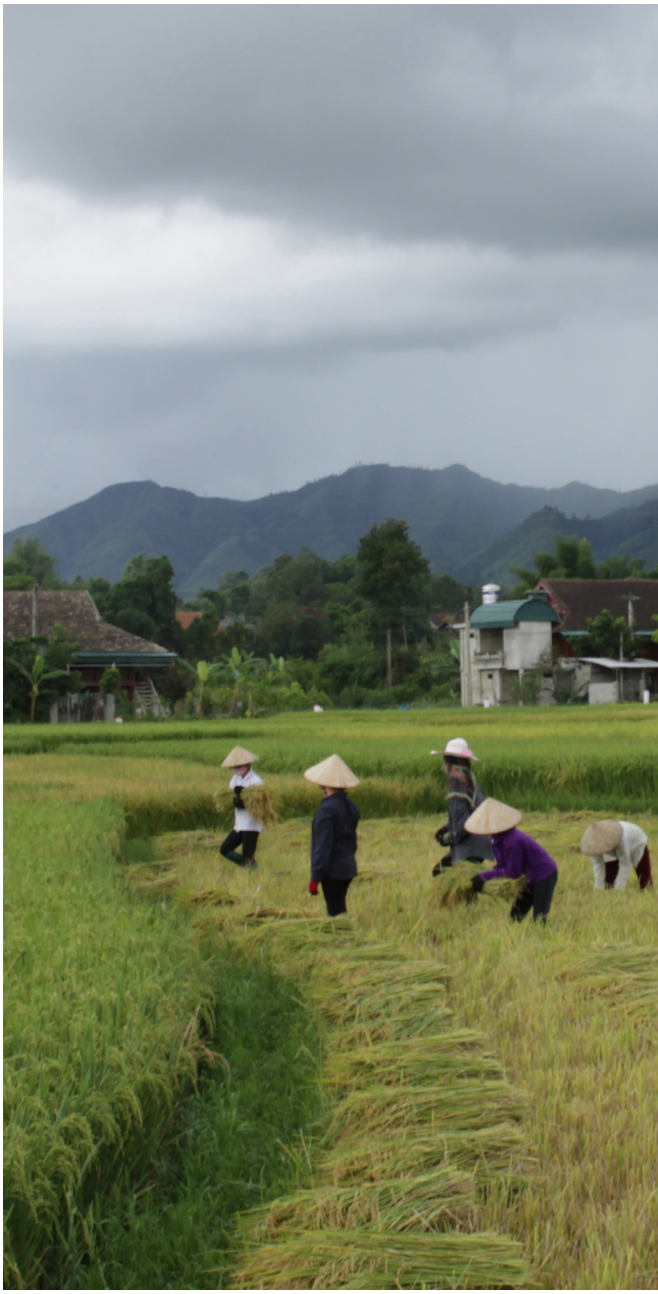
- Full production loss (such as eggs, milk, and animal breed) due to death of animals; and
- Partial production loss due to a decline in production that is caused by stress, lack of shelter, food shortage and health problems attributed to the disaster.

For estimating production loss in fisheries and aquaculture, three scenarios are likely:

- Partial to full production loss in destroyed aquaculture ponds;
- Total production losses in inland capture fisheries; and
- Total production loss in marine capture fisheries.

For salt production, losses are estimated by the incomes that cannot be obtained because of the repair or replacement of the salt field for some months.

Other losses are unexpected expenditures to meet humanitarian needs during the post-disaster emergency phase. Losses are expressed in current costs at the time of the PDNA.



2.3.1. Calculating the losses of crops

Regarding seasonal crop affected by a disaster, there are two scenarios:

1. Able to re-plant – the loss will be replanting cost as in Table 16, or
2. Not able to re-plant – the loss will be production loss as in Table 18.

Table 16. Calculating the losses of seasonal and horticulture crops – able to be replanted

Items	Unit	Quantity of areas can be replanted	Average replanting/ replacement cost per unit (VND/unit)	Total estimated cost for replanting/ replacement (VND)
		A	B	C = A x B
Seasonal crops				
Rice				
Corn				
Soybean				
Sweet potato				
Cassava				
Other				
Horticulture				
Vegetables				
Flowers				
Ornamental plants				
Other				
TOTAL				

Table 17. Calculating the losses to permanent and fruit tree production – due to re-plantation

Item	Unit	Total re-planting areas (ha)	Lost yield per year (tons/ year)	Average unit cost for replanting (mill VND per ton)	Total estimated losses annually (mill VND)	Estimated time from re-plant to harvesting (year)	Total estimated cost of losses (mill VND)
		A	B	C	D = A x B x C	E	F = D x E
Permanent crops							
Pepper							
Coconut							
Coffee							
Other							
Fruit trees							
Oranges							
Mangoes							
Bananas							
Other							
TOTAL							

Table 18. Calculating the losses of crop production (seasonal, permanent, horticulture, and fruit trees)

Item	Unit	Total affected areas (Ha)				Lost yield (tons/unit)	Average unit price (mill VND /ton)	Total estimated losses (mill VND)	Additional production losses (mill VND)	Total estimated cost of losses (mill VND)
		<30 (%)	30-50 (%)	50-70 (%)	>70 (%)					
		A				B	C	D = A x B x C	E	F = D + E
Seasonal crops										
Rice										
Corn										
Soybean										
Sweet potato										
Cassava										
Other										
Permanent crops										
Pepper										
Coconut										
Coffee										
Other										
Horticulture										
Vegetables										
Flowers										
Ornamental plants										
Other										
Fruit trees										
Oranges										
Mangoes										
Bananas										
Other										
TOTAL										

2.3.2. Calculating the losses of livestock

The monetary value of losses will be calculated for animals that produce milk, eggs or other products (e.g. honey).

Table 19 Summary of losses in livestock

Type of animal	No. of HHs affected	Number of dead animals	average product per animal (litre or egg /unit/year	Average unit price (mill VND/L or Egg/year per unit)	Duration affected (year)	The estimated cost of losses (mill VND)
		A	B	C	D	E = A x B x C x D
Breeding/female/male animals dead						
Milking cows						
Pig						
Chicken						
Ducks						
Honey						
Other						
TOTAL						

2.3.3. Calculating the losses of aquaculture

Table 20. Summary of losses to aquaculture production

Item	Unit	Total affected areas (ha)				Lost yield (tons)	Average unit price (mill VND per ton)	Total estimated losses (mill VND)	Additional production losses (mill VND)	Total estimated cost of losses (mill VND)
		< 30 %	30-50 %	50-70 %	> 70 %					
		A				B	C	D = A x B x C	E	F = D + E
Shrimp										
Shrimp farming in a rice field										
Extensive shrimp farming										
Intensive shrimp farming										
Traditional fish raising in small ponds										
Catfish farming										
Crab										
TOTAL										

Table 21. Summary of losses in fisheries and aquaculture

No.	Item affected	No. of HHs affected	Unit	Number of affected production units	Average production per unit/ year	Average selling price per unit per/ year (mill VND)	Duration being affected (year)	Additional production costs (mill VND)	Estimated cost of losses (mill VND)
				A	B	C	D	F	E = (A x B x C x D) + F
Physical assets									
1	Ice plants/ freezers/ storage buildings								
2	Others								
Equipment and machinery									
3	Fishing boat with an engine < 20CV								
4	Fishing boat with an engine from 20-90CV								
5	Fishing boat with an engine >90CV								
6	Communication equipment sets for fishing boats								
7	Aquaculture equipment (gear, nets)								
8	Other								
TOTAL									

2.3.4. Calculating the losses in salt production

Table 22. Summary of losses in salt production

No.	Item Affected	No. of HHs affected	Unit	Number of affected production units	Average production per unit/ year	Average selling price per unit per year (mill VND)	Duration being affected (year)	Additional production costs (mill VND)	Estimated cost of losses (mill VND)
				A	B	C	D	F	E = (A x B x C x D) + F
SALT PRODUCTION									
1	Salt production field		ha						
TOTAL									

Calculating other losses

Also, other losses should be calculated for:

- The disruption of governance and social processes, such as needs for renting agriculture office space, increase in transportation cost, hiring more extension officers, decrease taxation of agriculture inputs, issuing new agriculture policy and regulations;
- Increased risk and vulnerabilities such as cost to limit risks of further landslides, further animal death due to waterborne disease arising from the disaster, loss of processed fish due to the destruction of the cooling warehouse.

Table 23. Other losses to be calculated

Item	Unit	Unit cost (in million VND)	Duration (month)	Total loss (in million VND)
		A	B	C = A x B
DISRUPTION OF GOVERNANCE AND SOCIAL PROCESSES				
INCREASED RISKS AND VULNERABILITIES				

The total monetary value of the disaster effects is the sum of the totals of damage and losses: = Sum of total tables 10, 11, 12, 13, 15, 16, 17, 18, 19, 20, 21, and 22.

3. ASSESSING DISASTER IMPACTS

3.1. Macro-economic impacts

This section highlights the critical implications of the disaster for the province or even the country's economic performance, such as the reduced production in crops, livestock, fishery and aquaculture and salt; 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.

The PDNA team should collate and analyse the following qualitative information to compare with the pre-disaster situation:

- The entire loss of food and fishery production that affects the food security situation of the affected communes, districts, provinces and the country;
- *The impact of reduced production on revenue and revenue structure at all levels? Risks of revenue and expenditure imbalance?*
- Consider the interdisciplinary factors due to impacts from the agricultural sector, especially the services of providing input materials and processing animal feed and considering the impacts on job loss and income of agricultural labour due to the disaster.

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 Agriculture Sector.

The possible impact on overall inflation would be estimated once the post-disaster impact data from all sectors become available.

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

- The gross value of production that will not be obtained because of the disaster in each of the agriculture subsectors (crops, livestock, fishery and salt production), in the calendar year of the disaster and subsequent calendar years;
- The gross value of higher costs of production that will be incurred because 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 salt 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, Fisheries as a result of the higher costs of production due to the disaster,
- 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.

3.2. Human impacts

This section needs to collect information and analyse human development and social disaster impacts at the macro and micro level, such as:

- Impact on poverty (particularly rural poverty);
- Impact on overall levels of food and nutrition (the Agriculture 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 Sustainable Development Goal 1 (no poverty); and
- Impact on household and personal income.

Any disaster that significantly affects agriculture and the rural population has severe 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 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, livestock, salt);
- Comparative impacts on agriculture, fisheries and aquaculture, livestock, salt;
- 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 salt sub-sectors;
- General condition of livelihoods-related environmental and natural resources; and
- Spontaneous recovery efforts.

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

4. DEFINING RECOVERY NEEDS

Recovery needs in the Agriculture Sector include the restoration of the following categories to resume Agriculture, livestock, fisheries and aquaculture, and salt production:

4.1 Reconstruction of physical assets

- The estimated cost of reconstruction of destroyed physical assets with build back better principles. This is a combination of the value of the damage and added costs to improve quality, introduce modern production technology, and to reduce disaster risks;
- The estimated cost of replacing animal stocks that died because of the disaster;
- The cost of restoring the land affected by erosion, siltation, or by other natural hazards, so that they may return to their pre-disaster quality and levels of productivity.
- The cost of replanting perennial crops

4.2 Resumption of production of, and access to goods and services

- Agricultural inputs to be supplied to re-start agriculture in the affected provinces, e.g. supply of seeds, tools, and fertilizers;
- Agricultural food products that may need to be supplied to the province or country;
- Imports required because of restricted supply in-country;
- Agricultural support services for agricultural rehabilitation, such as extension services, farming schools, technical expertise, human resources, capacity building, and training;
- Requirements to rehabilitate rural roads to open agricultural areas;

- Measures needed to restore access to food;
- The actions required to regain access to markets, employment and financing services (credit and loan schemes).

4.3 Restoration of governance and social processes

- Restore the capacity of the provincial and district Agriculture and rural development offices;
- Technical expertise and human resource requirements;
- Support agricultural cooperatives, the Farmer's Union, the Viet Nam Women's Union, and the Viet Nam Red Cross Society to resume full functioning in support of affected local people;
- Other support services needed, such as information systems, training, and agricultural and rural development policy decision-making.

4.4 Reducing future disaster risks

Immediate disaster risks

- Needs to control immediate risks in the Agriculture Sector to avoid further food insecurity.

Mid- and long-term

- 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, dykes to protect farmland and aquaculture from floods);
- Specific climate change adaptation measures for the Agriculture Sector.

4.4 Estimating recovery cost

The recovery costs are estimated as follows:

The **value of damage** plus any improvements through **build back better**, e.g. better, and more resistant seeds, better irrigation mechanisms, plus **DRR and technological improvements**.

Plus

A part of the **cost of loss** that supports to re-start the agriculture production, for example, bringing back fields into production such as seeds and fertiliser; the higher than normal costs for veterinarian care for disease control.

Plus

Additional needs which are usually identified during the human impact analysis, for example, livelihoods would be important when dealing with agriculture, food security, and gender issues that need to be addressed through the cost of putting together specific programs and projects for **capacity building**, **improved governance** and reducing the **immediate risks and vulnerabilities** identified.

Recovery needs in the Agriculture Sector arise from a comparison between the agriculture situation before the and after the disaster, an analysis of the effects and impact of the disaster on the sector, presenting recovery and reconstruction needs for the reconstruction or repair of physical assets and for restoration of production and access to goods and services, governance issues and reduction of immediate risks.

Table 24. Recovery needs for agriculture sector

Sub-sectors	Recovery activities	Estimated cost (million VND)
Crops		
Infrastructure and physical assets		
Production of goods and services and access to goods and services		
Governance and decision-making processes		
Increased risks and vulnerabilities		
Livestock		
Infrastructure and physical assets		
Production of goods and services and access to goods and services		
Governance and decision-making processes		
Increased risks and vulnerabilities		
Aquaculture		
Infrastructure and physical assets		
Production of goods and services and access to goods and services		
Governance and decision-making processes		
Increased risks and vulnerabilities		
Salt		
Infrastructure and physical assets		
Production of goods and services and access to goods and services		
Governance and decision-making processes		
Increased risks and vulnerabilities		
TOTAL		

Table 25. Consolidated recovery needs and costs for the Agriculture Sector in phases

Recovery and reconstruction needs	Short term (million VND)	Medium term (million VND)	Long term (million VND)	TOTAL (million VND)
Crops (List recovery activities from table 24)				
Livestock (List recovery activities from table 24)				
Aquaculture (List recovery activities from table 24)				
Salt (List recovery activities from table 24)				
TOTAL				

5. DEVELOPING A RECOVERY STRATEGY

Based on the assessment information, recovery needs to be collected in the above sections, the PDNA team for the Agricultural Sector needs to develop a sectoral recovery strategy.

A sectoral recovery strategy must include the following elements:

5.1 Vision and guiding principles

This section presents the goal for the Agricultural Sector recovery, e.g. how much food is secured for how many people or how much agricultural yield/income in total need to remain. A specific objective for the recovery of sub-sector also needs to be specified in the strategy to achieve this goal.

Note. The objective setting must be accurate, can quantify the results of implementation later.

5.2 Management and coordination

The strategy should be clear in which government department will be focal to manage the recovery, which division will handle each sub-sector. This section should also clarify how agencies in each sub-sector collaborate, information sharing mechanisms, and external partnership relationship, national and international organizations to ensure that there is no duplication or overlapping.

5.3 Priority needs

Based on the financial and human resources, urgency, spatiality and impact, the PDNA team needs to identify which interventions to implement first.

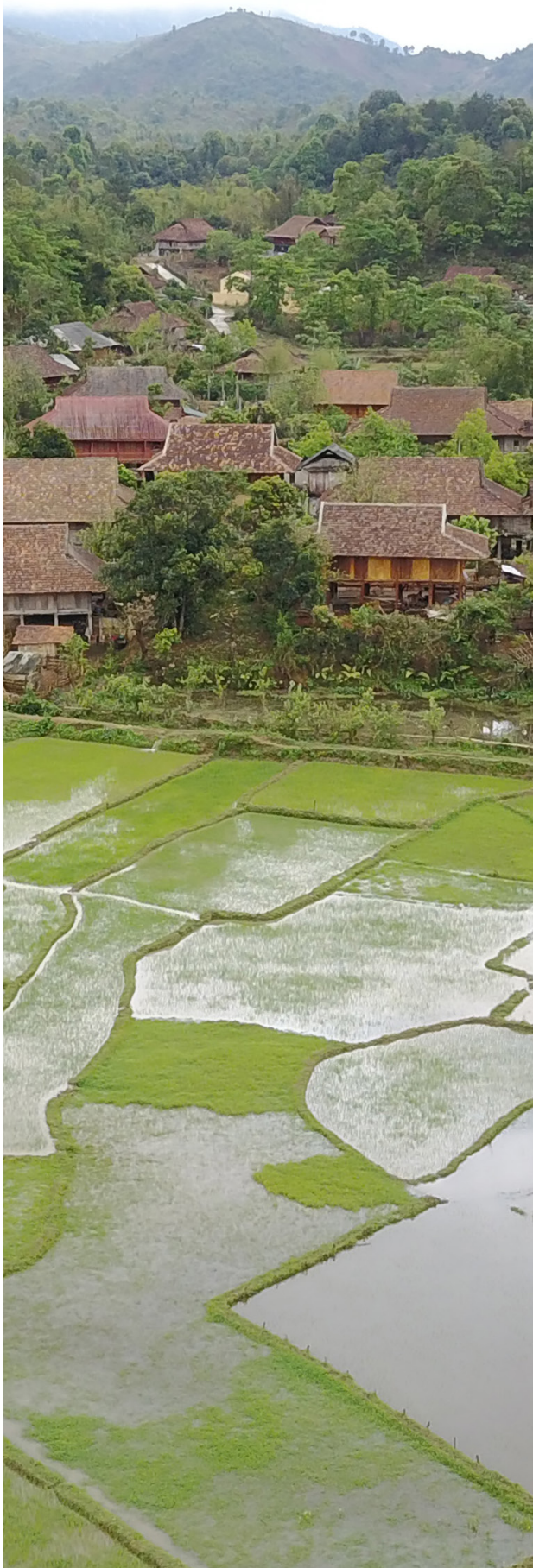
5.4 Timeframe for implementation

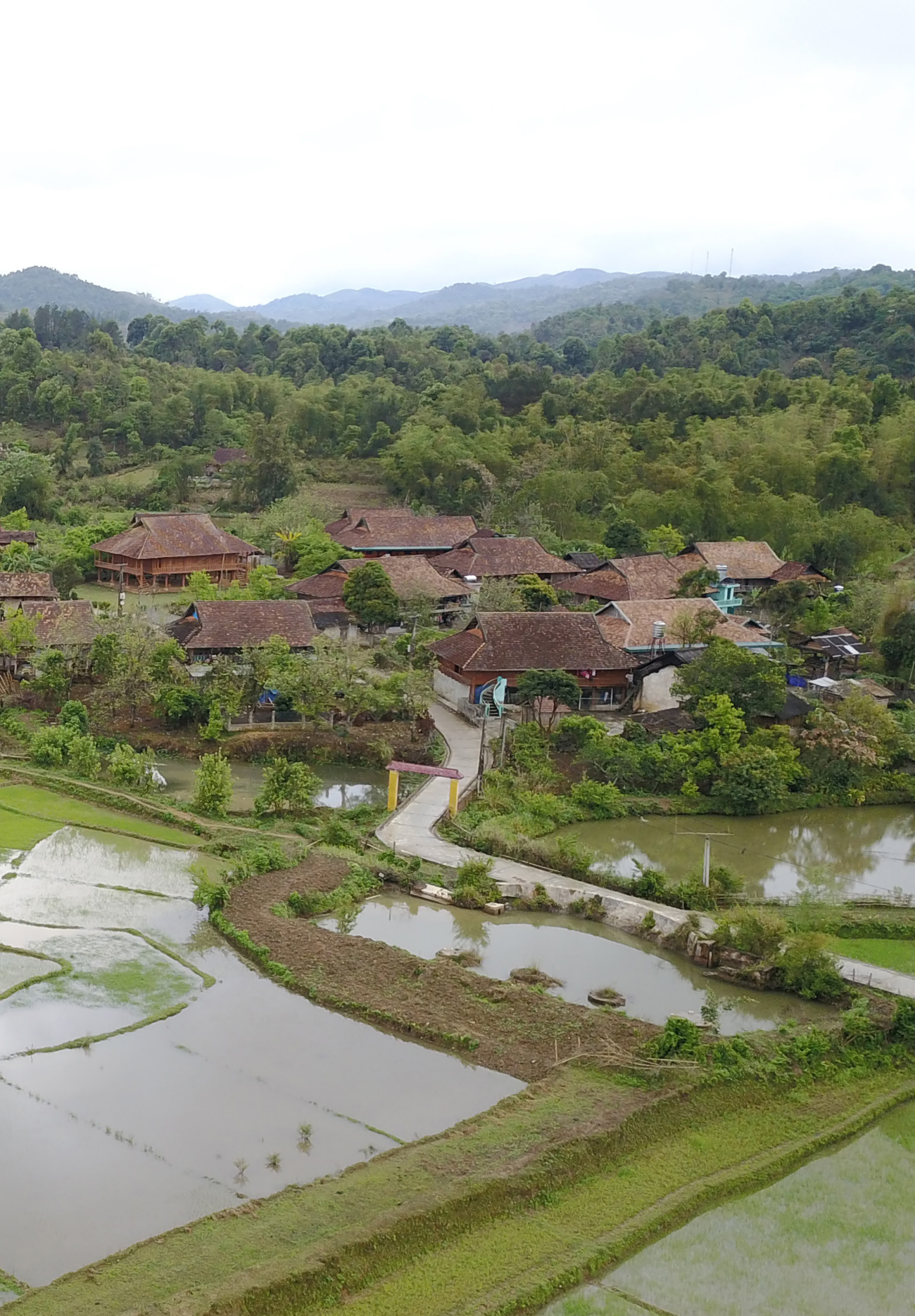
After identifying priority needs, based on budget, human resources, market availability, urgent needs, seasonality of agriculture, the PDNA team will elaborate a timeframe for interventions of all sub-sectors.

5.5 Resource mobilization

Based on the assessment of recovery needs in section IV as well as the priority needs mentioned above, the PDNA team needs to calculate the recovery budget, which is expected to be mobilized from where? *How much will be self-recovered by local people? How much will be covered by the commune/district/provincial/central budget? What is expected external funding (e.g., from the private sector or civil society organizations)?*

Please refer to Template 1: Outline of a PDNA report and Recovery Strategy of the Volume A: Introduction to the Post-Disaster Needs Assessments for a Recovery Strategy template





VIET NAM DISASTER MANAGEMENT AUTHORITY,
MINISTRY OF AGRICULTURE AND RURAL DEVELOPMENT

Address: 2 Ngoc Ha Street, Ha Noi

Website: phongchongthientai.vn

Telephone: (+84)24 3733 5804

UNITED NATIONS DEVELOPMENT PROGRAM IN VIET NAM

Address: 304 Kim Ma Street, Ha Noi

Website: www.vn.undp.org

Telephone: (+84)24 3850 0100

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