

SUB-REGIONAL OFFICE FOR THE PACIFIC ISLANDS

GUIDANCE NOTE

**POST DISASTER
DAMAGE, LOSS AND NEEDS ASSESSMENT
IN AGRICULTURE**

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Damage, Loss and Needs Assessment in Agriculture

Introduction

This guidance note has been prepared as a guide to assist Pacific Island Countries following disasters affecting the agriculture sector. It describes the requirements and steps required in undertaking post-disaster damage, loss and needs assessment in all of the sub-sectors of agriculture.

I. Purpose of This Guidance Note

This guidance notes aims to improve the existing assessment methodology of the Pacific Island Countries in comprehensively assessing the impacts of natural disasters in the agriculture sector and in identifying post-disaster needs. The concepts, methodologies and definitions used on this guidance notes are consistent with those developed by international agencies like the Economic Commission for Latin America and the Caribbean (ECLAC) as modified by the Global Facility for Disaster Risk Reduction of the World Bank (GFDRR/WB), the United Nations agencies including the Food and Agriculture Organization of the United Nations (FAO) and the European Union, among others. These concepts are now used as the international standards in post-disaster damage and loss assessments from which post disaster needs are based on.

The proposed improvements, as contained in this guidance notes, have the following advantages:

1. The assessment of disaster effects can be completed expeditiously without sacrificing accuracy. With baseline information and instructions in the valuation of damages and losses, trained assessment specialists can do the work with minimal direct surveys.
2. With the concepts on damages and losses, the methods can be used to assess the effects and impacts of:
 - a. sudden-onset natural disasters like flash typhoons, floods, earthquakes, etc.;
 - b. slow-onset natural disasters like drought, salt water intrusion and other climate change-related phenomena;
 - c. epidemics like SARS and avian flu; and
 - d. civil unrest that may cause disruption or temporary stoppage of normal economic activities.
3. The concepts are based on sectors which are consistent with the national accounting system, thus, the values of the damages and losses can be used by the Government planning and/or finance agencies in estimating the impacts of a disaster on macroeconomic indicators like gross domestic product (GDP), budget deficit, balance of payment, inflation and employment for the year the disaster occurred and beyond.
4. Development partners will have a better perspective of the impacts of disasters which will enable them to respond to the needs of individual countries accordingly.
5. A simple computer program, which can expedite estimations, can be created using the said concepts and methods described in this guidance note.
6. The methods can be used in calculating the economic cost-benefit analysis of proposed disaster preparedness and mitigation programs and projects as well as climate change related activities.

It should be noted, however, that the quantified value of damages and losses in agriculture as described in this guidance notes do not include the expenditures spent for the emergency phase like search and rescue (SAR) operations; mass evacuation into temporary shelters; feeding of evacuees; water, sanitation and disease prevention; protection and security operations and other humanitarian assistance. The recovery and reconstruction needs that will be included here will refer to the needs identified based on the assessed damages and losses aimed at restoring the productivity and livelihoods in the agriculture sector.

There are no definite time durations as to when each post-disaster phase (emergency, recovery and reconstruction) will end and the next one will commence. In major disasters, the emergency phase can last up to more than a month before recovery activities can commence. In most cases, there are overlaps in the activities of the various phases.

In this guidance notes, the agriculture sector covers the following sub-sectors:

1. Seasonal crops (or crops) - rice, corn, vegetables and other crops grown and harvested within certain seasons of the year.
2. Permanent crops - those that require a certain period of time to mature before produce can be harvested regularly like coconut, fruit trees, coffee and others.
3. Forestry - forest products like timber and rattan, among others.
4. Livestock – animals grown like cattle, swine, poultry, etc.
5. Fisheries - includes both inland and marine fisheries.
6. Infrastructure – the physical assets that are related to agriculture like irrigation facilities, warehouses, mills, animal sheds, fish cages, etc.

The following are the sections of this guidance note:

1. The general framework and concepts in assessing damages and losses.
2. The required baseline information.
3. Steps in assessing damages and losses.
4. Steps and issues to be considered in identifying recovery and reconstruction needs.
5. Additional required information that will expedite assessment and needs identification.

II. Framework in Improving Damage Assessment in the Agriculture Sector

In accordance with the Handbook for Estimating the Socio-economic and Environmental Effects of Disasters of the ECLAC and the subsequent work of the GFDRR, there are generally three (3) classifications of disaster effects that are quantified in this guidance note, and these are damages, losses and macroeconomic impacts. However, other impacts are also described here although not quantified.

A. Damages

1. Damages are the effects on assets or stocks and valued as the cost of:
 - a. Replacement of totally destroyed assets. Replacement cost is the value of the asset just before it was totally destroyed.
 - b. Repair of partially destroyed assets. Repair cost is the amount required to put the asset back into its condition just before its partial destruction.

2. Assets, in general, will include infrastructure like roads, bridges, buildings, equipment and economic installations like power, water supply systems, transportation and communication, irrigation systems, etc.
3. Damages will also include the value of lost inventory of goods like agricultural products and inputs; equipment, machinery; and raw materials for production, among others.
4. In agriculture, damages will be the cost of replacement of the totally destroyed assets or the cost of repair of partially destroyed physical assets and infrastructure such as:
 - a. structures like animal sheds, storage, ice plants, etc.
 - b. farm equipment and machineries
 - c. irrigation systems
 - d. stocks like animals, fertilizers, seeds, veterinary needs, etc.
 - e. ready-to-harvest crops
 - f. totally destroyed permanent trees and crops coconuts, coffee, plantations, etc.
5. Ready-to-harvest crops that were destroyed by disasters are considered part of damages. They are valued as the farm gate prices for these crops.
6. The value of totally destroyed permanent trees and crops will be the cost of replanting such types of trees.
7. Damages should be valued at pre-disaster prices.

B. Losses

1. Losses are effects on economic flows and will be the value of lost output or income due to the disruption of the normal flow of goods and services in the economy.
2. Losses are measured as the pre-disaster value of goods and services that were not and/or will not be produced or rendered over a time span (broken down per annum) due to the disaster until full recovery is attained.
3. Losses in the agriculture sector will include:
 - a. Reduced income from planted crops, livestock, fisheries, forestry, etc. after they were affected by disasters.
 - b. Future income from harvests due to the destruction of land by floods, landslides, prolonged droughts, etc.
 - c. Foregone income from harvests due to the destruction of permanent crops and trees.
 - d. Additional expenses to clean up the debris of destruction, retrieval of assets, etc.
 - e. Investment losses or higher production costs.

It should be noted that:

4. In agriculture, an important type of loss is the investment loss of farmers and/or growers when their standing crops (or fish stocks) are totally destroyed by a disaster. If this happens, and the farmers (or growers) are not able to replant (or replace the fish stocks), the value of investment put into the destroyed crops (or fish stock) will be considered as loss.
5. If the farmers (or growers) will replant (or replace the fish stocks) in time to harvest within the year, it will be as if the farmers (or growers) incurred a higher production cost to produce the same volume of harvest within the year. The total cost of production for the same output within the year will be the normal production cost plus the investment losses they incurred

due to the disaster. The above two concepts are important because they have a bearing in the calculation for the impact on the GDP.

6. For the other sectors, the example of losses are,
 - a. The opportunity losses of public transport vehicles if their operations are temporarily stopped due to collapsed bridges or roads closed by landslide.
 - b. Foregone incomes of hotels due to cancelled arrival of tourists.
 - c. Increases in financial outlays of the government in the provision of essential services
 - d. Reduction of expected income of the government like lower fees and taxes.
 - e. Reduction in industrial production due to damages to factories; limited access to raw materials due to damages in agriculture; transport difficulties caused by collapsed transport system like roads, bridges, airports and seaports.
7. The effects to the other sectors of the damages and losses in crops, fisheries, livestock and forestry should not be counted in the agriculture sector. They should accrue to the sector where they belong. For example, if a food manufacturer uses cassava as input to their production, any losses suffered by the manufacturer due to the limited supply of cassava after a disaster should be counted in the manufacturing sector.

C. Macroeconomic Impacts

Macroeconomic impacts are the changes caused by disasters to the expected performance of the national economy (or to a regional economy). Depending on the structure of the economy on one hand and the scope and extent of a disaster on the other, the effects on the macroeconomy can extend several years after a disaster has occurred. The following are some of most common affected economic indicators:

1. *Gross Domestic Product (GDP)*. Reduced production and/or consumption after a disaster will result in lower-than-expected GDP.
2. *Prices or inflation*. Damages to production assets, closed roads or damaged bridges, etc. will reduce supply of goods and services that will result to increase in prices, especially of prime commodities.
3. *Employment*. Damages to agriculture, factories, retail shops and other businesses can result in the retrenchment of workers. Higher unemployment and lower taxes collected by the government will both impact adversely on the household level and the national economy.
4. *Balance of payment*. Reduction in production of goods for exports and increase in imports to stabilize supply will result in adverse BOP position. However, increased personal or family remittances from abroad after a disaster may offset some of the losses from export earnings.
5. *Fiscal balance*. Due to emergency expenses, it may be necessary for the government to augment or realign the budget to accommodate relief operations instead of expenditures that are related to economic expansion. Also, losses in overall production and reduction in employment can impact on the income of firms and other related businesses resulting in lower tax revenue collection for the year and the future years.
6. *National debt and its repayment*. If the cost of recovery and reconstruction will be financed by foreign or domestic borrowings, government indebtedness will increase which can result in larger budget deficits in the succeeding years

Macroeconomic impacts are normally quantified by national economic planning and/or finance ministries based on the estimates of the Ministry of Agriculture on the losses incurred by the agriculture sector from a disaster.

Other Impacts

D. Poverty incidence

Losses in production and unemployment under a high inflation regime will exacerbate the living conditions of the poor and may raise the poverty incidence in the country. Moreover, basic services provided by the government which are patronized mostly by the poor may be reduced significantly if the damages to such facilities are extensive.

E. Gender Impacts

The condition of women may be severely affected or exacerbated by a disaster event. There can be possible new roles of women as breadwinners for their families; double burden or additional work in the farms and on the house; potential abuse; health deterioration for lactating mothers; etc.

F. Environment

Disaster events can cause the destruction of some environmentally sensitive areas like watershed areas, corrals, mangroves, etc. Volcanic eruptions may cause the rise of air and water temperature which can exacerbate global warming and other phenomena related to climate change.

In summary, the following are the important principles that must be remembered:

1. Damages are the costs of:
 - a. repair of partially damaged assets to restore them to their pre-disaster condition; and/or
 - b. replacement of totally destroyed assets valued at their pre-disaster prices.
2. Repair and replacement of assets should be based on their pre-disaster conditions or standards. This is to ensure that the values of damages are priced correctly.
 - a. For example, the replacement cost of a totally destroyed farm tractor should be its market value before it was totally destroyed and not the cost of a brand new one. If it is to be replaced by a brand new one, the value of should be included in the post-disaster needs.
 - b. The same is true for repairs. If the owner of a partially destroyed asset decides to repair plus upgrading its standards, the value should be included in the post-disaster needs.
 - c. The post-disaster needs will be discussed in the latter section of this guidance notes.
3. Losses are the values of:
 - a. foregone output/income as a result of a disaster;
 - b. investment losses or higher production costs; and
 - c. other unexpected expenditures
4. Losses can be experienced several years after the disaster occurred (up to the time that the pre-disaster level of production is regained) causing macroeconomic impacts.

5. The values of damages and losses should be in local currency at pre-disaster prices. They should not be affected by the post-disaster inflation.
6. The sum of the damages and losses is generally termed as the disaster effects.
7. Macroeconomic impacts are not the addition of the values of damages and losses although they are the causes of the impacts.
8. It is very possible too that a disaster may cause a huge macroeconomic impact on the regional or provincial economy although it may have minimal effects on the national economy. For instance, an island province may be totally devastated by a typhoon but if its contribution to GDP is minimal, the impact to the national economy is negligible although the impact on poverty conditions of the people affected may be tremendous.
9. The methodology for assessing the impact on human development is still being developed by the UN under its Human Recovery Needs Assessment. This guidance note is more focused on the damages and losses in the agriculture sector which will be the basis for the identification of the recovery and reconstruction needs consolidated into a plan with financing requirement and implementation schedule, among others. However, some crosscutting issues will be discussed here as part of recovery planning.

III. Steps in Undertaking Post-Disaster Damage and Loss Assessment in the Agriculture Sector

Disaster damage and loss assessments should be based on previous conditions that were measured prior to disasters. There are two types of information that must be generated to the assessment. These are the:

1. Pre-disaster baseline information
2. Post-disaster information on damages and losses.

Some of the recommended baseline information are the same or similar as those required in undertaking a food security assessment.

The following are the possible sources of data required:

1. In some countries data for the agriculture sector already exists based on past surveys.
2. Demographic and socio-economic information can be sourced from the latest family income and expenditure surveys. Data existing with the other clusters can be used.
3. If the required sets of data are not yet existing, the national government can request the provincial governments to conduct sample surveys in cooperation with the municipal or village authorities.

The geographical reference of the information can be the village, district or province depending on the country. In the templates that will be shown in this guidance note, the province will be used as the reference. Individual countries should use their preferred or appropriate geographical reference.

To undertake post-disaster damage, loss and needs assessment, the following steps can be followed. (Some of the baseline information required are the same as those for the food security assessment).

Step No. 1. Create Pre-disaster Baseline Information

The following are the important information that should be gathered as part of the baseline from which damage and losses will be assessed.

1. Population and Income

A. Social and Economic Profile

The demographic and economic profile of the province will give an indication of the total number of people that can be adversely affected by a disaster.

Table 1. Information on Households and Population

Province			
Demography and Economic Information	Male	Female	Total
1. Total Population by sex			
2. Total number of households, by sex of household head			
3. Average household size, by sex of members			N.A.
4. Average family income, by sex of household head			N.A.

Notes in filling out Table 1.

- The annual income mentioned above should refer to the total income derived by households or families from all sources.
- Demographic profiles and income sources can be sourced from the regular survey of the National Statistics Office NSO and/or the data from Agricultural Statistics Offices of the Government.
- The segregation by sex of the population will be important in the assessment of impacts on the gender.

B. Farmers Profile

The number of farmers, by sex and scale of operation, will determine the most vulnerable among the farmers and will assist in prioritizing assistance. It can be assumed that subsistence farmers with smaller farms are most vulnerable to hunger once a major disaster occurs. The table below can be used.

Table 2. Number of farmers and their income according to scale of operation

Province							
Type of Farmers	Profile of Farmers						
	Male	Female	Average Family Income (\$)	Average Family Size			
				Male		Female	
				Below 1 year old	Above 1 year old	Below 1 year old	Above 1 year old
Subsistence Farmers							
a. < 1 hectare							
b. 1.1 – 3 hectares							
c. 3.1 – 5 hectares							
d. 5.1 – 7 hectares							
e. 7.1 – 10 hectares							
f. > 10 hectares							
Commercial farmers							
State enterprise farmers							
Landless workers							
TOTAL							

Notes in filling out Table 2.

- Although subsistence farmers should be in accordance with the definition of individual countries, they are generally those that are engaged in farming as the major source of livelihood whose produce are mostly for home consumption with minimal surplus for sale. These farmers have control over production regardless of land ownership.
- Commercial farmers refer to individual farmers working for wage on farms operated on a commercial scale with mechanized systems.
- State enterprise farmers refer to individual farmers working for wage on commercial farms owned and operated by the government.
- Landless workers refer to seasonal agricultural workers who earn wages from working on other people's farms during planting, weeding or harvest season. These workers have no control over the management and production decisions on the farm.
- The segregation of male and female farmers can be used in analyzing the potential impacts on women and children.
- The information on the age of children will indicate the number of infants and lactating mothers who are more vulnerable to food insecurity.

2. Seasonal and Permanent Crops

A. Planting to Harvest Season

A planting to harvest season chart of the crops grown will give immediate information on what types of crops are planted as well as their stages of growth when disasters occur. The assessment specialist can, thus, focus on these crops during the assessment. The chart will also provide the time required for food crops to be harvested from the planting stage. Consequently the gaps in food supply for the coming days or weeks after a disaster can be analyzed.

Table 3. Planting and harvest season of seasonal and permanent crops

Province	Total Area Planted by Scale (Hectares)			Planting to Harvest Season (Months)											
Seasonal Crops	Subsistence	Commercial	State Enterprise	J	F	M	A	M	J	J	A	S	O	N	D
				1. Taro											
2. Cassava															
3. Yam															
4. Sweet potato															
5. Rice															
6. Corn															
7. Soybean															
8. Peanut															
9. Pineapple															
10. Papaya															
11. Banana															
12. Leafy vegetables															
13. Others															
TOTAL				Not Applicable (N.A.)											
Permanent Crops															
1. Coconut															
2. Coffee															
3. Sugarcane															
4. Banana															
5. Others															
TOTAL				Not Applicable (N.A.)											
Forestry															
1. Timber															
2. Rattan															
3. Others															
TOTAL				Not Applicable (N.A.)											

Notes in filling out Table 3.

- The total land area by scale of operation is the consolidated number of hectares planted with the crops indicated.
- Individual countries should include in the above table their own main crops.
- The letters under the “Planting to Harvest Season” refer to the months of the year.

- Tick the boxes under the column of months to show the period from planting to harvesting of the crops.
- In the case of permanent crops/trees and forestry, where harvesting is done after long maturity, the harvesting months can be ticked.

B. Production and Prices

The information beforehand on the volume and gate prices of crops will facilitate the quick estimation of losses after a disaster.

Table 4. Past Production, Estimated Production and Prices of Seasonal Crops

Province									
Seasonal Crops	Average Production for the Past Three Years		Estimated Production (Pre-Disaster)						Average Farm Gate Price
			Current Year		Year 2		Year 3		
	MT	\$	MT	\$	MT	\$	MT	\$	\$/Unit
1. Taro									
2. Cassava									
3. Yam									
4. Sweet potato									
5. Rice									
6. Corn									
7. Soybean									
8. Peanut									
9. Pineapple									
10. Papaya									
11. Banana									
12. Leafy vegetables									
13. Others									
Permanent Crops									
1. Coconut									
2. Coffee									
3. Sugarcane									
4. Banana									
5. Others									
Forestry									
1. Timber									
2. Rattan									
3. Others									

Notes in filling out Table 4.

- “MT” refers to metric tons. This should be changed according to the unit/s of measure/s the Pacific countries are using like kilograms.
- The estimated production for the current year and the succeeding 2 years as well as the average farm gate price per unit are based on pre-disaster projections which are normally done by the Ministries of Agriculture.

C. Investment Costs in Crops by Stages of Growth

The information on the investment costs at various stages of growth will provide the actual value of investment losses (or higher production costs) should a disaster occur.

Table 5. Investment costs per hectare per crop by stages of growth

Crops by Stages of Growth	Average Investment Costs per Hectare At Various Stages of Growth (\$/Ha.)			
	Stage 1	Stage 2	Stage 3	Stage 4
Seasonal Crops				
1. Taro				
2. Cassava				
3. Yam				
4. Sweet potato				
5. Rice				
6. Corn				
7. Soybean				
8. Peanut				
9. Pineapple				
10. Papaya				
11. Banana				
12. Leafy vegetables				
13. Others				
Permanent Crops				
1. Coconut				
2. Coffee				
3. Sugarcane				
4. Banana				
5. Others				
Forestry				
1. Timber				
2. Rattan				
3. Others				

Notes in filling out Table 5.

- The stages of growth should be adjusted according to crops as classified by individual countries. For instance, stage 1 can be classified as the seed bed stage; stage 2 is the transplanting stage; stage 3 as flowering stage; etc.
- The cost per crop at various stages per hectare varies in each country.
- Matured or ready-to-harvest crops are priced according to their farm gate prices.

3. Livestock and Poultry

The value of each type of livestock and poultry according to their age will provide a quick estimate of the value of damages after a disaster.

Table 6. Number and value of livestock and poultry

Province									
Livestock	Type	Quantity	Average Value of Animal by Age (in \$)					Number of Growers	
			Less than 1 year	1 to 2 years	2 to 3 years	3 to 4 years	More than 5 years	Male	Female
Livestock	Cattle								
	Swine								
	Goat								
	Sheep								
	Others								
Poultry	Chicken								
	Duck								
	Others								

Notes in filing out Table 6.

- The types of livestock, their description and age should be based on the existing information in the province.
- The average value of the animal refers to the price in \$ per type of animal according to their respective ages based on the prevailing farm gate prices.
- The number of growers refers to the actual number of persons who raise or grow the animals segregated as male and female.

4. Fisheries

The various species grown and/or harvested in the area should be identified and the value of each type can provide a quick estimate of the cost of damages and potential after a disaster. Both in-shore and off-shore fisheries should be included.

Table 7. Fisheries production, prices and number of fishers

Province											
Species	Average Production for the Past Three Years		Estimated Production (Pre-Disaster)						Average Farm Gate Price \$/MT	Number of Fishers	
			Current Year		Year 2		Year 3			Male	Female
	MT	\$	MT	\$	MT	\$	MT	\$			
1. Tuna											
2. Lobster											
3. Squid											
4. Crab											
5. Others											
TOTAL											

Notes in filling out Table 7.

- The estimated production for the current year and the succeeding 2 years as well as the average farm gate price are based on pre-disaster projections which are normally done by the Ministries of Agriculture.
- The species should include the types of fishes and other species like shrimps, oysters, seaweeds, etc, grown in the specific country.
- The number of fishers refers to the actual number of persons who are engaged in fishing segregated as male and female.

5. Irrigation Assets

Irrigation is one of the major components in agriculture that is vital for the sector's performance which must be accounted for before a disaster to facilitate a post-disaster assessment in the future.

Table 8. Irrigation Facilities

Province						
Name and Type of Irrigation Facility	Areas Irrigated	Total Length	Construction Cost	Monthly Income From Fees	Number of farmers-beneficiaries	
	Hectares	Meters	\$	\$	Male	Female
Irrigation 1						
Irrigation 2						
Total						

Note in filling out Table 8.

- The type of irrigation facility can be a description of its construction such as concrete, earthen, etc. Each country should put here their own classifications of irrigation systems.

6. Other agricultural assets

Equipment and machineries used in agriculture should be part of the sector. The following table will identify these assets.

Table 9. Agricultural Assets

Province	Quantity by Ownership		Average Replacement Value
Assets	Private	Public	\$
General Physical Assets			
1. Agricultural Buildings			
2. Storage facilities			
3. Others			
Farming Assets			
1. Tractor			
2. Hand tractor			
3. Thresher			
4. Weeder			
5. Plow			
6. Seeds			
7. Fertilizers			
8. Others			
Fisheries Assets			
1. Nets			
2. Fish Cages			
3. Boats			
4. Engines			
5. Hatcheries			
6. Fish feeds			
7. Other fishing gears			
Livestock and poultry assets			
1. Pig pens			
2. Animal sheds			
3. Breeding facilities			
4. Feeds			
5. Veterinary medicines			
6. Others			

Note for filling in Tables 9.

- The agricultural buildings will include the offices, agricultural research and development buildings, farmers' cooperative offices and other structures used for agricultural purposes.
- The average replacement value refers to the average pre-disaster market price in local currency of the concerned asset.

- The average replacement value may be left unfilled if the values are not available at present. However, they must be valued at the post-disaster damage assessment which will be described later.

7. Other agriculture-related cottage industries/livelihood

Another important data necessary in the baseline information is the types of cottage or small-scale industries which are agriculture-based like fish drying, weaving, carving, etc. which are sources of income. Such information will be valuable in determining and designing future post-disaster assistance in the agriculture sector. The following table should capture this information.

Table 10. Cottage industries

Province					
Industries	Number of Households	Number of People Engaged		Average Income (\$ per Month)	
		Male	Female	Male	Female
Mat-weaving					
Cloth-weaving					
Hat-making					
Wood carving					
Charcoal-making					
Fish drying					
Fish net weaving					
Food processing					
Others					

Note for filling in Tables 10.

- The industries required in the table above should be limited to those that are micro, cottage or home-based livelihood in which farmers and their families are engaged in. Those that are on commercial scale should be included in the appropriate sector which is normally the manufacturing sector. This is intended to avoid double counting.
- Individual countries should indicate the common cottage industries existing in their respective countries.

Step No. 2. Assess Damages

Post-disaster assessments are necessary to provide short- and long-term support that will enable the agriculture sector to recover. In this guidance note, damages and losses will be assessed one after another by sub-sector.

After a disaster, field visits should be conducted to assess the damages. The assessment specialists should use the baseline information to identify the assets to be assessed.

A. Damage Information No. 1. Agricultural Assets

Actual disaster damages are those that were totally or partially destroyed infrastructure, equipment, machineries or lost inventory of goods like harvested crops, input goods and raw materials for production, among others. After the field visit, the total value of damages can be compiled under a single table as shown below.

Table 11. Damages to Agricultural Assets

Village							
Town							
Province							
Assets	Number of Partially Destroyed by Ownership		Average Repair Cost	Number of Totally Destroyed by Ownership		Average Replacement Cost	Total Damages
	Private	Public	\$	Private	Public	\$	\$
A	B	C	D	E	F	G	H
General Physical Assets							
1. Agricultural Buildings							
2. Storage facilities							
3. Others							
Farming Assets							
1. Tractor							
2. Hand tractor							
3. Thresher							
4. Weeder							
5. Plow							
6. Seeds							
7. Fertilizers							
8. Others							
Fisheries Assets							
1. Nets							
2. Fish Cages							
3. Boats							
4. Engines							
5. Hatcheries							
6. Fish feeds							
7. Other fishing gears							
Livestock and poultry assets							
1. Pig pens							
2. Animal sheds							
3. Breeding facilities							
4. Feeds							
5. Veterinary medicines							
6. Others							
TOTAL			N.A.			N.A.	

Notes for filling in Table 11.

- Column A contains the types of assets.
- Columns B and C are for the quantity of partially damaged assets segregated as private or public.

- Column D refers to the average cost of repair for all those that were partially damaged.
- Columns E and F are for the quantity of totally damaged assets segregated as private or public.
- Column G is for the average replacement cost for all those that were totally damaged.
- The 'Total Damages' will be the value of the quantity of partially damaged assets multiplied by the average repair costs plus quantity of totally destroyed assets multiplied by the average replacement cost.
- In formula, Total Damages Column H = [(Column B + Column C) x Column D] + [(Column E + Column F) x Column G]
- The table can be expanded if there are other important assets that were damaged, as may be determined by the assessment team.

B. Damage information No 2. Damages to Irrigation

The assessment specialist who is tasked to assess damages must be familiar with the costs involved in the construction and repair of irrigation systems.

Table 12. Damages to Irrigation Systems

Province	Extent of Damage		Repair Cost	Replacement Cost	Total Damages
Name and Type of Irrigation Facility	Partial	Total	\$	\$	\$
A	B	C	D	E	F
Irrigation 1					
Irrigation 2					
Total					

Note for filling in Table 12.

- Enumerate the names of the irrigation facilities in Column A.
- The extent of damage in Columns B and C refers to the damage of the concerned irrigation facility which is either partial or total. Tick the space either for partial or total.
- The value of damage is the repair cost of the irrigation facility/ies if partially damaged or the replacement cost for those that were totally damaged.
- In formula, the 'Total Damages' will be Column F = (Column B x Column D) for partially damaged or Column F = (Column C x Column E) if totally damaged.

C. Damage information No 3: Damages to Livestock

A general head count of all the livestock that died from the disaster can be made to account for the damages.

Table 13. Damages to Livestock

Province									Total Value (\$)
Livestock Description		Number of Dead Livestock					Number of Dead Poultry		
		Cattle	Swine	Goat	Sheep	Others	Chicken	Duck	Others
Age	Sex								
<i>Less than 1 year</i>	Male								
	Female								
<i>1 to 2 years</i>	Male								
	Female								
<i>2 to 3 years</i>	Male								
	Female								
<i>2 to 3 years</i>	Male								
	Female								
<i>3 to 4 years</i>	Male								
	Female								
<i>More than 5 years</i>	Male								
	Female								
TOTAL									

Notes in filling out Table 13.

- The number of dead livestock and poultry should be determined in the field.
- The values of each type of animal by age and sex are already established in the baseline information.
- The value of total damages will be the quantity of dead animals multiplied by their respective values as contained in the baseline information.

D. Damage information No 4: Damages to Permanent Crops and Forestry

The assessment must be able to account all the permanent crops, trees and forest products that have been totally destroyed or uprooted by the disaster to account for the damages.

Table 14. Damages to Permanent Crops and Forestry

Province				
Permanent Crops	Affected Area	Quantity of Trees Totally Destroyed	Average Replanting Cost per Tree	Total Damages
	Hectares	Unit	\$/Unit	\$
A	B	C	D	E
1. Coconut				
2. Coffee				
3. Banana				
4. Fruit trees				
5. Timber				
6. Others				
TOTAL			Not applicable	

Notes in filling out Table 14.

- The “Total Damages” (Column E) is the “quantity of trees totally destroyed (column C) multiplied by the “average replanting cost per tree” (column D). In formula, Column E = Column C x Column D.
- The average replanting cost per tree will be the amount required to replant each of the totally destroyed permanent crops and trees. If, however, a destroyed tree has a salvage value (like a fallen coconut tree can be sold for a certain amount), the said salvage value should be deducted from the cost of replanting.
- The number of trees can also be estimated by the average number of trees per hectare if such data exists. By knowing the area where totally damaged are planted, the number of trees can be estimated.

E. Summary of Damages

The above estimated damages can be summarized in the following table.

Table 15. Summary of Damages

Damages	Value in \$	Remarks
1. General Assets		
2. Farming		
3. Fisheries		
4. Livestock and poultry		
5. Irrigation		
6. Permanent crops and forestry		
TOTAL		

Notes in filling out Table 15.

- The values of the damages come from the previous tables.
- Any important notation/s can be placed in the column on remarks.

Step 3. Estimate Losses in Agriculture for the Year That the Disaster Occurred

In estimating losses, the following should be kept in mind:

- a. The losses should be segregated as those that will be experienced within the year that the disaster occurred and those that will be experienced beyond, until normalization is achieved. This process will enable the economic planners to estimate the economic impacts on an annual basis which will be necessary in revising the economic targets and projections, consistent with the national system of accounts.
- b. The main factors that can cause severe reduction in future production are damages to irrigation, land and permanent crops. Unrepaired irrigation facilities will reduce the cropping season while it will take time before permanent crops mature to regain production. Damage to land like salt water intrusion may reduce land productivity over extended period.
- c. On the other hand, the rate at which affected farmers can replant or replace destroyed livestock and poultry will depend on their financial capacity and resources and/or the availability of outside assistance (from the government or development partners) that will enable them to resume production and normalize agriculture.

Important Assumption

In succeeding discussions on the estimation of losses, it is assumed that farmers and growers will be able replant or resume production using their own resources at earliest possible time (which is normally after the emergency phase). As such, the losses that will be estimated will indicate the best-case scenario.

To estimate worse or worst case scenarios, the assessment specialist can assume some eventualities where farmers do not have enough resources necessary to replant on their own in the earliest possible time. For example, what are the consequences if farmers, because they lack production capital, can only replant 5 months after the disaster instead of 2 months? If such will be the situation, the assessment specialist must be able to project the impacts on food security, poverty and the overall economy, among others. Delaying recovery and reconstruction activities may cause greater socio-economic losses in the coming years. The post-disaster needs of the agriculture sector must, therefore, enable it to recover and normalize within the shortest possible time.

A. Production and Investment Losses

The estimated production losses in agriculture will be the value of the reduction in harvest due to the disaster. This will be the expected pre-disaster yield less the post-disaster estimated yield in all of the sub-sectors - crops, livestock, fisheries and forestry - within the year that the disaster occurred.

It should be noted that:

- a. If the standing crops of farmers are totally destroyed by a disaster and they are not able to replant to harvest within the same year, the value of investment put into the destroyed crops will be considered as loss and not the value of the expected production.
- b. If, however, the farmers will be able to replant in time for harvest within the same year, the investment put in their totally destroyed crops can be considered as added (higher) production cost for the same quantity or volume of harvest. This type of loss (investment

loss) applies also to fisher folks and their fish stocks as well as poultry owners and their layers.

- c. The value of investment losses or higher production costs is important in estimating the GDP. The value of investment losses or higher production costs indicates what have already been contributed to the goods and services rendered for the year, thus, it will enable economic planners to consider them appropriately in the GDP calculation.

In the following tables of losses for the sub-sectors, the term “higher production cost” will be the used. (In any case, the value of investment losses and higher production cost will be the same).

1. Crops

Table 16. Losses from Seasonal Crops

Province										
	Crops	Projected Annual Crop Production				Production Losses		Higher Production Cost	Other Losses	Total Losses
		Pre-Disaster		Post-Disaster		(MT)	\$	\$	\$	\$
		(MT)	\$	(MT)	\$					
A	B	C	D	E	F	G	H	I		
1. Taro										
2. Cassava										
3. Yam										
4. Sweet potato										
5. Rice										
6. Corn										
7. Soybean										
8. Peanut										
9. Pineapple										
10. Papaya										
11. Banana										
12. Leafy vegetables										
13. Others	N.A.		N.A.		N.A.					

Notes in filling out Table 16.

- “Production Losses” is the difference between the “Pre-disaster” and “Post-disaster” crop production estimates for the year. ‘MT’ refers to metric tons of production while ‘\$’ refers to the equivalent in monetary terms of the production. In formula, it is:
 - Column E = Column A – Column C
 - Column F = Column B – Column D
- “Higher production cost” will be incurred if the farmers will re-plant in time for harvest within the year. Therefore, the value of “higher production cost” will be the initial investment put into the crops before they were destroyed by the disaster; they will be the “added” cost to the re-planting expenses of the farmers.
- The value of the “higher production cost” will depend on the timing of the occurrence of the disaster. For instance, if floods wiped out a hectare of rice land just after planting, the investment put into the land is lower compared to when floods happened during the middle

stages of growth of rice. The assessment team must, therefore, be aware of the timing of the occurrence of the disaster – whether it happened at the early planting, middle or maturing stages of cropping. It must be noted too that more production inputs may be needed after a disaster.

- The “total losses” will be the sum of production losses (in \$), higher production costs and other losses. Other losses are the additional costs of cleaning up debris, retrieving documents, etc. In formula, it is:
 - Column I = Column F + Column G + Column H
- The above concepts will be followed in the following tables.

2. Permanent Crops and Forestry

Table 17. Losses From Permanent Crops and Forestry Production

Province									
	Permanent Crops	Projected Annual Production				Production Losses		Other Losses	Total Losses
		Pre-Disaster		Post-Disaster					
	(MT)	\$	(MT)	\$	(MT)	\$	\$	\$	
1. Coconut									
2. Coffee									
3. Sugarcane									
4. Banana									
5. Others (Specify)									
Forestry									
6. Timber									
7. Rattan									
8. Others (Specify)									
TOTAL	N.A.		N.A.		N.A.				

Notes in filling out Table 17.

- Permanent crops and forest products will usually take a longer time to regain its productive capacity. As such, losses will extend beyond the disaster year. The assessment team must be able to estimate the various durations before the permanent crops and forest products will yield the pre-disaster levels of production.
- Since destroyed permanent crops cannot regain its pre-disaster level of production within the year that the disaster occurred, there will no higher production costs.
- The losses beyond the disaster year will be considered in the next step.

3. Fisheries

Table 18. Losses From Fisheries Production

Province									
Fisheries	Projected Annual Production				Production Losses		Higher Production Cost	Other Losses	Total Losses
	Pre-Disaster		Post-Disaster		(MT)	\$	\$	\$	\$
	(MT)	\$	(MT)	\$					
1. Tuna									
2. Lobster									
3. Squid									
4. Crab									
5. Others									
TOTAL	N.A.		N.A.		N.A.				

Notes in filling out Table 18.

- If the damaged species are in aquaculture, fisheries can be damaged at several stages of production – newly stocked, maturing and ready-to-harvest.
- Higher production costs will be incurred if the fish growers will re-stock in time for harvest within the year. Therefore, the value of “higher production costs” will be the initial investment put into the fingerlings before they were destroyed by the disaster; they will be the “added” cost to the re-stocking expenses of the fish farmers.
- The other notes in the previous table apply in filling out this table.

4. Livestock

Table 19. Losses From Livestock Production

Province									
Livestock	Projected Annual Meat Production				Losses		Higher Production Cost	Others Losses	Total Losses
	Pre-Disaster		Post-Disaster		Kg	\$	\$	\$	\$
	Kg	\$	Kg	\$					
Meat									
1. Cattle									
2. Swine									
3. Goat									
4. Sheep									
5. Chicken									
6. Ducks									
7. Others									
8. Eggs	Dozens	\$	Dozens	\$	Dozens	\$	\$	\$	\$
9. Milk	Liters	\$	Liters	\$	Liters	\$	\$	\$	\$
Draft Animals	Offspring	\$	Offspring	\$	Offspring	\$	\$	\$	\$
10. Buffalo									
11. Cattle									
12. Others									
TOTAL	N.A.		N.A.		N.A.				

Notes in filling out Table 19.

- The higher cost in production for livestock can be due to additional veterinary and medical expenses for the affected livestock, cost temporary shelters for animals, etc.
- Disaster can also stress animals, adversely affecting their productivity. For instance, after a disaster, the egg production by chicken-layers was observed to generally decrease.

B. Losses from Irrigation fees within the disaster year

There will be foregone income from destroyed irrigation facilities if they charge fees from users. The table below can be used to assess the losses from fees.

Table 20. Losses from irrigation

Province					
Name and Description of the Irrigation and Drainage Facility	Estimated Income From Fees		Losses (\$)	Ownership	
	Pre-disaster	Post-disaster		Public	Private
1.					
2.					
3.					
4.					
TOTAL					

General notes on the above tables of losses.

- The assessment specialist must be able to segregate the damages and losses as to private or public in nature. Ownership can be verified from the baseline information. Normally, crop, fisheries and livestock production are private in nature although some facilities like irrigation, storage, etc. can be public.
- Similar sheets would need to be filled in for each of the affected provinces.

Step 4. Summarize the damages and losses for the year that the disaster occurred

Based on the information gathered in the previous tables, a summary should be developed to show the total damages and losses in a province. The details of the entries in the summary table below are from previous tables of damages and losses of the various sub-sectors under agriculture and forestry.

Table 21. Summary of Damages and Losses in a Province

Province						
Agricultural Sub-sector	Damages (\$)		Total Damages (\$)	Losses (\$)		Total Losses (\$)
	Private	Public		Public	Private	
1. Crops						
2. Permanent Crops						
3. Fisheries						
4. Livestock						
5. Forestry						
6. General Assets						
7. Irrigation						
8. Others						
TOTAL						

Notes for filling out Table 21.

- The Damages in Column 2 is the sum of the values in the tables for damages to agricultural assets, irrigation and drainage systems, livestock and the damages on permanent crops.
- The Losses in Column 4 is the sum of the values in the tables for the estimated production losses and higher production costs for crops, permanent crops, fisheries, livestock, forestry and irrigation.
- Other losses can include unexpected expenses like veterinary medicines, land clearing, retrieval or reconstruction of documents, etc.

The damages and losses for all the provinces should be consolidated to form the national estimate of damages and losses.

Step 5. Estimate Future Losses

The effects on production levels due to the damages to land and permanent crops or trees, irrigation, etc. must be accounted for to enable the Ministry of Planning and/or Finance to estimate the impacts to economic indicators. (Again it is assumed here that such losses will be incurred even if assistance will be provided on time; this is the best-case scenario). The following tables should be created and shared with the Ministry of Planning and/or Finance.

1. Crops, Permanent Crops, Livestock and Fisheries

Table 22. Estimated Post-disaster Losses Beyond the Disaster Year

Province												
Sub-sector	Year 1 Production Estimates						Year 2 Production Estimates					
	Pre-Disaster		Post-Disaster		Losses		Pre-Disaster		Post-Disaster		Losses	
	Unit	\$	Unit	\$	Unit	\$	Unit	\$	Unit	\$	Unit	\$
Crops												
1. Taro												
2. Cassava												
3. Yam												
4. Sweet potato												
5. Rice												
6. Corn												
7. Soybean												
8. Peanut												
9. Pineapple												
10. Papaya												
11. Banana												
12. Leafy vegetables												
13. Others												
Permanent Crops												
1. Coconut												
2. Coffee												
3. Sugarcane												
4. Banana												
5. Others												

Forestry													
1. Timber													
2. Rattan													
3. Others													
Meat													
1. Beef													
2. Pork													
3. Goat meat													
4. Mutton													
5. Chicken													
6. Ducks													
7. Others													
Draft Animals													
1. Buffalo													
2. Cattle													
3. Others													
Fisheries													
1. Tuna													
2. Lobster													
3. Squid													
4. Crab													
5. Others													
Others													
1. Eggs													
2. Milk													

Notes for filling out Table 22.

- Years 1 and 2 refer to the years after the disaster has occurred.
- “Pre-disaster estimate” is the original estimated value of production (in quantity and currency) for the year under consideration *if there was no disaster*. The pre-disaster estimates are normally based on the country’s economic or sectoral plans.
- “Post-disaster estimate” is the revised estimated value of production (in quantity and currency) for the year under consideration *after a disaster has occurred*. The post-disaster estimates should be based on the assessment of agricultural experts.
- “Losses” refers to the difference between the pre- and post-disaster estimates.

It must be noted that if the permanent crops and forest products were totally destroyed (by strong winds or the land was totally covered by landslides), some of these permanent crops and forest products will take more than 2 years to become productive again. As such, the losses that will be incurred from these crops will be for more than 2 years.

2. Irrigation Fees

Losses from irrigation fees will occur if the facility/ies cannot collect fees until they are fully repaired and operational. The table below will summarize the losses.

Table 23. Estimated Post-disaster Losses From Fees on Irrigation Beyond the Disaster Year

Name of District:						
Name and Description of the Irrigation Facility	Year 1 Estimate of Fees (\$)			Year 2 Estimate of Fees (\$)		
	Pre-Disaster	Post-Disaster	Losses	Pre-Disaster	Post-Disaster	Losses
1.						
2.						
3.						
4.						
Total						

Step 6. Summarize Losses for the Years After The disaster Occurred

Based on the previous tables, a summary of the estimated futures losses in agriculture could be made using the table below. (Again, it should be noted that the losses indicated here are the best-scenarios by assuming that the farmers can re-plant as soon as possible.)

Table 24. Summary of Future Losses in Agriculture, in Kips

Province			
Sub-sector	Losses (in \$)		
	Year 1	Year 2	Total
1. Crops			
2. Permanent Crops			
3. Fisheries			
4. Livestock			
5. Forestry and Timber			
6. Irrigation			
7. Others			
TOTAL			

The estimated future losses in the provinces can be summed up to come up with the disaster impact on agriculture on a national scale.

Step 7. Summarize the Overall Estimated Damages and Losses in the Agriculture Sector

The assessment for all the sub-sectors can be consolidated to create a summary of damages and losses in a province for the year the disaster occurred and beyond, as shown in the table below.

Province

Table 25. Summary of Damages and Losses in Agriculture in a Province

Province					
Sub-sector	For the Disaster Year (\$)		Losses After the Disaster Year (\$)		Total (\$)
	Damages	Losses	Year 1	Year 2	
1. Crops					
2. Permanent Crops					
3. Fisheries					
4. Livestock					
5. Forestry and Timber					
6. Irrigation					
7. Others					
TOTAL					

Nationwide

Again, the estimated damages, losses and future losses in the provinces can be summed up to come up with the disaster impact on agriculture on a national scale.

Table 26. Summary of Damages and Losses in Agriculture Nationwide

Name of Province	For the Disaster Year (\$)		Losses After the Disaster Year (\$)		Total \$
	Damages	Losses	Year 1	Year 2	
Province 1					
Province 2					
Province 3					
Province 4					
Province 5					
TOTAL					

IV. Identifying Post-Disaster Recovery and Reconstruction Needs

As indicated earlier, the loss assessment was based on the assumption that farmers will be able to finance their own needs to resume their agriculture activities. As such the estimated losses are the best-case scenarios.

If (and usually the case is) farmers cannot finance their own recovery in time, it should be expected that losses will continue to be experienced over a longer period. If farmers can replant in 5 months after the disaster instead of, say 2 months, food insecurity may occur, poverty levels may increase, prices may rise, government revenues will decrease and the economy as whole may collapse. Such scenarios can be used in assessing the needs which will prevent such conditions from happening.

The identified post-disaster needs, therefore, should be the best possible way to bring back normalcy in the agriculture sector. The needs can be identified with an analysis of the impacts of the disaster among the agriculture sub-sectors and their subsequent impacts on the people and the economy.

This analysis should enable the Ministry of Agriculture to identify appropriate policies, programs and projects and justify why they should be prioritized over other concerns.

The following are the suggested steps in identifying recovery and reconstruction needs in the agriculture sector.

Step 1. Analyze the Disaster Impacts Based on the Damages and Losses

In analyzing the impacts of disasters, the following should be considered:

A. Poverty incidence and long-term food security.

This part should include the socio-economic impact of disasters on people engaged in agriculture especially those living below and in the border of the poverty line. This part can portray the impacts on a family in terms of income loss and its consequences on health; education; conditions of women, children and the elderly; among others. There are possibilities too of increased crime rates, marginalization of the most vulnerable, etc. Using the information presented in the tables earlier, the following are some of the issues that can justify the prioritization of agriculture:

1. More people are engaged in agriculture and the poorest groups are dependent on this sector. Delays in assisting these groups will exacerbate their socio-economic conditions. For instance, prolonged loss of income may also result in deteriorating health conditions and the children dropping out of school to help their families earn a living, among others. In effect, not prioritizing the agriculture sector for recovery may result in more expenses for the government in terms of welfare support for the people in the agriculture sector.
2. Without assistance, a planting season may be missed by the farmers which will result in the scarcity of basic food supply such as rice and corn that can cause inflation not only in the disaster-affected areas but also in other districts or even nationwide.
3. Delay of assistance may further put farmers in debt. It must be remembered that poor farmers usually incur debts for their production inputs. Without assistance from the government, they will be unable to meet their financial obligations.

The effects on the national targets for the Millennium Development Goals (MDG) can be used to analyze the impacts of the disaster.

B. Contribution of agriculture to other sectors

There are agricultural products which are major inputs of other industries. For instance, if corn is the basic ingredient of animal feeds, its reduction in supply will also increase the prices of feeds which will eventually inflate the prices of poultry products affecting a greater number of people. The chain of adverse impacts that damages and losses to agriculture can cause should, therefore, be analyzed further.

C. Gender Impacts

The condition of women may be severely affected by a disaster event. The impact on women should be looked into in relation to their possible new roles as breadwinners for their families after the husband or men in the family died from the disaster; the potential double burden or additional work in the farms and on the house; possibility of sexual abuse; deteriorating health conditions especially for lactating mothers; etc.

D. Contribution of agriculture to GDP

If the damages and losses in certain crops or livestock or timber products are for export, foreign earnings will decrease if the recovery of the sector will not be prioritized. The Ministry of Planning and/or Finance can further analyze the impact of the reduction of foreign earnings to the national economy.

E. Potential threats or hazards created by the disaster

There may be some hazards that may have been created by the past disasters such as a landslide threat caused by extensive rains, or potential flooding of agricultural lands brought about by destroyed irrigation systems or dikes. If the potential losses to agriculture from these threats are extensive, the government should consider mitigation as top priority.

F. Environmental Effects

One of the aftermaths of a disaster event is the destruction of some environmentally sensitive areas. For instance, some watershed areas may be put at risk by landslides or by the destruction of the forest that sustains them. Environmental concerns must be included in the criteria for prioritizing programs and projects for recovery.

Step 2. Set the general recovery and reconstruction strategies for agriculture

While the analysis of the damage and loss assessment report is being undertaken, the Government in partnership with development partners involved in the agriculture sector should develop the general strategies to be followed for recovery and reconstruction of the sector.

“Building Back Better” Principle

In developing the overall strategies, the concept of “building back better” should be a prime consideration. Recovery and reconstruction should build back better structures, processes and practices to build a resilient sector that will reduce future risks from disasters. Under this concept are issues and comparisons like:

- a. Simple repair vs. Repair with retrofitting for reinforcement;
- b. Reconstruction vs. Relocation or resettlement;
- c. Cost of emergency assistance vs. Pre-disaster preparedness and mitigation activities; and
- d. Proper crop and livestock selection as post-disaster intervention.

Some of the broad content of the strategy could include the following:

- Identifying sector-specific factors which will contribute to ‘building back better’ or higher resilience of the agriculture sector like crop and livestock selection, location of animal sheds, fishing boat sanctuaries, etc.
- Possibilities of relocation of agricultural facilities situated in high risk areas.
- Possible incentives to private agri-business owners for reconstruction of damaged facilities and stock with higher standards of resilience.
- Enhancing and strengthening medium to long-term disaster risk reduction related issues in the agriculture sector such as integrating hazard resilience standards in design and construction of all new farm buildings, retrofitting of existing facilities situated in high risk areas, improving of disaster risk reduction measures such as dikes to protect farm lands from floods, etc.

- Policy guidelines and strategies in financing the recovery and reconstruction activities in the sector covering both the public and private sectors like grant and credit assistance to affected farmers; Government loan or internal revenue generation to finance recovery and reconstruction, etc.

Step 3. Identify the Post-disaster Needs in the Agriculture Sector

Gender Concerns in Identifying Post-Disaster Policies, Programs and Projects

All recovery and reconstruction activities should be gender-sensitive. Ideally there should be a gender study done before a disaster which can identify the needs and conditions of women, specifically:

- a. The roles of men, women, boys and girls in all the phases of farm production from pre-planting planning to post-harvest and trading/marketing;
- b. Differentiation of farm tools and equipment used by and among men and women, if any,;
- c. Consumption patterns at home;
- d. Boy-girl preferences; and
- e. Domestic work allocation between men, women, boys and girls.

In the absence thereof, the IASC Gender Marker Tip Sheet on Food Security 2 (Agriculture and Livelihoods) dated 29 July 2011 can be used designing gender-responsive recovery programs and projects in the agriculture sector.

1. Recovery Needs

Recovery activities are generally short-term interventions designed to mitigate and shorten the adverse impacts of the disaster on the personal or household level and the economy in general. In the agriculture sector, quick recovery efforts must be undertaken since a great number of people depend on the sector for their source of income and food supply. Even people not affected directly by the disaster can suffer the consequence of lower food supply or higher cost of food items. Priority in recovery should be the stabilization of personal and family incomes and subsequently food supply. As such, urgent assistance to restore incomes, revive economic activities and stabilize food supply should be implemented. For the recovery activities, the following options can be implemented:

A. Cash- and food-for-work schemes.

To immediately restore personal and family incomes, cash- and food-for-work schemes may be implemented. Implementing food-for-work or a combination of cash-for-work to rehabilitate/reconstruct damaged irrigation systems, immediate repair of agriculture-related facilities town halls, public schools, health centers, etc. can provide temporary employment while farmers are waiting to plant and harvest. This can be in combination with adopting the labor-intensive reconstruction method.

B. Direct subsidy to poor crop growers.

Recovery activities in the crop sub-sector can include the provision of inputs required for replanting such as fertilizers, seeds, pesticides and farming tools. These can be extended to poor farmers who are ready to resume their normal work on their lands.

C. *Immediate repair of vital infrastructure and production inputs.*

Production inputs will enable farmers and growers to resume agricultural activities immediately after the emergency phase. Certain infrastructure like irrigation, warehouses, etc, will provide the necessary support to production.

D. *Provision of animals and the necessary veterinary and other related services.*

To restore livestock and prevent any outbreak of animal diseases, assistance in the provision of animals and veterinary medicines and other services like feeds may be provided. Any new and remaining livestock and poultry must be protected from diseases and starvation to ensure meat supply, eggs and other related products. Distributing and protecting the work animals will enable farmers to resume work on their farms while livestock and chickens will provide additional source of income and food.

E. *Pond repairs and re-stocking of fingerlings.*

Recovery of the fisheries sub-sector can include the assistance in the repairs of fish cages, ponds or fish traps and the provision of tools and gears as well as fingerlings to replace the depleted aquaculture and fisheries stock.

There are certain options that can be implemented through policy measures to expedite recovery and reconstruction, among them are:

A. *Production credit.* A credit scheme with soft terms, like low interest rate with longer repayment periods, can provide the not-so-poor farmers and growers the resources to buy production inputs and revive their agricultural activities immediately. Credit schemes should be made available to all the sub-sectors of agriculture (crops, livestock, fisheries and forestry). Credit can be channelled through existing government programs or through the private banking system with a government guarantee. This scheme can be implemented through a policy directive which will not need any monetary outlay from the government except for the liability associated with the guarantee.

B. *Income and importation tax breaks to affected farmers and firms.* Exempting farmers and agricultural firms from paying certain taxes for a certain period, say 2 years, will enable them to invest more due to the savings they will derive from such exemptions. Farmers can be exempted from paying income taxes while agricultural suppliers can be exempted from import or sales taxes which can be passed on to small farmers. This scheme can be implemented through a policy directive which will not need any monetary outlay from the government.

The following table can show the possible recovery needs of the agriculture sector.

Table 27. Summary of Recovery Needs in the Agriculture Sector

Possible Assistance by Economic Activities of People Affected	Type and Amount of Assistance Needed (\$)		Total Amount Needed (\$)
	Grant	Credit	
1. Cash- and food-for-work schemes			
2. Direct subsidy to crop growers			
a. Seeds			
b. Fertilizers			
c. Pesticides			
d. Tools			
e. Other inputs			
3. Repair of agricultural facilities			
a. Irrigation systems			
b. Animal sheds			
c. Fish cages or ponds			
d. Warehouses			
e. Mills			
f. Others			
4. Provision of animals, feeds and veterinary services			
5. Provision of fingerlings and feeds			
6. Provision of permanent crop and forestry seedlings			
7. Food supply stabilization			
8. Non-farm livelihood support			
TOTAL			

Notes in filling out Table 27.

- Part of Column 1 (Food Supply Stabilization) is the amount required to stabilize or maintain the pre-disaster food balance within and outside the affected areas even after the emergency phase. This should be determined in the Food Security Assessment (which is covered by a separate guidance note). The food stabilization requirement here should be over and above the amount provided in the emergency phase.
- Column 2 is for the type and amount of assistance needed by the people in the sub-sectors. For example, seeds that will be given for free to crop growers should indicate the amount under the grant column. Animals dispersed under a certain repayment scheme should be under credit
- Column 3 is for the total amount needed in \$ which is the total of the grant and credit.
- Non-farm alternative livelihood activities that may be extended to the affected people in the sector like assistance to restore micro or cottage industries like weaving, mat-making, etc. This should be based on the baseline information on micro/cottage industries existing in the area/s.

2. Reconstruction Needs

Reconstruction needs are those that usually take longer time period to implement and complete and are intended to sustain the recovery projects and/or mitigate future disasters. Reconstruction activities should include both public as well as private sector in agriculture and they may require different types of financing strategy. Possible reconstruction related activities in the agriculture sector could include the following:

- New construction and/or long-term reconstruction of heavily-damaged agricultural structures like storage buildings, irrigation facilities, research facilities, etc. using a 'building-back-better' strategy to ensure future disaster resilience through the adoption and enforcement of improved construction standards.
- Structural retro-fitting of undamaged or partially damaged agricultural facilities using better construction standards so that they are not affected by disaster event in the future.
- Relocation of vital facilities (like main storage of grains and other harvests) to safe areas, as necessary. In this case, the additional costs land acquisition, and basic services provision (water, sanitation, electricity, etc) should be included.
- Replacement of agricultural equipment and machinery that were destroyed may be included in the reconstruction needs, unless they have been covered under the recovery needs. Included here are all the sub-sectors like tractors for the crop sub-sector, boats and engines for fisheries sub-sector, etc.
- Dispersal of animal stock and/or the development of breeding stations to re-populate the decimated animal population. Appropriate types of animal breed may be chosen to adapt to disaster-prone areas.
- Soft-term credit for reconstruction and repair of private agricultural businesses. Such schemes can be accompanied by technical assistance for improved disaster resilient standards of construction.
- Preparedness and mitigation projects. There may be some projects which are needed to mitigate future disasters like rice land flooding, landslides, etc.

The following can summarize the reconstruction needs of the agriculture sector.

Table 28. Reconstruction Needs of the Agriculture Sector

Assistance to the Agriculture Sector	Reconstruction Needs (\$)		Total Reconstruction Needs (\$)
	Grant	Credit	
1. Construction of new agricultural facilities like:			
a. Irrigation facilities			
b. Warehouses			
c. Agricultural buildings/facilities			
d. Animal shelters			
e. Fish cages			
f. Other structures			
2. Structural retro-fitting of undamaged or partially damaged agricultural facilities			
3. Relocation of vital facilities			
4. Replacement of agricultural equipment and machinery			
5. Establishment of breeding stations			
6. Soft-term credit for private agricultural businesses			
7. Preparedness and mitigation			
Total			

Notes in filling out Table 28.

- “Grant” refers to the free assistance that will be extended by the government and other donors while “credit” refers to the assistance that is to be repaid by the beneficiaries.

Items and amount needed for the recovery and reconstruction activities that are not produced locally and have to be imported from other countries should be estimated and expressed in percentage of total amount of needs. This will be used for the analysis of impact on the balance of payment.

Step 4. Develop short, medium and long-term projects and design implementation plan

Recovery and reconstruction needs identified above would need to be broken down in short, medium and long-term needs. Generally, the activities identified in the recovery needs are within the short-term category while those included in the reconstruction component are medium to long-term projects. (Some of these projects may need feasibility and engineering studies which will require longer periods before they are completed).

The identified needs should have a rough schedule of implementation outlining at the very least the activities, timing and budget required for all the programs and projects. The following techniques can be considered:

1. Identify the specific projects according to their relative urgency or priority in relation to recovery.
2. Plot the timeline of activities of all the projects, with the urgent ones on top, in a Gantt chart with the corresponding funding requirement. This will assist the Ministry of Finance in

programming the necessary funds over a certain time period, like on a quarterly or annual basis.

3. Identify and include in the list projects that need further feasibility studies which may be funded by foreign grants.
4. To the extent possible, a logical framework (log frame) should be created for each of the project proposed for inclusion in the recovery plan.

Step 5. Draft the assessment report

Once all the information and analysis are in, the report can be drafted. The following format may be considered in writing the assessment chapter of the agriculture sector:

1. Brief background on agriculture sector
2. Overview of impacts of the disaster on the agriculture sector
3. Damage and Loss quantification (by province)
4. Proposed strategies for recovery and reconstruction of the agriculture sector
5. Needs estimation for recovery and reconstruction of the agriculture sector

The report of the agriculture sector should be written by the Ministry of Agriculture in close partnership with development partners involved in assessment of the sector. Once completed, the report should be submitted to the appropriate higher authorities for inclusion in the final report that will include the assessment of other sectors.

Step 6. Provide Inputs to the Ministry of Planning for Macro-Economic Impact Analysis

The damage and losses to the agriculture sector can affect the macro economy. The post-disaster assessment report should be forwarded to the appropriate Ministry (Planning or Finance) to enable it analyze the potential impacts on the following the macro-economic indicator:

- **Gross Domestic Product (GDP)** - The loss of the contribution to the national economy of income generated directly or indirectly by the agriculture sector may reduce GDP. Information on production losses for the year that the disaster occurred and beyond must be estimated.
- **Balance of Payment** – Lower exports of agricultural products arising from production losses will reduce export earnings while importation of staple food to meet increase in demand, raw materials and equipment to replace damaged ones will increase outflow of foreign currency.

The damage assessment should include estimations of the reduction of agricultural exports and the value of repair and reconstruction items that must be imported from abroad including equipment, machinery, construction materials, etc. Also, any importation of commodities to fill the demand gap must be estimated and be reflected in potential effects on the balance of payment.

- **Fiscal Balance** -The impact on the fiscal balance for the agriculture sector may be twofold: on the current and the capital accounts of the budget. In the first case, the unexpected expenditures to finance the immediate needs of the sector combined with possible lower tax revenues from private enterprises. In the second case, the government may resort to more borrowings/fresh loans for the recovery and reconstruction of the sector after a disaster which can result into higher budget deficit.

The assessment must provide an indication on the fiscal balance of the government in

relation to the duration of providing emergency assistance and other unexpected expenditures. Furthermore, incentives or tax breaks for those affected by the disaster must also be viewed from the point of view of the fiscal balance.

- **Prices or Inflation** - Prices of food commodities could go high if the destruction of the sector is massive. Food security must be insured by the government to avert any health and nutrition problems. Also, the prices of other products may rise if agricultural products are prime inputs to their production.
- **Employment** - There can be a big reduction in employment if the destruction is huge in the sector where most of the poor are engaged in. This may contribute in the increase of poverty level as a result of decreased employment.

Other indicators

- **Poverty Incidence** – There can be an increase in the number of people living under the poverty due to the disaster.
- **Effects on the MDG Targets** – The target dates for the achievement of the MDG may be moved further in time if the impact of the disaster is massive.

V. Concluding Notes: Future Activities to Further Enhance Damage, Loss and Needs Assessment

The following are some of the activities that should be undertaken to further improve post-disaster damage, loss and needs assessment:

Training

Since the contents of this guidance note may be new or different from the ones used in some Pacific island countries, training sessions are necessary especially for personnel from Ministries of Agriculture tasked to perform post-disaster assessments. The trained national level personnel can echo the training to their provincial or sub-national level counterparts who will perform the assessment in their respective geographical area/s of responsibility/ies. Likewise, regional development partners within the Food Security Cluster can benefit from attending such training/s to achieve a commonality and consistency of knowledge within and among the regional and national actors.

Additional studies

To further expedite the post-disaster assessment process, there are several sets of information that can be generated through the conduct of separate studies. These are:

1. A matrix of potential effects on crops that can be caused by certain disasters or hydro-meteorological phenomena like typhoons and floods.
2. A vulnerability matrix based on scientific analysis that can provide information even before a disaster occurs.
3. The gender dimensions of agriculture – from pre- planting to post harvest and trading – which can assist in identifying gender-sensitive pre- and post-disaster activities.
4. Coping mechanisms within the community which can provide responders valuable information in identifying, planning, designing and implementing pre- and post-disaster programs and projects.

a. **Matrix of potential reduction in harvest**

The matrix of potential crop losses due to floods can be based on both existing scientific information from the Ministry of Agriculture which can be validated by empirical observations in the field with the collaboration of farmers.

The matrix can look like the one below.

Matrix 1. Estimated reduction in harvest due to natural disasters based on empirical observation.

Main Crops	Stage of Growth	Estimated Reduction in Harvest (in % per hectare)			
		Extreme Rain (Millimeters)	Submerged in Flood Waters for:		
			1 Day	2-3 Days	> than 3 days
Taro	Stage 1				
	Stage 2				
	Stage 3				
Cassava	Stage 1				
	Stage 2				
	Stage 3				
	Stage 3				
Leafy vegetables	Stage 1				
	Stage 2				
	Stage 3				
Banana	Stage 1				
	Stage 2				
	Stage 3				
Coffee	Stage 1				
	Stage 2				
	Stage 3				
Sugarcane	Stage 1				
	Stage 2				
	Stage 3				
Coconut	Stage 1				
	Stage 2				
	Stage 3				
Others	Stage 1				
	Stage 2				
	Stage 3				

Notes in filling out Matrix 1.

- Individual Pacific countries should identify their own main crops.
- The various stages of growth of the various crops should be determined by the experts at the Ministry of Agriculture. For instance, stage 1 may be the seeding stage; stage 2 is the transplanting stage; stage 3 is flowering stage or in some crops the maturing stage.
- The “Extreme rain” condition in millimetres should be determined by agriculturists and meteorologists in each country.
- The “Estimated Reduction in Harvest (in % per hectare)” refers to the percent reduction of harvest per hectare with the occurrence of extreme rainfall or flood as compared to without them. It is a “with” and “without” floods comparison.

- At various stages of growth, the estimated reduction in harvest per hectare of a specific crop caused by, say, floods can be varied. For instance, a flood that will submerge newly planted taro for 2 to 3 days may cause a 100% reduction in harvest while the same flood may cause only a 50% reduction in harvest of taro at maturing stage.

A similar analysis for winds brought about by typhoons can be done too for the same main crops.

b. Vulnerability Matrix

The vulnerability matrix should indicate the crops and the corresponding area/s which are vulnerable to certain types of disasters. The information should be based on scientific study and empirical observations on the ground.

The matrix can look like the one below.

Matrix 2. Vulnerability analysis of farm lands.

Province																
Main Crops	Land Area Planted	Vulnerability														
		Floods			Landslide			Tsunami			Drought			Others		
	(Hectares)	L	M	H	L	M	H	L	M	H	L	M	H	L	M	H
Taro																
Cassava																
Leafy vegetables																
Banana																
Coffee																
Sugarcane																
Coconut																
Others																

Notes in filling out Matrix 2.

- Individual Pacific countries should identify their own main crops.
- The various levels of vulnerability (L for Low; M for Medium; and H for High) of the farms/lands planted with different crops should be determined by the experts at the Ministry of Agriculture in cooperation with the Bureau of Meteorology and other appropriate agency/ies and organization/s.

By using Matrices 1 and 2 with the relevant baseline information on crops – land area, productivity, period of planting – a reliable analysis can be made to provide a relatively accurate estimate of potential losses should a certain type of disaster occur.

Annex 1.

Glossary

Damage- The monetary value of fully or partially destroyed assets, stock and property. It is initially assumed that assets will be repaired or replaced to the same condition – in quantity and quality – prior to the disaster, i.e., valued at agreed replacement (as opposed to reconstruction) costs. The assessment should consider the level of damage, i.e., whether an asset can be rehabilitated or repaired, or has been completely destroyed (modified from UN ECLAC/R. Jovel, 2007).

Disaster Risk Management - This term is an extension of the more general term “risk management” to address the specific issue of disaster risks. Disaster risk management aims to avoid, lessen or transfer the adverse effects of hazards through activities and measures for prevention, mitigation and preparedness (UN ISDR, 2009).

Disaster Risk Reduction - The concept and practice of reducing disaster risks through systematic efforts to analyze and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events (UN ISDR, 2009)

Disaster: A serious disruption of the functioning of a community or a society causing widespread human, material, economic or environmental losses which exceed the ability of the affected community or society to cope using its own resources.

Fiscal Balance: A taxation policy that keeps a country's employment and taxation levels in balance.

Gross Domestic Product (GDP) - is one of the measures of national income and output for a given country's economy. GDP is defined as the total market value of all final goods and services produced within the country in a given period of time (usually a calendar year).

Hazards – a dangerous phenomenon, substance, human activity or condition that may cause loss of life, injury and other health impacts, property damage, loss of livelihoods and services, social and economic disruptions or environmental damage. (UNISDR 2008). Hazards can cause disasters. Natural hazards include floods, earthquakes, volcanic eruptions, tsunamis and other natural phenomena.

Inflation: The rate at which the general level of prices for goods and services rises and, subsequently, purchasing power falls; investors can track the direction of inflation by monitoring the Consumer Price Index (CPI).

Loss- changes in the flow of goods and services that will not be forthcoming until the destroyed assets are rebuilt or recovered. These losses will be quantified at the present value of such flows. Losses include the production of goods and services that will not be obtained; higher costs of operation and production; reduced income; increased expenditure and the cost of the humanitarian assistance activities. A distinction is made between private and public losses (modified from UN ECLAC/R. Jovel, 2007).

Macroeconomic effects- It reflects the manner in which the disaster modifies the main economic variables of the affected country (and includes fiscal impacts, implications for Gross Domestic Product growth, the Balance of Payments, etc.) (modified from UN ECLAC/R. Jovel, 2007).

Mitigation - the lessening or limitation of the adverse impacts of hazards and related disasters (UN ISDR, 2009).

Preparedness: Activities and measures taken in advance to ensure effective response to the impact of hazards, including the issuance of timely and effective early warnings and the temporary evacuation of people and property from threatened locations.

Prevention: Activities to provide outright avoidance of the adverse impact of hazards and means to minimize related environmental, technological and biological disasters.

Prices: Market value, or agreed exchange value, that will purchase a definite quantity, weight, or other measure of a good or service.

Recovery - the restoration, and improvement where appropriate, of facilities, livelihoods and living conditions of disaster-affected communities, including efforts to reduce disaster risk factors. The recovery task of rehabilitation and reconstruction begins soon after the emergency phase has ended, and should be based on pre-existing strategies and policies that facilitate clear institutional responsibilities for recovery action and enable public participation. Recovery programs, coupled with the heightened public awareness and engagement after a disaster, afford a valuable opportunity to develop and implement disaster risk reduction measures and to apply the “build back better” principle (UN ISDR, 2009).

Replacement cost - the amount that an entity would have to pay, at the present time, to replace any one of its assets. In the insurance industry, "replacement cost" is a method of computing the value of an insured item. Replacement cost is not market value, but is instead the cost to replace an item or structure at its pre-loss condition (modified from UN ECLAC/R. Jovel, 2007).

Risk: The probability of harmful consequences, or expected losses (deaths, injuries, property, livelihoods, economic activity disrupted or environment damaged) resulting from interactions between natural or human-induced hazards and vulnerable conditions.

Vulnerability: The conditions determined by physical, social, economic and environmental factors or processes, which increase the susceptibility of a community to the impact of hazards.

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