



Post Flood and Post Drought Recovery Guideline



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National Disaster Management Secretariat, Lao PDR

Acronyms

AADMER	ASEAN Agreement on Disaster Management and Emergency Response
AHA	ASEAN Humanitarian Assistance
ASEAN	Association of South East Asian Nations
BBB	Build Back Better
CEDMHA	Center for Excellence in Disaster Management and Humanitarian Assistance
DaLA	Disaster Damage, Loss and Needs Assessment
DRR	Disaster Risk Reduction
ECLAC	Economic Commission for Latin America and the Caribbean
GFDRR	Global Fund for Disaster Risk Reduction
HFA	Hyogo Framework for Action
M&E	Monitoring & Evaluation
MRC	Mekong River Commission
NDMO	National Disaster Management Office
NSDRR	National Strategy for Disaster Risk Reduction
PDNA	Post-Disaster Needs Assessment
PFRNA	Post Flood Recovery Needs Assessment
PMU	Project Monitoring Unit
RaDE	Rapid Post-Disaster Damage Estimation
SDGs	Sustainable Development Goals
SFDRR	Sendai Framework for Disaster Risk Reduction
UN	United Nations
UNDP	United Nations Development Program
NDMO	National Disaster Management Office
DMC	Disaster Management Committee
NDMC	National Disaster Management Committee
PDMC	Provincial Disaster Management Committee
DDMC	District Disaster Management Committee



Chapter I Overview

1.1. General Knowledge on Floods

A flood is a common type of disaster occurred when there is heavy rain and when water sources can no longer accommodate such an excessive amount of water, particularly for meandering streams. The two most common types of floods affecting Lao PDR are surface water floods and flash floods:

- (1) Surface water floods refer to a gradual increase of water level before an inundation. This type of flood often occurs in low-lying areas where people usually have time to move to a safer location. This flood can have substantial damage to the economy and the lives of people in the affected community.
- (2) Flash floods refer to a sudden and strong flow of water that occur because of heavy rain, usually from a nearby or higher area, that increases a huge volume of water in a short period of time. Such rapidly accumulated water flows through rivers, canals, or roads at high speed. In addition, this type of flood can also be caused by the sudden release of water from dams.

The two types of floods mentioned above can cause damage to a wide area, affecting lives, causing deaths and economic, property, and environmental damages and losses. Moreover, these floods hinder economic development and growth at both local and national levels.

1.2. General Knowledge on Droughts

Drought, in general, refers to the evaporation of water both in the river, land surface, and underground sources due to high temperature and unusually prolonged warm weather. Droughts are classified into 3 types:

- (1) Meteorological drought refers to the evaporation of soil moisture and plant water that happens at a much higher rate than the annual precipitation;
- (2) Hydrological drought refers to meteorological changes when the earth experiences low precipitation, low underground water level and low river level;
- (3) Agricultural drought refers to the shortage of water for agricultural activities. This usually happens at the beginning of the rainy season (delayed rainfall) causing damage to agricultural production in a wide area (Budha Kooncharoen, 2003).

Drought often happens when unusually low precipitation continues for several weeks per year, water flow drops below the level of reservoirs or other sources. This type of disaster



is exacerbated and in recent years has been worsening due to climate change, deforestation, and hydropower constructions. In some years, drought episodes can occur for many months and cause severe economic, social, and environmental impacts. Sometimes, environmental impacts from droughts remain for a longer period of time or even become irreparable¹.

Apart from socio-economic impacts, drought can also cause environmental effects on plants, water-dependent animals, and food supply, while destroying animal habitats. Impacts from drought can be temporary. For example, animal habitats and food supply may return to the normal stage once the affected area starts receiving rain. Sometimes, environmental effects can be permanent. The environmental impacts include:

- 1) Aquatic animals and wildlife lose their habitats;
- 2) Food and water shortage;
- 3) Increase of animal diseases due to food and water shortage;
- 4) Increased migration of wildlife;
- 5) Increased pressures upon nearly-extinct species;
- 6) The water level in reservoirs, streams and lakes decreases;
- 7) Loss of wetlands;
- 8) Forest fires are more likely to happen;
- 9) More wind and soil erosion;
- 10) Deterioration of soil quality.

1.3. Geographical Location and Features of Lao PDR

Laos is located at the heart of South-East Asia between the Pacific Ocean and the South China Sea. Because of this location, the country is prone to receive tropical cyclones and storms, as well as typhoons that come from both seas. These storms often lead to recurrent disasters, such as flash floods, surface water floods, soil erosion, and dam floods. Moreover, these disasters are likely to increase in severity due to climate change. On the other hand, drought episodes have increasingly occurred in recent years in many parts of the country. The occurrence of these two disasters is closely related to the precipitation level. If rainfall is below 200mm per year, drought is more likely to occur. If rainfall is above 200mm for two consecutive days, floods in flat areas, especially those located near the Mekong River and its tributaries, are likely to be inundated. The areas near mountains are prone to flash floods that impact infrastructure, people's lives and properties, and the economy.

¹ Source: <https://drought.unl.edu/Education/DroughtforKids/DroughtEffects.aspx>



According to the government, nearly half of arable areas in the central and southern parts of Laos are inundated almost every year. Floods in the northern part cause damage to infrastructure and people's living and economic conditions. Because the northern part has a higher elevation, water usually flows at a much higher speed than in the central and southern parts of the country. Overall, floods in Lao PDR result from rain brought about by tropical cyclones from the South China Sea and the Pacific Ocean traversing through Vietnam, as well as from dam water releases or dam bursts.

1.3.1 Flood Impacts

In Lao PDR, floods usually occur during the rainy season beginning from May to October, particularly between August and September, when tropical storms and typhoons collide. Central and southern provinces are mostly affected by floods. According to official information, severe floods occurred in 1966, 1976, 1978, 1995, 1996, 2000, 2008, 2009, 2011, 2013, 2015, 2017, 2018, 2019, and 2020. Significant floods and their impacts in the past two decades are listed below:

- 1) Tropical Storm Koguma caused heavy rain and floods from June 8–14, 2021 in many areas of the following seven provinces: Vientiane, Xiengkhouang, Xayaboury, Luang Prabang, Bokeo, Saravan, and Sekong. Among the affected provinces, Xayaboury was hit the hardest and particularly suffered damages and losses of housing, arable land, livestock, schools, irrigation systems, telecommunication systems, roads, bridges, and public utilities. Damages affected 10 districts, 136 villages, 3,098 families, 15,012 people (7,532 women), 2,305 houses, and four people injured, with estimated total losses costing 172,229,980,401 kip².
- 2) From October 6–12, 2020, Lao PDR was hit by the Tropical Storm Noul No. 11, Tropical Storm Linfa No. 15, and several other typhoons, which resulted in floods in the provinces of Savannakhet, Sekong, and Saravan. The floods affected 19 districts, 253 villages, 17,062 families, 92,773 people (39,806 women), six deaths. Three persons were reported missing. The disasters caused substantial economic, social, environmental, and infrastructure losses totalling an estimated 784,558,901,780 kip.
- 3) In 2019, the seasonal climate in combination with Typhoons Podul and Kajiki swept through seven provinces of Khammouan, Savannakhet, Saravan, Champasack, Attapeu, and Luang Prabang. The disasters affected 45 districts, 1,534 villages, 154,359 families,

² Social Welfare Department, National Disaster Management Secretariat 2021, Report on Post-Disaster Damage and Recovery Needs Assessment, Xayaboury Province, August 2021.



767,771 persons (53,415 women), killed 19 persons, and one person went missing. Estimated loss amounted to 1,458,669,675,328 kip³.

- 4) From July 23–24, 2018, Tropical Storm Son-Tinh brought heavy rain which caused the Xepian–Xenamnoy Dam to burst, which resulted in an unprecedented flash flood in Attapeu, Lao PDR. Furthermore, on August 18 of the same year, Tropical Storm Bebinca hit Lao PDR and resulted in floods in the central and northern parts of the country. Floods in that year caused economic losses amounting to 3,166.99 billion kip or approximately 371.5 million US dollars (total damage cost from 1,253.10 billion to 1,914.02 billion kip. Areas affected include: Vientiane Capital, Huaphan, Khammouan, and Attapeu. The Xepian–Xenamnoy dam burst damages alone reached as high as 35 million US dollars, almost 10% of the total damage cost⁴.
- 5) On July 24, 2017, with the increasing precipitation level caused by Tropical Storm Sonca, Saravan, Champasack, Sekong, Xayaboury, Bolikhamxay, Savannakhet, and Attapeu were inundated. Over 1,700 families in these provinces were affected, particularly in Xayaboury where two were killed and one was injured. In Kenthao District, 89 houses were affected by the disaster. Meanwhile, in Khamkeuth District, Bolikhamxay Province, 43 villages were affected and one person was killed by the flood.
- 6) From June 29–31, 2011, Nock-Ten swept through seven northern and central provinces of the country. The storm caused heavy rain, flash floods, and soil erosion that affected some 165,427 persons. The storm ruined about 21,800 hectares of rainy season rice and raised the Mekong River to a dangerous level, particularly in eight districts of Khammouan. In the first week of August, Tropical Storm Nock-Ten swept through Laos causing floods and soil erosion that affected 340,000 persons in 96 districts from 12 provinces. The disaster destroyed 64,000 hectares of arable land, 323 roads, 42 bridges, and 30 people went missing⁵.

1.3.2 Drought Impacts

Droughts are common throughout Laos, particularly in the central and southern parts. Some 46% of the total population (about 188,000 families) are at risk from drought as most of these people live in the rural area and areas along the Mekong River in southern and northern provinces, such as Xayaboury and Luang Prabang. Droughts cause the water level in rivers to go down and thus making river navigation or transportation difficult. In some years, boats were unable to navigate rivers, especially rivers between Luang Prabang City and the Golden Triangle

³ Social Welfare Department, National Disaster Management Secretariat 2019 and 2020. Report on Post Flood Damage and Recovery Needs Assessment

⁴ Lao National Disaster Management Committee, Report on Post-Disaster Needs Assessment 2019.

⁵ https://www.adrc.asia/view_disaster_en.php?NationCode=418&Lang=en&Key=1538



in Bokeo. Meanwhile, in the southern part of the country, Champasack, Saravan, and Savannakhet often face droughts. Moreover, the eastern and northeastern parts like Xiengkhouang, Huaphan, and Luang Prabang usually have to encounter short-term droughts that can last from about two to four weeks during the cultivation period, forcing farmers to replant new seedlings and delaying rice production in that season. During these drought episodes, some 188,000 families suffer from prolonged droughts. In the past two decades, the country has been facing issues associated with food insecurity and clean drinking water due to the changing pattern of rainfall, water scarcity and loss of soil moisture.

In 1996, the Lao Government purchased 7,027 units of water pumps from India to address the drought problem. With these machines, the country was able to channel water into 99,700 hectares of agricultural irrigated land. According to official information, droughts occurred in Lao PDR in 1961, 2003, 2007, 2015, 2018, and 2019. Droughts in the northern and central parts of the country in 2003 resulted in over 16.5 million US dollars in loss and damages. In 2007, droughts in the central part accounted for approximately 1 million US dollars of loss and damages. In 2015, droughts as a result of the phenomenon called El Niño that dominates the South East Asian Region affected the agricultural production of Lao farmers substantially for several months. El Niño delayed the rainy season rice plantation due to water shortages. The phenomenon caused challenges in food insecurity for Lao farmers, particularly in Xayaboury, as the province relied mostly on agricultural production for their living. More than 1,000 hectares of agricultural area was affected, with economic crops, such as rice, sweet corns, and fruits, destroyed, especially in the area of Ngeun, Xienghome, Phieng, and Kenthao Districts. Under this situation, the provincial authority established a task force committee to work closely with farmers from affected districts in solving the issue.

In 2019, the warm climate led to a prolonged drought and caused the water level in major rivers including the Mekong and its tributaries to drop. This lack of water affected millions of people who relied on the rivers for their livelihoods. In the same year, the Mekong River in Vientiane Capital dropped by 0.7% below its average level measured from 1961 to 2018, exposing river stones and sand at several points along the river. Moreover, during that year, rice production dropped to only 40% throughout the country as there was a lack of rain during the planting period. From January 16 to 18, the Mekong River level decreased by 5.58%⁶. According to the Mekong River Commission (MRC-2008), the Mekong River reached its lowest

⁶ <https://laos.opendevelopmentmekong.net/topics/disasters-and-emergency-response/#ref-11569-12>



historical level between June and January of the year. Likewise, Bolikhamxay experienced the worst droughts in its history that year⁷.

1.3.3 Climate Change Forecast

Climate change contributes substantially to the occurrence of natural disasters in Lao PDR, such as pandemics, soil erosion, flood, and drought. Climate change affects the volume, size, density, pattern, and distribution of rainfall (Guhathakurta et al., 2011; Trenberth, 2011; Zhang et al., 2010). The Intergovernmental Panel on Climate Change reported that risks from precipitation will be higher at 2°C compared to 1.5°C of global warming (Masson – Delmotte et al., 2018). The World Bank Group in collaboration with the Asian Development Bank conducted a study on changing trends of rainfall in Laos influenced by climate change and found out that annual precipitation will range between –27–41% at 3°C of global warming (WBG & ADB, 2021). From such trends, it can be projected that in the future, some regions including Laos will be more prone to heavy rainfall and low precipitation. According to a report by the World Bank on climate risks and adaptability, the average temperature increase in Laos ranges from 0.1 to 0.3°C, with precipitation rising from 10 to 30% annually (Dyoulgerov et al., 2011).

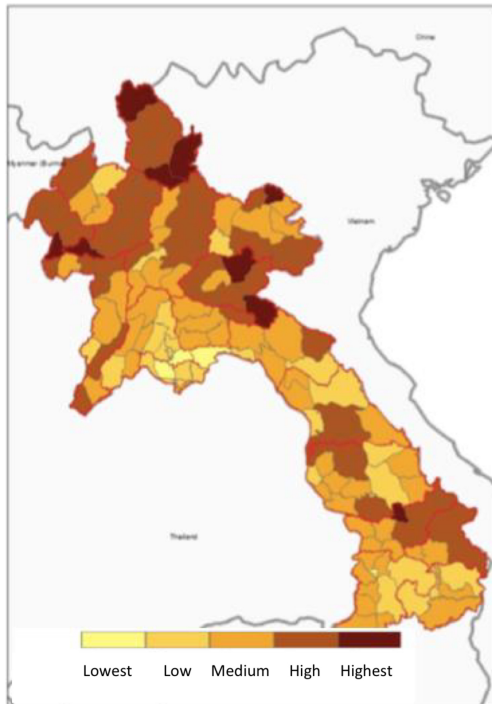
Increased precipitation affects the water level in different sources (Hu et al., 2012; Nijssen et al., 2001) which are used for consumption, electricity generation and agriculture around reservoir areas. Moreover, increased precipitation contributes to severe floods damaging the economy, society and people’s livelihoods. Scientists state that climate change will enable rainfall to continue shifting its patterns. In addition, the change has been accelerated in the past several decades and will continue to remain so at such a pace over the next several decades due to changes in the earth’s atmosphere (ILPCC, 2007). It will affect precipitation in the future by either increasing or lowering its level (Watts et al., 2016; Trendberth, 2006). Therefore, climate change forecasts are highly important for creating strong development plans for the infrastructure, production, agriculture, industry, and hydropower sectors that help prevent or mitigate possible impacts in the future to build capacity in ensuring effective climate change adaptability.

For this reason, access to climate change information is highly necessary for developing measures to effectively mitigate disaster risks, namely installation of an early-warning system in risky areas, increase of meteorology and hydrology stations, and utilization of satellites to support internal and external communication as a mean for collecting climate change information and providing early warning. Lao Government also attaches great importance to climate change forecast reflected in its participation in the UN Convention on Climate Change,

⁷ <https://www.mrcmekong.org/news-and-events/news/mekong-water-levels-reach-low-record/>



Kyoto Protocol on Greenhouse Gas Emission and Paris Agreement on Climate Change together with the global community to address such problem. In line with that, the Lao Government has also been mobilizing a number of technical aids and financial sources to support the more effective implementation of tasks related to climate change in Laos. More importantly, the Lao Government has passed laws, plans, and strategies to contribute to the solution of climate change in collaboration with the global community, particularly to limit the rise of global average temperature.



Source: Climate Change Department, MoNRE 2020



Chapter II Laws, Policies, and Institutional Frameworks on Disaster Management

The laws, policies, and institutional frameworks help facilitate activities of DMCs from the central to the local level, particularly the activities related to post-disaster protection, control, and recovery, as well as guiding how to request permission to utilize disaster management funds and other relevant financial sources.

2.1. Disaster Risk Reduction Vision and Strategy in Lao PDR

2.1.1 Disaster Risk Reduction Vision

The Government of Lao PDR considers disaster risk reduction as an important task. DRR is reflected in its strategic plan, programs, projects, education, awareness-raising, personnel structure, information strategy, budget, equipment, vehicles and aid mobilization, to enable concerned authorities to perform their task in an effective and efficient manner. The above task is done while guaranteeing peace and security, reducing risks associated with lives, health, assets, legitimate rights and benefits of all citizens. At the same time, the Lao Government also encourages and persuades individuals, legal entities, and both domestic and international organizations to contribute financial and technical assistance, equipment, vehicles, and other forms of material and assistance in disaster risk management. The Government also emphasizes developing human resources, building basic infrastructure, research and transferring scientific knowledge, utilizing modern and environmentally friendly technology, as well as applying local knowledge in disaster risk management.

2.1.2 Disaster Risk Reduction Strategy

The Disaster risk reduction strategic framework aims to prevent and reduce disaster risks, ensure preparedness, coordinate response, provide relief assistance, address emergencies, and recover from economic, social, environmental, and infrastructure damage and losses during the post-disaster period. The strategic framework objectives include:

- Manage socio-economic development to prevent new disaster risks, that may arise, through the construction of social and physical infrastructure that is disaster-resilient, while ensuring that Lao people are strong enough to withstand any disaster impact;
- Utilize resources and inclusive coordination mechanisms to enable all concerned parties to contribute to the disaster risk reduction;
- Strengthen vulnerable communities so that they can manage disasters and reduce severe disaster impacts, particularly in rural and remote communities. The task can be undertaken as part of the poverty reduction and sustainable development activities, including community-based disaster risk reduction (CBDRR).



- Increasingly extend the implementation of laws, policies, and international and regional strategies, particularly the Sendai Framework for Disaster Risk Reduction, Paris Agreement on Climate Change, ASEAN Agreement on Disaster Management and Emergency Response for the sake of Sustainable Development Goals (SDGs).

Furthermore, National Disaster Risk Reduction Strategy has set the following targets and priorities that support the Sendai Framework (SFDRR):

- Prevent and reduce existing risks, while strengthening economic, social, health, and environmental tasks. Promote understanding of disaster risks that Lao PDR is facing, apply knowledge on risks and evaluation results to define risks that exist at the local and central level by focusing on building technical, financial and administrative capacity for the disaster risk management (priority 1).
- Strengthen the disaster risk administration by mainstreaming the entire domestic and intra-sectoral disaster risk reduction, while defining roles and responsibilities for each sector (priority 2).
- Invest in disaster risk reduction to ensure resilience by allocating resources necessary for the development and implementation of the disaster risk reduction strategy at all levels of administration and by all concerned sectors (priority 3).
- Enhance preparedness for effective disaster response and “Build Back Better” to support the recovery, restoration, and reconstruction processes that incorporate the disaster risk reduction in all steps in order to enable communities and the country to handle disasters more effectively (priority 4).

2.2. Legal, Policy and Institutional Framework on Disaster Management

2.2.1 Policy Framework on Disaster Management

The government attaches great importance to disaster risk management within its policy reflected in the 5-year 8th National Socio-Economic Development Plan (2016–2020). The policy focuses on agriculture, environment, residence, and transportation, including climate change as approximately 80% of the Lao population makes a living through agriculture. The policy starts from the following operations: (1) develop laws to support disaster management, (2) strengthen the disaster response and climate adaptability, and (3) build capacity for public agencies involved in the disaster response.

5-year 9th NSEDP (2021–2025) defines targets and expected outcomes associated with disaster management by concentrating on enhancing the post-disaster prevention, control and recovery. Below are the outcomes defined by the plan:



- Incorporate the climate adaptability and climate change and disaster impact reduction into sectoral and local plans in a systematic manner;
- Create a technical guideline and regulation for operating an early warning of meteorological and hydrological dangers;
- Implement management plans, and measures for preventing, controlling and combating impacts from the climate change and natural disasters in an effective and efficient manner;
- Build a warning, prevention and emergency assistance system, including the capacity to forecast flood and drought in vulnerable areas throughout the country;
- Expand a meteorological and hydrological station network across the country;
- Improve and expand the National Early Warning Center as well as its information exchange network, the effectiveness of its forecasting and early warning of meteorological and hydrological threats;
- Improve the quality of reporting and press releases pertaining to climate warnings, weather, earthquake, and water level in an effective manner;

Moreover, NSEDP includes the following measures:

- Enhance the post-natural and human-made disaster prevention, control and recovery by strengthening the capacity for DMC at all levels in reducing disaster risks;
- Build and improve capacity for the national, provincial, district, and village contingency fund to enable them to provide disaster relief to victims in a timely and highly effective manner;
- Strengthen the coordination between public sectors and local authorities in addressing damages and losses caused by disasters;
- Effectively provide aid to people affected by disasters, while promoting participation from all parties both within and outside the country.

2.2.2 Legal Framework on Disaster Management

The government has enacted the Law on Disaster Management to be implemented by DMC at all levels with the following objectives: 1) to serve as principles, regulations, and measures for managing disasters; 2) to ensure the effective and efficient implementation using modern approaches of such task, while being able to quickly provide clear information, and remaining vigilant; 3) to reduce impacts from disasters upon health, lives, public, collective and private assets, the environment, and basic infrastructure while recovering, restoring, and reconstructing them after disasters; 4) to integrate with the regional and international community; 5) to contribute to the national socio-economic development.



In addition, the law has provided guidance on the institutional arrangements for DRR to be promulgated across various Government levels. It also requires the setting-up of Disaster Management Committees at 4 levels:

- (1) National Disaster Management Committee (NDMC);
- (2) Provincial Disaster Management Committee (PDMC);
- (3) District Disaster Management Committee (DDMC);
- (4) Village Disaster Management Committee (VDMC).

These DMCs are appointed by the Government in the following manner: NDMC is appointed by the Prime Minister based on a proposal made by the Minister of Labor and Social Welfare (MoLSW). NDMC has a duty to comply with the disaster management policies, strategies, laws, plans, and projects. NDMC is a non-standing organization established under Chapter VII of the Law on Disaster Management. NDMC consists of:

- (1) Deputy Prime Minister as the Chair,
- (2) Minister of Labor and Social Welfare as the Vice Chair and Standing Member,
- (3) Deputy Minister of National Defense as the Vice Chair,
- (4) Deputy Minister of Finance as the Vice Chair,
- (5) Deputy Head of the Prime Minister's Office and concerned deputy ministers, including the Deputy Secretary of Lao Revolutionary Youth Union, as committee members.

The above committee members play an advisory role to the Government on issues related to disaster management throughout the country. The Social Welfare Department, MoLSW, acts as the Secretariat and has a duty to formulate policies, regulations, and plans, coordinate with relevant sectors, including local DMCs and development partners, and perform other tasks.

2.2.3 Sendai Framework for Disaster Risk Reduction

Sendai Framework for Disaster Risk Reduction (SFDRR) 2015–2030 is an international framework adopted by member states of the United Nations, including Lao PDR, with the following objective to be achieved within the next 15 years:

“The substantial reduction of disaster risk and losses in lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries.”



The framework acts as a non-binding agreement, designed to help the member states implement interventions to reduce existing risks while preventing new risks from emerging. Sendai Framework is the successor instrument to the Hyogo Framework for Action (HFA) and has a goal to reduce negative socio-economic impacts from climate change, natural and human-made disasters, such as earthquakes, volcanic eruptions, soil erosion, floods, droughts, fire, storms, accidents, building collapse, underground water contamination, the dam burst, etc. Even though SFDRR is a voluntary agreement, the framework aims at helping signatory countries to address and reduce risks from the above-mentioned disasters. The framework, therefore, serves as an instrument for holding states, and other relevant parties accountable through international and regional cooperation. The framework also focuses on promoting inclusive participation from all parties and partners involved. As a result, the instrument encourages its member states to ensure good governance at the local, national, regional, and international levels.

The framework has 7 global targets known as “4 increases and 3 reductions” to be achieved from 2020–2030 with the following details:

- (1) Reduce the average number of deaths per 100,000 worldwide;
- (2) Reduce the number of affected victims worldwide by aiming at mitigating the number to below 100,000;
- (3) Reduce losses in GDP caused by disasters;
- (4) Reduce damage from disasters to important basic infrastructure and prevent the discontinuation of basic services, including the mitigation of damage to health and educational facilities through possible developments;
- (5) Increase the number of countries that have national and local disaster risk reduction strategies;
- (6) Intensify cooperation between developed countries and developing countries to support the implementation of this framework;
- (7) Enhance the preparedness and access to an early-warning system and information related to disaster risks.

2.2.4 ASEAN Agreement on Disaster Management and Emergency Response

The ASEAN Agreement on Disaster Management and Emergency Response (AADMER) is a regional legally binding agreement for the South East Asian Region forged by the 10 ASEAN member states. The agreement was signed in 2005 to provide guidance for regional cooperation in managing and responding to disasters. The agreement aims to support the reduction of disaster impacts on the lives, society, economy, assets, and the environment of each member



state. Also, AADMER puts great importance on promoting cooperation in disaster response at the national, regional, and international levels. It aims at building the capacity of ASEAN to ensure the effectiveness of regional early warning, preparation for emergency response and disaster risk reduction. The instrument also provides guidance and seeks international cooperation, including aid mobilization in times of disaster and for post-disaster assistance, protection, rescue and recovery.

More importantly, the agreement defines basic principles for signatories or partner countries to implement, namely: 1) measures for defining disaster risks; 2) evaluation; 3) monitoring; 4) prevention; 5) disaster relief; 6) preparedness; 7) emergency response, and 8) post-disaster recovery. In addition, AADMER also established the ASEAN Humanitarian Assistance Center (AHA Center). The Center, with its headquarter located in Jakarta, Indonesia, has duties to coordinate and strengthen disaster preparedness, risk evaluation, surveillance, disaster warning, and issuance of preliminary situation report, including coordination, cooperation, and aid provision in the event of any disaster occurring in the member countries. Moreover, the Center aims to facilitate cooperation and coordination between ASEAN countries and the United Nations and other inter-governmental organizations in governing the management of disasters and emergencies.

AADMER has the following targets:

- (1) Improve capacity for ASEAN countries with regards to early warning, including the monitoring, emergency response preparedness and disaster risk reduction by creating policy, working system, process, mechanism, institutional, and legal frameworks for regional and international advocacy;
- (2) Increase humanitarian aid and coordinate the emergency response to enable member states to respond to disasters in an effective, timely, and reliable manner through the implementation of a working mechanism and speedy resource mobilization;
- (3) Strengthen technical and institutional capacity for member states through the preparation of capacity-building projects and training on disaster management, disaster risk reduction, and emergency response through the exchange or sharing of knowledge, information, experience, and expertise to prepare for the disaster response and risk reduction;
- (4) Help member nations and promote cooperation in disaster risk reduction, including the adaptation to climate change in the region to ensure sustainable development;
- (5) Further promote close cooperation in the preparation, response, risk reduction, and disaster recovery with development partners, intergovernmental organizations, civil



society organizations, academic institutions, military organizations and the United Nations agencies;

- (6) Support a community-based approach to disaster management and raise awareness of disasters among ASEAN people to instil them in the culture of safety and adaptation.

AADMER was signed by member states of ASEAN on December 24, 2009.

CHAPTER III: Post-Disaster Flood and Post Drought Recovery

Post-flood and post-drought recovery is one of the most important tasks of the Government, particularly for relevant DMCs in collaboration with concerned sectors. The recovery process focuses on 1) repairing basic infrastructure, improving people's livelihoods, health, and physical assets, and addressing social, cultural and environmental impacts, while restoring economic activities within affected communities to normal or better based on the BBB principle; and 2) repair houses and medium and long-term basic infrastructure that is needed to support people's livelihoods, and reduce disaster risks in the future. However, before implementing any post-flood and post-drought recovery activity, DMC at all levels must comply with principles stipulated in Article 21 – 29 of the Law on Disaster Management (National Assembly, 2019).

3.1 Coordination and Emergency Needs Assessment

3.1.1 Coordinate with Concerned Authorities

- Coordinate with the Secretariat of relevant DMC;
- Coordinate with local authorities where the disaster occurred;
- Coordinate with relevant sectors and development partners;

3.1.2 Monitor Impacts, Damages and Emergency Needs

- Set up a team to monitor preliminary damages and emergency needs;
- Set a plan to visit the affected area and prepare proper vehicles;
- Conduct an emergency needs assessment to provide initial aid in terms of dried food, safe drinking water, accessibility to hygienic and health facilities, as well as temporary shelters;
- Prepare accommodations for disaster management officials who will conduct the post-disaster needs assessment;
- Provide information to the Government, and humanitarian organizations.



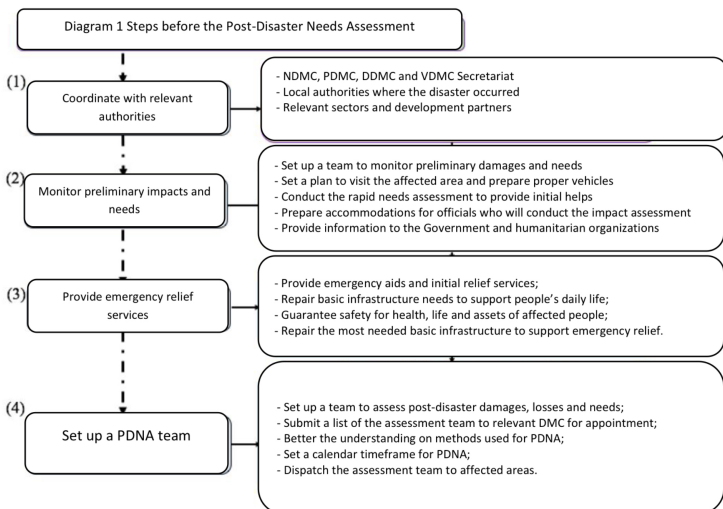
3.1.3 Emergency Aids and Initial Relief Services

- Provide emergency aids and initial relief services;
- Repair basic infrastructure needed to support people's daily life;
- Guarantee safety for health, life, and assets of affected people;
- Repair the most needed basic infrastructure to support emergency relief.

3.1.4 Team Setup for PDNA

After the coordination, the immediate establishment of the PDNA team is required to support the emergency response. The establishment of a team can be done as follows:

- Establish a team to assess post-disaster damages, losses, and needs;
- Submit a list of the assessment team to the relevant DMC for appointment;
- Improve the understanding of methodologies used for PDNA;
- Set a timeframe for PDNA;
- Dispatch the assessment team to affected areas.



After a PDNA team is established, the next steps are to 1) assess post-disaster needs; 2) conduct post-disaster recovery planning; 3) implement recovery activities; 4) conduct post-recovery monitoring.

3.2 Post-Disaster Need Assessment (PDNA)

3.2.1. Steps for PDNA

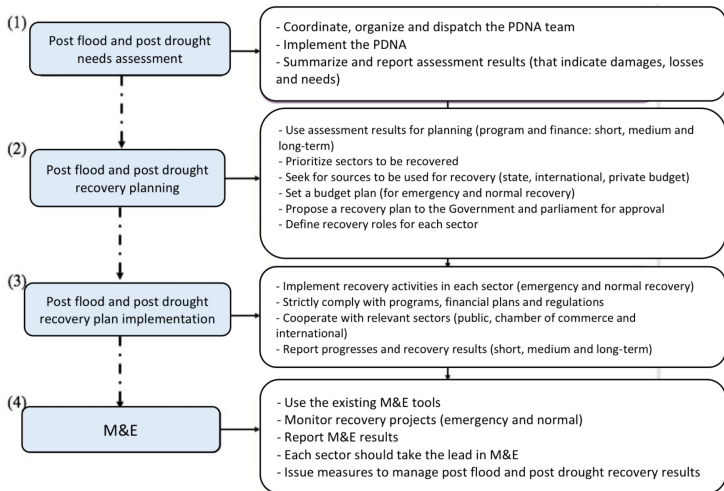
PDNA is the main responsibility of the Government, especially relevant DMCs, who must take the lead in assessing disaster needs. In general, the assessment should be done based on the PDNA Methodology⁸. The assessment focuses mainly on damages in terms of assets, economic opportunities, and human losses, as well as the needs of all victims. Vulnerable groups, such as women, disabled persons, and senior citizens must be given special consideration to mitigate inequality and social exclusion. PDNA consists of the following steps:

- Contact local authorities and concerned sectors within the affected area;
- Set a timeframe for collecting and processing data within 2–4 weeks;
- Dispatch an assessment team together with tools to the affected area for collecting initial data;
- Assess damages and losses caused by the disaster;
- Assess the needs of each sector that are necessary for conducting the recovery. However, the needs must be closely related to the particular disaster;
- Report assessment results that indicate damages, losses, and needs for disaster recovery (please refer to a reporting format shown in Annex A4).

⁸ PDNA is an internationally accepted methodology used to evaluate physical damages, economic losses and costs spent in responding to post-disaster recovery needs. It is a process performed and led by the Government of the affected country.



Diagram 2: Post Flood and Post Drought Recovery



3.2.2 Sectors to be Assessed

In general, there are 3 sectors to be subject to PDNA as follows:

1. Social Sector	2. Productive Sector	3. Infrastructure Sector
<ul style="list-style-type: none">- Residence and location- Health- Public health- Nutrition- Education- Culture	<ul style="list-style-type: none">- Fishery- Livestock- Irrigation- Processing industry- Trade and service- Tourism	<ul style="list-style-type: none">- Transport- Water and sanitation- Hygiene- Electricity (transformer, grid)- Land and water transportation- Telecommunication
Surrounded sectors or issues: Disaster risk reduction, livelihoods, governance, gender roles, protection of children, people with disability, senior citizens, and widows, employment, human development, environment, climate change, macro-economy, and individual and household income		

3.2.3 Report of Assessment Results

Report of assessment results must make use of quantitative data on the value of damaged physical assets (for instance: land, machine, building, vehicle, money...) and lost produces (for example, loss in businesses or economic and life opportunity) to assess financial needs required for recovery and redevelopment. The report should indicate the following points:

- Damages and losses of affected communities (avoid listing duplication);
- Measures for mitigating disaster impacts or risks in the future;
- Value of physical assets of the Government and private sector damaged by the disaster;
- Identify methods for cooperating with local authorities and different sectors in the recovery;
- Identify post-disaster recovery and redevelopment needs (for short, medium and long-term).

❖ Post-disaster short, medium and long-term recovery needs

- Short-term recovery needs during this period are usually centred on people's livelihoods and affected sectors, such as agriculture and industry that employ large workforces, poverty reduction, transportation;
- Medium-term recovery needs are mostly associated with basic infrastructure improvement (repairing of roads, bridges, and irrigation facilities and clearance of UXOs);
- Long-term recovery needs are usually a financial requirement for repairing houses, schools, roads, and irrigation, including the production of renewable agriculture, loan



supply, and support for activities that help increase income and improve living conditions;

- It is quite difficult to distinguish needs caused by floods from needs that have already existed in the health and nutrition sector. Nevertheless, recovery needs in these sectors can be divided into the following categories:
 - (1) 20–25% of the affected population are mal-nutritious, particularly children under 5 years of age and pregnant women;
 - (2) Lower than 40% of the affected population has access to a latrine that guarantees sanitation during the disaster affected situation and after that;
 - (3) There are many preventable diseases and health issues compared to lower treatment capacity. Health centres at different levels have insufficient human resources, medical personnel and equipment.

3.3 Post-Flood and Post-Drought Recovery Planning

After receiving results of damage, loss, and need assessment, what to do next is to apply such assessment results to recovery and redevelopment planning. The planning must indicate the following points:

- (1) Indicate which sector and place to be recovered or redeveloped;
- (2) Prioritize recovery projects (both emergency and normal projects);
- (3) Amount of funds needed for the recovery (both in kip and US dollar).

3.3.1 Emergency response planning

Emergency response planning can be done in the following steps:

- 1) NDM Secretariat summarizes and reports to the Chair of NDM;
- 2) The chair of NDM reports to the Government (PMO) to request for approved budgets to be spent on emergency relief, such as housing, food, clothes, daily necessities, and water and sanitation, including initial healthcare.
- 3) PMO reports to the Prime Minister to request for using the existing financial sources (Government reserves; emergency fund);
- 4) PMO studies financial sources before issuing a notice for allocating a certain portion of the budget to NDMC to be utilized in the recovery effort;
- 5) NDMC allocates the fund further to affected sectors by having PDMC manage the budget implementation;
- 6) Address impact upon good prices by utilizing measures under Article 474/GOV;



- 7) Emergency response to impacts upon national roads shall rely on the road fund while spending a specific budget of the Government on local road repair;
- 8) Damaged road and bridge recovery must be separated from the emergency and normal recovery.

3.3.2 Normal response planning

Normal response planning focuses on the following list: bridges, roads, schools, hospitals, health centres, budget sources, materials, and labour forces. Each sector must comply with the following:

- (1) Based on the results of the need assessment of affected communities;
- (2) Based on socio-economic policies and plans of the Government;
- (3) Consider the existing financial sources and capability of the country;
- (4) Prioritize needs for recovery or redevelopment and budgets to be used;
- (5) Define target population, sectors, and timeframe for the recovery (between 2 and 3 years);
- (6) Report to the Government and also notify the Ministry of Planning and Investment (MPI);
- (7) Every normal response project needs to be approved by the NDM Secretariat and MoLS;
- (8) MPI does the comparison between data provided by the relevant sector and the one provided by the affected province to propose such a normal response project for the parliament's approval;
- (9) Once the National Assembly approves, MPI will allocate the budget to the relevant sector and province;
- (10) MPI to follow up on the recovery project implementation together with relevant sectors and provinces;
- (11) Define the existing financial sources by reviewing the disaster management strategy or disaster risk reduction strategy, disaster insurance facility, state budget, annual budget, private financial sources, donations, and grant aids provided by development partners;
- (12) Propose the recovery plan to relevant public agencies to request approval and budget allocation (Article 32, Chapter 3 of the Law on Disaster Management (2019)).



3.3.3 Study the Existing Disaster Recovery Financial Sources

When floods or droughts occur, relevant DMC as stipulated by the Disaster Management Law must look through the existing budget sources to find out which source can be used. Below are current financial tools which can be utilized by the Lao Government:

- 1) Government reserves (Fiscal Department, Ministry of Finance);
- 2) State treasury (Fiscal Department, Ministry of Finance);
- 3) Social welfare fund (Social Welfare Department, Ministry of Labor and Social Welfare);
- 4) Road fund (Ministry of Public Works and Transport);
- 5) Provincial emergency fund (provincial authority);
- 6) South-East Asia Disaster Risk Insurance Facility (SEADRIF) that Lao PDR has been a member of since 2021;
- 7) Soft and long-term loans provided by international organizations;
- 8) Other financial tools mobilized from society, the private sector and international organizations;
- 9) Others.

3.4 Post-Flood and Post-Drought Recovery Implementation

Post-flood and post-drought recovery is another duty to be fulfilled by the Government and local authorities (particularly NDMC, PDMC, and DDMC) in the affected area. Recovery has the following processes: 1) implement the recovery plan adopted by the parliament (National Assembly or local council) in collaboration with all sectors and parties involved; 2) consider the possibility, necessity, and quality of disaster risk reduction in the future; 3) make use of an inclusive approach to promote community and social participation; and 4) comply with the Build Back Better (BBB) principle. Flood and drought recovery processes could vary depending on the severity, scope, and duration of the disaster.

3.4.1 Sectors to be Recovered

Recovery must cover the following 3 sectors:



➤ **Social Sector**

Recovery in this sector includes residence, settlement, education, health, nutrition, and culture. Human recovery is also associated with mental, social, and physical health, as well as individual, family, and community well-being.

➤ **Economic or Productive Sector**

Recovery in this sector focuses on losses in agriculture, industry, trade, service, employment opportunity, and ability to run local businesses and production, such as losses from plantations, livestock, fishery, trade, industry, and tourism.

➤ **Infrastructure Sector**

Recovery in this sector concentrates on basic infrastructure that is essential for production, services, and livelihoods, including water supply systems (pipes, underground, wells, gravity-fed systems), sanitation (drainage and wastewater treatment systems), roads, bridges, irrigations, buildings, embankments, airports, railways, and electricity system (electricity grid and transformer) that are lost and damaged by disasters.

➤ **Surrounded Sectors**

Recovery in these sectors includes disaster risk reduction, livelihood improvement, promotion of gender equality, governance, protection of children, people with disability, and senior citizens, employment, female migrant workers, human development, macro-economy, and individual and household income.



3.4.2 Post-Disaster Recovery Responsibility

Sectors responsible for the post-flood and post-drought recovery	Key recovery activities
1. Public works and transport sector, as well as its sub-divisions	<ul style="list-style-type: none"> ▪ Construct temporary shelters for victims ▪ Construct permanent housing for victims (in some cases) ▪ Improve damaged roads and bridges (local and national) ▪ Construct a drainage and wastewater treatment system in the area where temporary shelters are located ▪ Construct clay roads leading to the agricultural production area ▪ Water supply system (gravity-fed, underground, or pipe system) and sanitation ▪ Embankment, airport and railway ▪ Review contracts signed between project owners and construction contractors
2. Health sector and divisions, as well as its sub-divisions	<ul style="list-style-type: none"> ▪ Repair or reconstruct a health service centre ▪ Repair damaged medical equipment ▪ Install medical check-up facilities ▪ Keep track of risks associated with emerging diseases ▪ Improve awareness of villagers on hygiene and provide medical supplies ▪ Provide water purifiers to temporary shelters ▪ Dispatch mobile medical staff and distribute medicine for free
3. Labor and social welfare sector, as well as its sub-divisions	<ul style="list-style-type: none"> ▪ Relocate affected families to a safer area ▪ Provide food (rice) and money to affected families



	<ul style="list-style-type: none"> ▪ Provide additional materials for constructing shelters ▪ Protect children, people with disability, senior citizens, and the most vulnerable groups ▪ Mobilize funds and relief goods as approved by the Government ▪ Help misplaced victims to reunite with their families and communities ▪ Coordinate and manage post-flood and post-drought recovery activities; ▪ Find new jobs for victims on a case by case basis ▪ Guarantee employment for affected families within 45-60 days ▪ Survey and clear UXO in the recovered area
<p>4. Financial and banking sector, as well as its sub-divisions</p>	<ul style="list-style-type: none"> ▪ Implement a tax-custom policy associated with the disaster recovery ▪ Recover the local economy by focusing on the most vulnerable and marginalized groups ▪ Consider and disburse recovery budgets ▪ Provide low-interest loans to affected families ▪ Extend the debt or interest repayment period for affected families in a case by case basis (for debt made before disasters)
<p>5. Agriculture and forestry sector, as well as divisions under it</p>	<ul style="list-style-type: none"> ▪ Repair damaged irrigation ▪ Recover fishing sources ▪ Supply plant seedlings and animal breeds, fertilizer, insecticide, vaccine and veterinary equipment ▪ Clear or pioneer new pieces of agricultural land for victims



	<ul style="list-style-type: none"> ▪ Provide techniques and the necessary equipment to support the agricultural production
6. Energy and mining sector, as well as divisions under it	<ul style="list-style-type: none"> ▪ Repair electricity grids and install transformers ▪ Electrify temporary shelters
7. Education and sports sector, as well as divisions under it	<ul style="list-style-type: none"> ▪ Designate a temporary learning area ▪ Repair school buildings (in case they sustain partial damage) ▪ Reconstruct school buildings (in case they are destroyed completely) ▪ Provide and substitute damaged study equipment and materials ▪ Assist teachers who are affected and cannot help themselves ▪ Improve and restore the school environment
8. Information, culture and tourism sector	<ul style="list-style-type: none"> ▪ Help people access information in a timely manner ▪ Restore tangible and intangible cultural heritages ▪ Restore tourist sites
9. Natural resources and environment sector, as well as divisions under it	<ul style="list-style-type: none"> ▪ Monitor and recover the affected environment, such as wildlife and aquatic habitat, biodiversity, soil, water and air quality
10. Industry and commerce sector	<ul style="list-style-type: none"> ▪ Recover enterprises, factories and income generated businesses ▪ Processing industry and handicraft ▪ Promote SMEs ▪ Control good prices and import-export
11. Women's Union	<ul style="list-style-type: none"> ▪ Promote gender equality and address gender-based violence ▪ Child protection in collaboration with the labour and social welfare sector
12. Development partners in collaboration with local authorities/line ministries	<ul style="list-style-type: none"> ▪ Provide funding, construction materials, drinking water, food, water purifiers and water tanks ▪ Protect the rights of children and women together with Lao Women's



	Union, and the labour and social welfare sector
13. Private sector/companies	<ul style="list-style-type: none"> ▪ Construct roads (national, provincial, rural) ▪ Health, education basic infrastructure ▪ Temporary shelters ▪ Others measures based on applicable laws and international agreements

➤ **Recovery is divided into 3 phases, namely short, medium and long-term**

- Short-term recovery usually takes less than 6 months, with a focus on responding to immediate and emergency needs;
- Medium-term recovery usually takes between 6–18 months (or 0.5 to 1.5 years) centred on people’s livelihoods and affected sectors, such as agriculture and industry that employ a large number of staff members, poverty reduction, and transportation (road, bridge and irrigation repair).
- Long-term recovery usually takes between 18–36 months (or over 3 years but not exceeding 5 years). This phase of recovery mostly focuses on improving housing and basic infrastructure, namely houses, schools, roads, and irrigation, including the production of renewable agriculture, loan supply, and support for activities that help increase income and improve living conditions. A huge amount of investment is required here to help with repairing or rebuilding damaged infrastructure based on the BBB principle while ensuring their resilience to disasters in the future (please see Annex A3).

3.5 Monitoring and Evaluation (M&E)

Post-disaster M&E is another crucial element of public administration. M&E process will be conducted when the recovery completes in order to gather necessary data to report the successful project implementation. M&E covers various fields, such as procurement, financial management, contract management, and disaster recovery project. M&E has objectives to 1) inspect the effectiveness, efficiency, and sustainability of the disaster recovery project and 2) help the Government obtain basic information which can be used to improve the existing and future disaster management policies. Recovery is usually a responsibility of relevant DMC as elaborated in Chapter 3, Article 34 of the Law on Disaster Management 2019.



M&E can be carried out by agencies or public officials appointed by the Project Monitoring Unit (PMU). This unit has the following duties and responsibilities: 1) create effective indicators; 2) define directions and help relevant agencies in utilizing the monitoring system and selecting which tools to use; 3) collect monitoring reports submitted by local authorities; 4) create a database to accommodate program and project information while maintaining and regularly improving the system; 5) coordinate with relevant agencies on points of concerns about project implementation; 6) make a report to capture the project status in each period of time and submit it to the parliament and the Chair of NDMC as appropriate; 7) review status reports of main projects submitted by senior assessment units as deemed appropriate.

M&E measures adopted by the recovery project cover physical, environmental, social, and economic factors that are combined to help produce an accurate image of the recovery and redevelopment process, including the speed and quality of such disaster recovery effort. The measures must be monitored and evaluated by comparing key indicators with initial statistical data obtained through satellite photographs. Remote sensing survey is a highly vital tool for the Government and donors to develop a systematic framework to ensure accurate and comprehensive M&E. Satellite photography, which combines its survey elements to help collect M&E indicators, is used to track the progress of the disaster recovery project (please see Annex C3).

Physical data regarding academic and health institutions, including buildings, roads, electricity transmission lines, reservoirs, water tanks, livelihoods, and the natural environment can only be collected through ground survey because satellite photography is unable to collect data in such details, for example, of household damage. Field or ground survey can also record the details that remote sensing survey is unable to capture, e.g. the building use including small changes and repair works that took place. These changes can only be certified through photographing on the ground. Improving the existing monitoring and recovery tools, as well as auditing and construction contracts are very important for the M&E team.



Post-disaster recovery has the following steps:

- 1) Design M&E for the recovery;
- 2) Utilize the existing M&E tools to collect data;
- 3) Operate onsite data collection;
- 4) Analyze post-disaster recovery gaps;
- 5) Report evaluation results to the Government and donors;
- 6) Handover and define measures for managing recovery results;
- 7) Apply lessons learned to future recovery projects.

3.5.1 Design M&E for the recovery

- Define M&E methodologies;
- Define objectives, indicators, and data sources;
- Define the target population for M&E;
- Define methods for data analysis.

3.5.2 Utilize the existing M&E tools to collect data

- Questionnaire forms;
- Interview forms;
- Household survey forms;
- Ground survey forms;
- Remote sensing survey forms.

3.5.3 Operate onsite data collection

- Coordinate with local authorities and relevant sectors;
- Contact about 10–15 data providers from relevant sectors;
- Use a standard set of questions and record answers in writing;
- Set a budget plan and coordinate with accommodation service providers;
- Remotely examine the physical characteristics of the affected area by using a specially designed camera for the remote survey;
- Take aerial photographs.

3.5.4 Analyze post-disaster recovery gaps

- Analyze the collected data through existing tools;
- Analyze aerial photographs and remote data;



-
- Review high-resolution satellite photographs that were taken before the disaster;
 - Examine differences in photographs taken at different periods after the disaster.

3.5.5 Report evaluation results to the Government and donors

- Review data analysis results obtained from each sector;
- Prioritize the collected data;
- Draft a report on M&E results;
- Report the evaluation results to DMC before submitting them further to the Government and donors.

3.5.6 Hand over and define measures for managing recovery results

- Discuss with local authorities, Government and donors;
- Hand over the recovery projects to victims;
- Create regulations to help govern the utilization of recovery results;
- Apply the existing standards to public contract partners, construction contractors, and users.

3.5.7 Apply lessons learned in future recovery projects

- Reveal recovery results to the Government, donors, and the public;
- Apply knowledge and lessons learned to the policy improvement and future recovery projects;
- Propose technical measures that help mitigate community impacts in the future;
- Ensure relevance, effectiveness, efficiency and sustainability of the recover



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Annexes

Annex A1 Summary of Damage and Loss Values (Billion Kip and Million Dollars)

Sector	Value		
	Damage	Loss	Total (USD)
1. Social Sector			
- Residence and location			
- Public Health			
- Nutrition			
- Education			
- Culture			
2. Economic/Productive Sector			
- Fishery			
- Livestock			
- Irrigation			
- Industry – Handicraft			
- Commerce – Service			
- Tourism			
3. Infrastructure Sector			
- Transport			
- Water and sanitation			
- Electricity (transformer, grid)			
- Transportation (land and water)			
- Telecommunication			
4. Surrounded sectors: livelihoods, gender role, governance, child and disability protection, employment, human development, environment, macro-economy, and income (individual and household)			



Total in kip (billion)			
Total in USD (million)			

Annex A2 Damage and Loss (Billion Kip)

Sector	Damage			Loss		
	Public	Private	Total	Public	Private	Total
1. Social Sector						
- Residence and location						
- Public Health (hospital...)						
- Nutrition						
- Education (school)						
- Culture (temple...)						
2. Economic/Productive Sector						
- Fishery						
- Livestock						
- Irrigation						
- Industry						
- Commerce - Service						
- Tourism						
3. Infrastructure Sector						
- Transportation						
- Water and sanitation						
- Electricity (transformer, grid)						
- Transportation (land and water)						
- Telecommunication						
4. Surrounded sectors: livelihoods, gender inclusion, governance, child and disability protection, employment, human development, environment, macro-economy, and income (individual and household)						
Total in kip (billion)						
Total in USD (million)						



Annex A3 Short, Medium and Long-Term Recovery Needs

Sector	Short-Term	Medium-Term	Long-Term	Total Need (Kip)	Total Need (USD)
1. Social Sector					
- Residence and location	Build a temporary shelters	Survey to make sure that new temporary shelters are risk-free	Build permanent housing that is risk-free		
- Public Health					
- Nutrition					
- Education (school)					
- Culture					
2. Economic/Productive Sector					
- Fishery					
- Livestock					
- Irrigation					
- Industry					
- Commerce					
- Tourism					
3. Infrastructure Sector					
- Transport					
- Water and sanitation					
- Electricity (transformer, grid)					
- Transportation (land and water)					
- Telecommunication					
4. Surrounded sectors: livelihoods, gender Inclusion, governance, child and disability protection, employment, human development, environment, macro-economy, and income (individual and household)					
Total in kip (billion)					



Total in USD (million)					
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Annex B1 Evaluation Survey for Post Drought Damage, Loss and Recovery Needs

Sector	Damage	Loss	Recovery Need
3.1 Economic Sector			
3.1 Loss from Crop Production			
1) Loss from annual crops and standing timbers			
2) Damage to plantation quality			
3) Decreased arable soil quality			
4) Insects and plant diseases			
5) Plants destroyed by wildlife			
3.2 Loss from milk and livestock production			
1) Decreased field productivity			
2) Decrease in crop prices			
3) Production cost increases due to water shortage in livestock farming			
4) Production cost increases due to animal feed shortage in livestock farming			
5) Higher mortality rate of livestock			
6) Sudden stop of livestock breeding (unsuccessful breeding or pregnancy)			
7) Decreased livestock weights			
8) Increased predation			
3.3 Loss from timber production			
1) Wildland fires			
2) Tree disease			
3) Insect infestation			
4) Defective timber products			
3.4 Loss from fishery production			
1) Damage to fish habitats			



2) Loss of fingerlings due to decreased water level			
3) Loss of income for farmers and directly affected people			
4) Damage to farmers resulted from the bankruptcy			
5) Unemployment in the production sector due to drought			
6) Damage to industrial, recreational and tourist sites			
7) Damage to producers and providers of recreational equipment			
8) Increased energy demands against decreased supply due to drought			
9) Production cost of energy industries and consumers concerning renewable fuels that are more expensive than electricity or oil			
10) Damage to industries associated with agricultural production, such as fertilizer, etc.			
11) Decreased food production/supply			
12) Increase in food prices			



13) Increased food imports (increase in production cost)			
14) Sudden stop of water supply from its sources			
15) Decreased revenue for water suppliers			
16) Revenue shortfalls			
17) Drinking water and ice factories make good profits			
18) Pressure in financial institutes (property seizure, credit risks, financial shortfalls, etc.)			
19) Government loses revenue from decreased tax payments resulting from an issue of boat navigation along rivers, streams, etc.			
20) High cost due to difficulties in water transportation			
21) Cost of developing new water sources or expanding the existing ones			

3.2 Environmental Sector



1) Damage to animal species			
2) Decrease in aquatic lives and wildlife habitats			
3) Food and water shortage			
4) Increased risk of diseases			
5) Wildlife migration			
6) Increased pressure against nearly-extinct species			
7) Damage to plant species			
8) Increase in the number and severity of fires			
9) Loss of wetlands			



10) Disturbances to estuaries			
11) Increase in volume of underground water and risk of land subsidence			
12) Biodiversity loss			
13) Strong wind and riverbank erosion			
14) Decreased water level in reservoirs, streams and lakes			
15) Decreasing flow of piped water			
16) Impacts upon water quality. For example, an increase in salt concentration, dissolved oxygen and turbidity			
17) Impacts on air quality (pollution, dust)			



18) Quality of scenic and landscape view			
3.3 Social Impacts			
1) Mental and physical stress from anxiety, depression, insecurity and domestic violence			
2) Health problems associated with contamination or a higher concentration of toxic substances			
3) Decrease in the ability to put out fires			
4) Decreased nutrition due to higher food prices and stress			
5) More deaths from stress, warm climate and suicide			
6) Public safety from forest fires			
7) Increase in respiratory diseases			
8) Diseases emerged out of wildlife density			



9) Increased conflicts			
10) Conflicts between water users, water source managers and so on			
11) Sudden change in cultural beliefs (religious and scientific beliefs associated with natural disasters)			
12) Reduction or change in recreational activities			
13) Others			
1.1 Inequality from drought divided by economic and social groups: race, age and gender			
1) Loss of cultural sites			
2) Loss of aesthetic values			
3) Acceptance of institutional limitations associated with water use			
4) Lower life quality, change in livelihoods			



5) Poverty in general increases			
6) Increased urbanization			

Annex B2 Drought Field Survey

No.	Name	Relationship with head of the household	Male/Female	Age	Education	Occupation		Workplace in/outside the village	Annual Income	
						Primary	Secondary		Agriculture	Non-Agriculture
1										
2										
3										
4										

Annex B3 Checklist for Ownership and Use of Lands Affected by Drought

Land Category	Area in Hectares	Land No.	Types of Tree		NL
Total land owned					
(a) Cultivated land					
Irrigated land					
Unirrigated land					
(b) Construction land					
Grazing					
Barren					
Others					
(c) Land leased-in					
Irrigated land					



Unirrigated land					
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Annex B4 Damage and Loss Survey in the Industrial and Commercial Sector

Date of Interview (date/month/year)	1. Province
2. District	3. Village
4. House No./Road:	5. Company Name
6. ID Number	
7. Address: ----- -----	8. Contact Number (if available)
9. Type of Business -Factory - Productivity - Industry - Wholesale/Retail	

Annex AB1 Survey of the Residential Sector Affected by Flood

List	Type of Residence					Disaster Impact		
	A	B	C	D	E	Damage	Loss	Total
Estimation of damage								
a) Totally damaged houses								
	Number of houses							
	Average value of compensation							
	Approximate value of the damage							
b) Partially damaged houses								
	Number of houses							
	Average value of compensation							
	Approximate value of the damage							
c) Household goods								
Estimation of loss								



Duration for restoration or reconstruction									
Cost for house and waste demolition									
Cost for a temporary shelter project									

Annex AB2 Survey of the Educational Sector Affected by Flood

List	Type of School					Disaster Impact		
	A	B	C	D	E	Damage	Loss	Total
Estimation of damage								
a) Totally damaged schools								
	Number of houses							
	Average value of compensation							
	Approximate value of the damage							
b) Partially damaged schools								
	Number of houses							
	Average value of compensation							
	Approximate value of the damage							
c) Household goods								
d) Damaged furniture								
e) Study materials								
Estimation of loss								
Duration for restoration in a month(s)								
Cost for house and waste demolition								
Cost of repairing schools used as temporary shelters								
Schools leased temporarily								



Duration for restoration or reconstruction									
Cost for house and waste demolition									
Cost for a temporary shelter project									

Annex AB2 Survey of the Educational Sector Affected by Flood

List	Type of School					Disaster Impact		
	A	B	C	D	E	Damage	Loss	Total
Estimation of damage								
a) Totally damaged schools								
	Number of houses							
	Average value of compensation							
	Approximate value of the damage							
b) Partially damaged schools								
	Number of houses							
	Average value of compensation							
	Approximate value of the damage							
c) Household goods								
d) Damaged furniture								
e) Study materials								
Estimation of loss								
Duration for restoration in a month(s)								
Cost for house and waste demolition								
Cost of repairing schools used as temporary shelters								
Schools leased temporarily								



Overtime charges for teachers									
Accelerate teacher's training									
Loss of income for private schools									

Annex AB3 Survey of the Health Sector Affected by Flood

List		Affected Region				Disaster Impact	
		A	B	C	Damage	Loss	Total
Estimation of damage							
a) Totally damaged facilities							
	Hospitals						
	Health centres						
	Others						
b) Partially damaged facilities							
	Hospitals						
	Health centres						
	Others						
c) Equipment							
Furniture							
Damaged medicines and equipment							
Estimation of loss							
Duration for restoration (reconstruction) in month(s)							
Cost for house and waste demolition							
Cost for house and waste demolition							



Medical treatment charge increases									
Cost of transferring patients to another centre increases									
Revenue from patients decreases									
	Number of patients after floods								
	Difference								
	Treatment cost per one patient								
	Revenue loss								
Outbreak									
	Outbreak duration								
	Surveillance cost								
	Control cost								
	Prevention cost								
	Increased cost of controlling the outbreak								
		Diseases emerged from floods							
		Post-flood diseases							
		Increased sickness							
		Treatment charge per person							
		Total cost in approximate							
Estimation of needs (costs associated with the improvement and movement of structures to a safer area)									



Annex AB4 Survey of the Electricity Sector Affected Flood

List	Affected Region					Disaster Impact		
	A	B	C	D	E	Damage	Loss	Total
Estimation of damage								
a) Power plants								
	Hydro power plants							
	Thermal power plants							
	Others							
b) Transmission system								
	Transmission lines							
	Sub-stations							
	Approximate value of the damage							
c) Electricity grids								
Duration for restoration (redevelopment) in month(s)								

Annex AB5 Survey of the Water and Sanitation Sector Affected by Flood

Estimation of the affected assets		Area/Zone	Affected Asset	Recovery	Affected Region				
					A	B	C	D	E
Estimation of damage									
	Water								
		Urban area	Weight structure						
			Water plants						
			Transport system						
			Data storage system						



			Distribution networks											
			Water well											
			Others											
	Sanitation													
		Urban area												
			Waste water networks											
			Water treatment											
			Water treatment system											
			Solid waste collection/eradication system											
		Rural area												
			Latrines											
			Waste water treatment tank											
Duration for recovery (month)														
Duration for construction (month)														
Estimation of damage														
	Water													
		Urban area												
			Decreasing income											
								Making water clean						
								Water distribution						
		Rural area						Cleaning water well						



				Chemicals for treating water						
	Sanitation									
		Urban area								
			Decreasing income							
			Increasing spending							
				Cleaning for waste water treatment projects						
				Increase in cost of solid waste transportation						
		Rural area								

Annex AB6 Survey of the Transportation Sector Affected by Flood

List		Impact	Type of Basic Infrastructure		
			1	2	3
Estimation of damage					
a) Roads					
	Total length of roads (km)				
	Total length of affected roads (km)				
		Totally destroyed			
		Partially damaged			
b) Bridges					
	Total number of bridges				
		Totally destroyed			
		Partially damaged			
c) Vehicles (number and value)					



	Light vehicles				
	Buses and trucks				
	Heavy vehicles (heavy trucks)				
d) Other structures					
e) Railroads					
	Total length of railroads (km)				
	Total length of affected railroads (km)				
		Totally destroyed			
		Partially damaged			
	Railway Stations				
f) Rail bridges and construction projects					
g) Rolling stock					
	Locomotives				
	Passenger cars				
	Good transportation cars				
h) Airports					
	Runway				
	Lights and other systems				
i) Airplanes					
Estimation of loss					
Approximate duration for stopping the traffic, in a month(s)					
Approximate duration for quality recovery and traffic to slow down, in a month(s)					
Approximate duration for quality recovery and traffic to slow down, in a month(s)					



Number of vehicles in traffic per month						
	Light vehicles					
	Buses and trucks					
	Heavy vehicles (heavy trucks)					
Operation cost of vehicles in US\$/km						
	Light vehicles					
	Buses and trucks					
	Heavy vehicles (heavy trucks)					
a) Increasing transportation cost						
b) Revenue loss for enterprises						
	Land transportation					
	Railway transportation					
	Ports and airports					

Annex AB7 Survey of the Agricultural Sector Affected by Flood

Affected Asset		Seasonal or Annual Crop						Permanent Crop		
		A	B	C	D	E	F	X	Y	Z
Estimation of damage										
Destroying agricultural lands										
	Land surface/hectares									
	Value of land in \$/hectares									
	Total damage in \$									
b) Irrigation and drainage system										
c) Machines and equipment for										



agricultural production																			
d) Demolishing warehouses and other buildings																			
e) Roads leading to the production area																			
f) Value of the arable land																			
Estimation of damage/loss																			
a) Estimated produces (before disasters)																			
	Arable land in ha																		
	Expected produces in kg/ha																		
	Expected volume (ton)																		
b) Unit price before disasters, in \$/kg																			
	Price of a farm door, in \$/kg																		
	Wholesale price in \$/kg																		
	Retail price in \$/kg																		
c) Estimated produces (after disasters)																			
	Arable land in ha																		
	Expected produces in kg/ha																		
	Expected volume in ton																		
d) Loss of produces																			
	Loss volume (23-31) tons																		



	Farm price of the produces in \$/kg										
	Loss value (34*33) \$										
e) Increasing production cost											
	Land cultivation										
	Seedlings										
	Fertilizer										
	Insecticides										
	Labour wage										

Annex AB8 Survey of the Industrial Sector Affected by Flood

		Type of Enterprise					
		Industrial Processing	Micro	Small	Medium	Large	Total
Estimation of damage							
a) Buildings							
b) Machines and equipment							
c) Raw materials							
d) Others							
Duration for recovery/reconstruction in month(s)							
Duration when of machines and special equipment arrive							
Duration when there are no raw materials							
Duration when electricity, water and other utilities are not used							
Estimation of damage							
a) Basic information							
	Normal volume of						



	production per month						
	Product unit price in \$/kg						
	Normal production in \$/month						
b) Duration when production stops, month(s)							
	Due to the lack of production factors (electricity, water)						
	Due to the lack of raw materials						
	Due to the recovery duration						
c) Production loss							
d) Increasing production cost							
	Increasing production cost						
	Increasing operation costs due to production factors						



Other relevant estimations for needs estimation

Annex AB9 Survey of the Commercial Sector Affected by Flood

		Type of Enterprise				
		Retail	Small	Medium	Large	Total
Estimation of damage						
a) Buildings						
b) Furniture						
c) Product warehouses						
d) Others						
Duration for recovery or redevelopment, in a month(s)						
Duration when there are no products to sell						
Duration when there are no products to sell						
Duration until when services, such as electricity, water, etc., are available						
Estimation of damage						
a) Basic information						
	Regular sales volume per month					
	Product unit price in \$/kg					
	Regular sales in \$/month					
b) Duration for selling and for stop selling, in a month(s)						
	Lack of production factors (electricity, water)					
	Due to the shortage of goods supply					
	Due to recovery duration					



c) Loss from sales						
d) Temporary site leasing						
e) Increasing cost for acquiring products						

Annex AB10 Macro-Economic and Human Development Impacts caused by flood

Priority	Key Impact	Province			
		District		District	
		Village	Household	Village	Household
1	Unemployment and loss of income for daily workers, farmers and retailers				
2	Housing unsafe to live in due to the damages, including the loss of warm clothes				
3	Damage upon latrine making it unusable due to its subsided/erosive condition causing insanitation				
4	Food insecurity leads to a higher rate of malnutrition, particularly among vulnerable groups, and the situation will remain at least until the next harvesting season				
5	Crops suffer heavily and cannot be harvested due to initial inundation				
6	Damage to roads, bridges and water pipelines in the rural area that is having an impact on people's livelihoods, agriculture, market, health, education and safety				
7	How many water wells are inundated? How many per cent of the facility is contaminated with arsenic?				
8	Loss from livestock mortality, animal feed shortage (cattle, poultry)				
9	Scarcity in the agricultural area or the inability of poor farmers to access seedlings and young plants				
10	Damage to the fishery, particularly fish farmers who lose all of their invested money				
11	Damage to academic institutions: schools and colleges, as well as loss of study materials, resulted in the suspension of education (unable to open schools for study)				



12	Increase in urbanization. However, this is not an option for families headed by women				
13	Increase in diseases emerged from floods and damage to medical or household facilities				
14	Poor people are forced to make high-interest loans				
15	Inability to access health centres and lack of transport facilities in the area				
16	Many people are forced to stop working and leaving their own house to stay with relatives				
17	Damage to industries and economic activities leading to unemployment				
18	Unable to cook due to shortage of firewood or money to buy fuel				
19	Damage to the environment, particularly to crops and young plants				

Annex C1 Comparison between Remote Sensing Survey and Official Statistical Data

Number of Houses	Remote Sensing Survey	Official Statistical Data	Difference
Before disasters			
Damage assets			
Reconstruction			

Annex C2 M&E Indicators

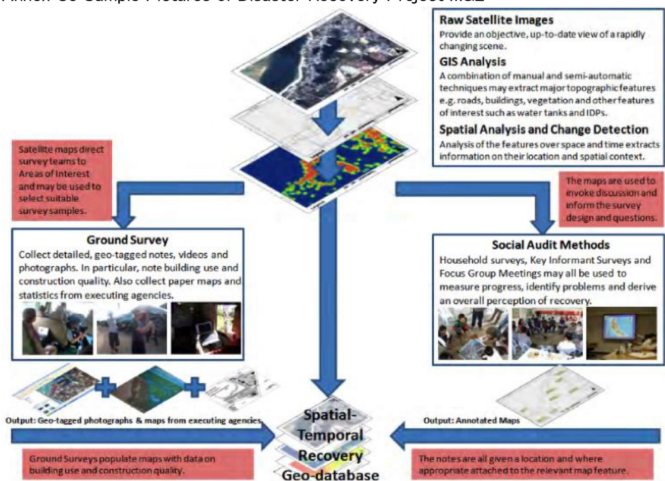
Indicators	Description
1. Road conditions	Examine transportation networks, identify damaged parts or damages and losses immediately occurred after disasters or at each period of time
2. Access to transportation and service networks	Examine changes in access to transportation networks in terms of travel time and the period when the networks were damaged or the relocation of villages and services. In addition, please identify households and businesses that are unable to access key facilities and services in a sufficient manner
3. Bridges and transportation system	Examine the construction of bridges and public transportation facilities
4. Vehicle existence	Examine the existence of vehicles and their traffic activities to consider whether they have been using roads and other related facilities or not?



5. Building demolition and construction	Follow up on the construction and demolition of damaged premises starting from when the premises still exist and disappear, all the way to the recovery process.
6. Changes in land use	Examine changes in urban planning and geographic characteristics of the region to find out the total volume of changes that happened in the area, as well as inspect the average size and shape of buildings.
7. Quality of residential restoration	Examine changes in size, shape, preparation, location and the environment of buildings, all the way to the natural and surrounding environment established. Elaborate duration and quality of the building construction, as well as the satisfaction of service users.
8. Temporary shelters	Set of indicators designed to identify temporary shelters and measure their longevity, basic infrastructure planning and environmental impacts
9. Population	Estimation of the population who will stay in temporary shelters based on the number of tents, shelters and buildings set up temporarily
10. Services and facilities	Elaborate on the status of services and facilities throughout all damaged regions
11. Public utilities: electricity, water and sanitation	Map features related to the provision of main public utilities, including electricity, water and sanitation
12. Lands and green areas	Identify areas where crops are increased and lost, for instance, wetlands and public open space
13. Livelihood recovery	Follow up on changes in major economic sectors in areas affected by disasters, namely agriculture, fishery and tourism

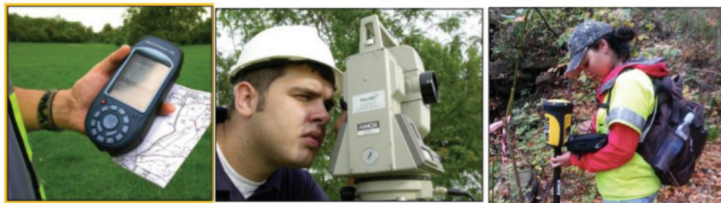


Annex C3 Sample Pictures of Disaster Recovery Project M&E



Source: Disaster Recovery Indicator, University of Cambridge, 2010 (First Edition)

Annex C4 Ground Survey and M&E Tools



Annex C5 Relevance

Relevance	Weight
1. Is the design of the recovery plan good?	25%
- Are needs and objectives properly defined?	
- Can the planned activities help achieve the identified d needs and objectives?	
- Are risks and hypotheses correctly defined?	
2. How well does the project adapt during its implementation period?	25%
Are recovery issues solved?	
Are conditions respected?	
Are conditions appropriate?	
3. How relevant are the following factors to the recovery plan?	50%
Are the targets and objectives of the project clearly defined?	



- Hypotheses	
- Activities	
- Outcomes	
Rate: A = Very Good; B = Good; C = Poor; D = Very Poor	
Summary	

Annex C6 Operation Efficiency

Efficiency	Weight
1. How were the outcomes the project?	20%
- Was the management going well each day?	
- Did the project complete on time?	
- Was the budget disbursed as per the plan?	
How were the activities of the project?	20%
- Was the management going well each day?	



- Did the project activities complete on time?	
- Was the budget disbursed as per the plan?	
3. Were the project objectives achieved as planned or not?	50%
- How has the quality of recovery been to date?	
- Has there been any project results delivered so far?	
- Did the recovery outcomes (based on the recovery framework) implemented?	
3. How much can the project adapt to changing needs?	10%
- If hypotheses turned out to be invalid, how well did the project adapt to the situation?	
How well did the project adapt to the external factors?	
Rate: A = Very Good; B = Good; C = Poor; D = Very Poor	



Summary (for record and feedback only)	
Is there a timeframe for implementing and disbursing total project budgets?	
Is there an internal auditing system in place?	
Suggested key operations shall be proceeded based on priorities.	

Annex C7 Impacts

Impacts	Weight
1. Are planned objectives likely to be achieved?	60%
- What is the level of overall recovery objectives?	
- How well does this project contribute to the achievement of overall objectives?	
2. In case of an unprecedented impact occurred on a wide area, such impact is (A) high positive; (B) positive; (C) negative; or (D) highly negative	10%
- With regards to overall objectives?	
- In general	
3. Adapting to the external factors	30%



- If hypotheses turned out to be invalid, how much did the project adapt/how will the project adapt in future?	
- How much could the project adapt to the external factors?	
- How much could the project coordinate with other relevant projects and donors?	
Rate: A = Very Good; B = Good; C = Poor; D = Very Poor	

Annex C8 Effectiveness

Effectiveness	Weight
1. Do the target beneficiaries benefit from the project?	70%
- Are all target beneficiaries benefit from this recovery effort?	
- How well did the communication with beneficiaries meet the targets?	
- Do all target beneficiaries have access to the project services?	
- How successful is the recovery program?	
- How do beneficiaries learn about their benefits?	
2. The work plan complies well with the project and overall objectives	10%
3. How much could the project be aligned with external factors?	20%
- If the recovery results are at a good level, how much could the project deliver the results to ensure that beneficiaries benefit from the project?	



- If there were any unexpected factors, how did the project adapt to such factors to ensure beneficiary satisfaction?	
Rate: A = Very Good; B = Good; C = Poor; D = Very Poor	
Summary	

Annex C9 Sustainability

Sustainability	Weight
1. How much policy support is provided and how much responsibility did the project management have?	16.7%
- What kind of policy support is provided at the national and international level together with the necessary budget?	
- How will the changes in policies and their priorities positively/negatively affect the project?	
- How much is the project supported by the public and private sectors?	
- Is there any condition that responds to long-term needs for support?	
2. How well does this project contribute to the capacity building?	16.7%
- How much is this project embedded in the local institutional structure?	
- How well does this project perform its technical, financial, and administrative operations?	



- Is there any coordination with the existing institutions? Can the recovery project continue its operation?	
3. How well does the project address socio-cultural and gender issues?	16.7%
- Does the project accurately align with the local needs?	
- How much do beneficiaries participate in the project?	
- Does the project acknowledge and address gender issues?	
- Does the project respect the local traditions? In case of any changes in the future, will the project still be welcomed?	
- How good is the interaction between the project management and recovery beneficiaries?	
4. How well does technology respond to the existing culture and knowledge?	16.7%
- What is the level of knowledge and adaptation? How much can it contribute to the local skill development?	
- Does the recovery help improve the living conditions of beneficiaries?	
- How much does the resource recovery benefit local communities?	
5. Are environmental issues considered?	16.7%
- Do stakeholders and beneficiaries take the environment into their consideration?	



- Has there been any environmental damage? Is any damage likely to be caused by the project?	
- Does the project respect the environmental needs?	
- Does the project address environmental accountabilities?	
- How well does the project respect traditional approaches to environmental protection that have been successfully practised?	
6. Financial/economic stability	16.7%
- Can the benefits sustain after economic changes in terms of the exchange rate and consumer prices?	
- Will there be institutional funds to support financial/economic research if required?	
- Will the service charge increase for beneficiaries after the completion of the project?	
- Does the person/institution in charge take their financial responsibility into account?	
Rate: A = Very Good; B = Good; C = Poor; D = Very Poor	
Summary	



