



**REGIONAL SCOPING WORKSHOP ON LOSS AND DAMAGE  
UNDER THE SANTIAGO NETWORK**

**SUMMARY REPORT OF ASIA PACIFIC REGION**

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## I. INTRODUCTION AND BACKGROUND

### A. MANDATE

Decision 2/CMA.2, para 43 established, as part of the Warsaw International Mechanism, the Santiago network for averting, minimizing and addressing loss and damage associated with the adverse effects of climate change to catalyse the technical assistance of relevant organizations, bodies, networks and experts for the implementation of relevant approaches at the local, national and regional level in developing countries that are particularly vulnerable to the adverse effects of climate change.

Decision 19/CMA.3, para 9 decided that the Santiago network is to have the following functions:

(a) Contributing to the effective implementation of the functions of the Warsaw International Mechanism, in line with the provisions in paragraph 7 of decision 2/CP.19 and Article 8 of the Paris Agreement, by catalysing the technical assistance of organizations, bodies, networks and experts;

(b) Catalysing demand-driven technical assistance including of relevant organizations, bodies, networks and experts, for the implementation of relevant approaches to averting, minimizing and addressing loss and damage in developing countries that are particularly vulnerable to the adverse effects of climate change by assisting in:

(i) Identifying, prioritizing and communicating technical assistance needs and priorities;

(ii) Identifying types of relevant technical assistance;

(iii) Actively connecting those seeking technical assistance with best suited organizations, bodies, networks and experts;

(iv) Accessing technical assistance available including from such organizations, bodies, networks and experts;

(c) Facilitating the consideration of a wide range of topics relevant to averting, minimizing and addressing loss and damage approaches, including but not limited to: current and future impacts, priorities, and actions related to averting, minimizing, and addressing loss and damage pursuant to decisions 3/CP.18 and 2/CP.19; the areas referred to in Article 8, paragraph 4 of the Paris Agreement; and the strategic workstreams of the five-year rolling workplan of the Executive Committee;

(d) Facilitating and catalysing collaboration, coordination, coherence and synergies to accelerate action by organizations, bodies, networks and experts, across communities of practice, including through their delivery of effective and efficient technical assistance to developing countries;

(e) Facilitating the development, provision and dissemination of, and access to, knowledge and information on averting, minimizing and addressing loss and damage, including comprehensive risk management approaches, at the regional, national and local level;

(f) Facilitating – through catalysing technical assistance of organizations, bodies, networks and experts – access to action and support (finance, technology and capacity building) under and outside the Convention and the Paris Agreement, relevant to averting, minimising and addressing loss and damage associated with the adverse effects of climate change, including urgent and timely responses to the impacts of climate change. Additionally, 12/CMA.4, para 15 requested the secretariat to continue providing support for developing countries that are particularly vulnerable to the adverse effects of climate change that may seek or wish to benefit from the technical assistance available from organizations, bodies, networks and experts under the Santiago network, until the Santiago network secretariat is operational.<sup>1</sup>

## B. WORKSHOP OBJECTIVES

Pursuant to the decisions, the UNFCCC secretariat brought together relevant focal points from countries in the Latin America and Caribbean, Africa and Asia Pacific regions with expertise and direct involvement in dealing with the most pressing climatological hazards of the countries.

The overall objective of the regional scoping workshops was to assist countries in articulating their needs for technical assistance for averting, minimizing and addressing loss and damage associated with climate change impacts in the context of the Santiago network.



*Figure 1: Workshop participants in the Asia Pacific region*

The workshop engaged countries in identifying and synthesizing information and insights on their experience in addressing major impacts of climate change, in particular major

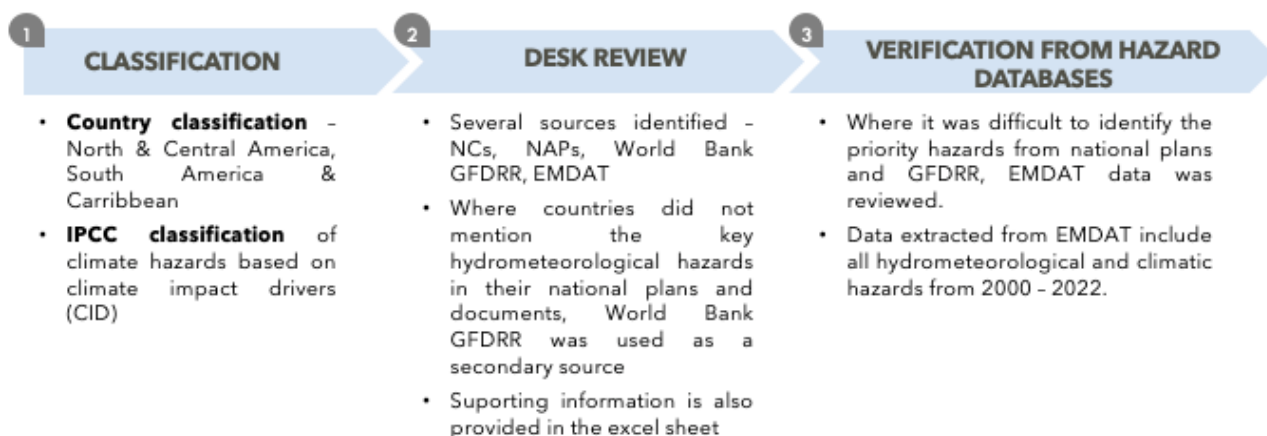
<sup>1</sup> [https://unfccc.int/sites/default/files/resource/cma2022\\_10a03\\_adv.pdf](https://unfccc.int/sites/default/files/resource/cma2022_10a03_adv.pdf)

losses and damages resulting from hydro-meteorological hazards and extremes, as well as specific needs for technical assistance at different stages of responding to and addressing the losses and damages. The outputs from the workshops will be used to better define and scope typical technical assistance needs of developing countries in the context of the Santiago network.

## 2. WORKSHOP MODALITY

### A. PRE-WORKSHOP PREPARATION

To identify the most pressing climatological hazards in the countries, an initial desk review was conducted to analyze the hazards that countries reported in their National Communications to the UNFCCC (NCs) and the disasters noted in the EM-DAT database. The following methodology was used:



The desk review indicated that floods and cyclones are the most prominent rapid-onset hazards across the continent. Sea level rise and glacial retreat were the most prominent slow-onset hazards.

Countries in South Asia experienced floods and landslides more frequently than other hazards. **Bangladesh** experiences extreme rainfall variability, cyclones, and sea level rise, among other hazards. Floods, cyclones and wind storms have led to extensive casualties and damages, running into billions of United States dollars in the country. **India** is prone to multiple hazards, with floods and droughts being particularly prevalent. Flooding affects 30per cent of districts annually, and drought conditions impacted several states in 2019. Cyclones such as Amphan in 2020 caused substantial damage, and heatwaves are a growing concern. **Nepal** faces substantial loss from climate hazards like floods, landslides and forest fires. On average, the country loses 647 lives (most people die from lightning strikes) and incurs losses of over NPR 2,779 million each year due to climate-induced disasters. **Pakistan's** recent devastating floods, like the one in 2022, exemplify the severe impact of climate change, with significant casualties and billions of dollars in economic losses. **Sri Lanka's** changing rainfall patterns, increased frequency of extreme weather events and rising sea levels pose significant risks to the country's

economy and infrastructure. Unlike other countries in South Asia, **Afghanistan** is significantly affected by droughts, along with cold waves and floods.

Southeast Asian countries face a mix of hazards. **Cambodia** has faced severe floods, including the 2011 and 2013 events that caused extensive loss of life and damages amounting to hundreds of millions of United States dollars. Typhoon Ketsana in 2009 was another significant event, leading to substantial economic and infrastructural damage. **Myanmar** suffered greatly from Cyclone Nargis, and other events like floods and landslides continue to threaten the people.

In east and northeast Asia, countries face a variety of hazards including heatwaves, floods, cyclones and drought. The 2020 heatwave and drought in the Yangtze River basin in **China**, as well as the significant threat of sea level rise to coastal cities, are notable in the region. **Japan** is affected by seasonal rain fronts and typhoons, with the southern part of the country receiving notably higher precipitation.

In North and Central Asia, **Armenia, Azerbaijan and Georgia** experience flash floods. Some countries, like **Kyrgyzstan**, are impacted by mudflows and floods, often triggered by heavy rains and snowmelt.

Considering these findings from the desktop research, the workshop was conducted to gather detailed inputs from the countries on these rapid and slow onset hazards.

## B. CONDUCT OF THE WORKSHOP

The regional scoping workshop sessions were organized into rounds of breakout groups, with participants from each country grouped according to the most pressing slow and rapid onset hydro-metrological hazards and extremes in their respective countries (participants were given the opportunity to self-select).

Interactive sessions were held to gather information about the impacts of climatic hazards and how countries respond to these hazards over time. This included short, medium and long-term stages of evolution of support through a country-specific mapping exercise followed by collaborative dialogue including countries and relevant agency stakeholders.

Participants were provided with a guided template (see Annex) to gather detailed, descriptive and sequential accounts of post-impact response actions, focusing on:

- Loss and damage resulting from specific hazard and extreme events (e.g. drought, tropical cyclone);
- Broad phases of response (e.g. anticipatory arrangements, response, recovery, and other phases and sub-phases);
- Gaps in response actions and capacity;
- Technical assistance needs for averting, minimizing and addressing loss and damage.

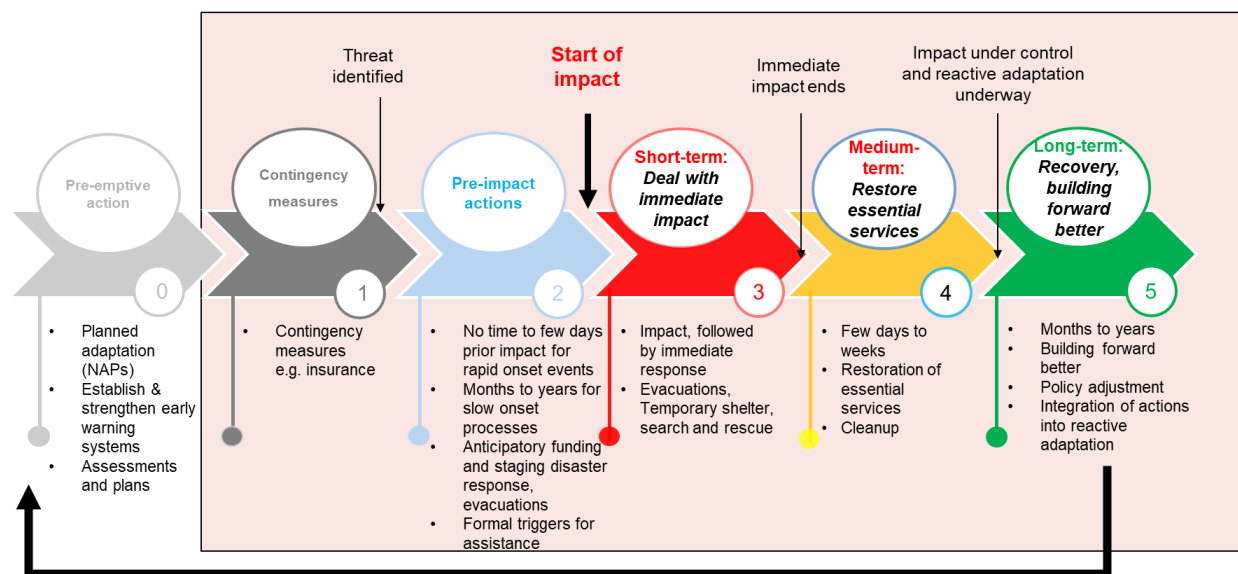


Figure 2: Diagram used to guide the workshop participants on the spectrum of actions in responding to time-bound climate impacts

Over the three-day period of the workshops, country participants provided their respective inputs. The first day focused on **rapid onset events** and the second day on **slow onset events**.

During the sessions, participants discussed a range of hazards – floods, drought, tropical cyclones, sea level rise, increasing temperatures, desertification, landslides, sandstorms, land and forest degradation, and salinization, each presenting unique challenges and requiring tailored responses.

During and after the workshop, participants were also invited to share their reflections from the sessions. The final reflections from the sessions underscored the need for technical assistance, the development of long-term forecasting models for climate impacts and the necessity of accessible funding mechanisms to support emergency responses. The discussions also highlighted the importance of innovative approaches, such as focus-based mechanisms for disaster response, the integration of insurance solutions for loss and damage, and the need for coordinated responses across different levels of government and sectors to effectively manage and mitigate the impacts of climate change in the Asia Pacific.





Figure 3: Breakout group engagement during the workshop

## C. POST-WORKSHOP

Following the workshop, UNFCCC secretariat conducted a preliminary analysis of the collected data, integrating insights and feedback from participants. This included a synthesis of varied experiences and challenges faced by countries in the Asia Pacific regions in responding to the climatological hazards.

The UNFCCC team conducted a thorough initial synthesis of the findings, focusing on the patterns, commonalities, and unique challenges identified in the participant inputs. This synthesis aimed to encapsulate the diverse climatic impacts and response strategies discussed during the workshop.

The synthesized data, along with identified technical needs and gaps, were then circulated among the participating countries for validation and verification. This step ensured accuracy and inclusivity, allowing for corrections and additional insights from the countries directly affected by the hazards.

Given the long duration of slow onset events (SOEs), there were some complexities in analyzing the anticipatory, response, and recovery measures. It was difficult to categorize actions and interventions with the usual disaster risk management framework due to the SOEs' prolonged and often indistinct progression, which typically unfolds as a single, extended phase rather than distinct stages.

Hence, the interventions for SOEs have been categorized into scoping and assessment phase, planning and preparation phase, adaptation action phase and monitoring and evaluation phase.

UNFCCC is continuously working to refine the understanding of the action phases and the corresponding technical assistance requirements for each country.

## 3. SUMMARY OF DISCUSSIONS

### A. FLOODS

*Summary of Bhutan, Malaysia, Cambodia, Iran, Lao PDR, Kazakhstan and Iraq*

#### Context

Many APAC countries have riverine floods as a major hazard in their countries. But relatively fewer lives are lost to this owing to timely evacuation and effective preparedness and response plans, pre-identification of temporary shelters, etc.

In a recent flood event in the Turkestan region of Kazakhstan, a heavy downpour and snowmelt from the mountains caused rivers to swell and overrun their slopes. The inundation affected several cities and districts, resulting in the flooding of more than 200 houses and disruption of regional highways.

In 2016, Bhutan faced a severe riverine flood event, triggered by incessant rainfall that especially devastated the southern part of the country. Sarpang district bore the brunt of this calamity, with Sarpang town swept away entirely by the adjacent river, which burst its banks. A total of 63 households, encompassing 218 individuals, were affected. Remarkably, due to efficient evacuation procedures and the strategic pre-identification of shelters, no lives were lost.

Malaysia's flooding in December 2021 displaced over 40,000 people and led to financial losses of USD 1 million. The Klang district recorded an unprecedented 316 mm of rainfall in 24 hours, submerging urban areas under four meters of water.

In Laos, a devastating flash flood event attributed to deforestation and poor preparedness resulted in submersion of houses and significant loss of life and property. The failure of critical services such as electricity, transportation and public services exacerbated the situation. Despite prior flood warnings, the severity of the impact was largely underestimated.

### **Anticipatory arrangements**

A flood event is usually declared 4-7 days ahead.

Countries have noted several measures for anticipatory action such as:

**Awareness and education:** There has been a concerted effort to raise awareness and educate the public about disaster risk management through programmes.

**Institutional frameworks:** The establishment of disaster management committees and incident management teams has been a critical step in organizing and coordinating flood response efforts.

**Capacity building programmes:** A series of capacity building initiatives have been introduced, focusing on the development of disaster management and contingency plans. Additionally, the formation and training of Search and Rescue (SAR) teams and Rapid Response Teams (RRT) have been prioritized. These teams are equipped with basic SAR equipment, enhancing their readiness to respond to crises.

**Other preparedness measures:** Maintenance of water level measuring instruments and the preparation of emergency plans are part of long-term strategies to mitigate flood impacts. A practical step in these preparations taken in some countries (e.g. Thailand) includes the distribution and placement of sandbags.

**Evacuation drills:** In some countries, safe evacuation sites and areas are identified so that populations at risk have a known destination in the event of flooding.

**Closer to the event, the following measures are taken:**

**Early Warning:** Countries have noted the use of early warning systems to alert people. The implementation of advanced hydrometeorological services has enabled the prediction of flash floods 72 hours prior to their occurrence. However, challenges remain in rural areas where early warning messages may not be received and local experience is often relied on for flood prediction.

**Pre-event planning:** Before potential flooding events, meetings involving the government sector, stakeholders, and the private sector are convened to plan and prepare necessary equipment, vehicles and personnel to aid in flood response. This includes facilitating the safe movement of people to designated safe places.

**Shelter management:** During an emergency, shelters are organized to evacuate and protect people in some countries. Organizations such as the Cambodian Red Cross are instrumental in stocking food and medicines. NGOs and the private sector are kept informed and involved in the response efforts. But the absence of evacuation centres across countries is a significant gap in these countries, indicating a need for investment and development in this area.

In later stages, the rescue departments, civil defense forces and other local government agencies conduct evacuations and prepare for relief assistance.

## Response

The overall duration of the flood event is from 2 days to 14 days. The effects last for about 6 months.

### *Triggers:*

Response to disasters is structured and tiered, activated according to the scale and capacity to cope. In Bhutan, for instance, the response mechanism is dictated by the disaster type. Type I disasters are small scale, and if the community or local government has the capacity to manage, the response is initiated at the local government level.

In some countries, the Department of Meteorology and Hydrology, alongside the Ministry of Natural Resources and Environment, is responsible for declaring events or incidents to relevant government agencies and the private sector at both national and provincial levels. Following such a declaration, the provincial authorities would then notify district and local communities.

As the water level rises beyond the threshold, an emergency is declared to mobilize the necessary response and resources for the affected areas.

### *Response measures:*

The initial phase of response lasts for about 14 days. Initial response measures include:

- Deployment of Search and Rescue (SAR) teams equipped with both basic and advanced SAR gear.
- Provision of medical aid, including first-aid.

- Evacuation of affected families and individuals to predetermined safe sites, such as a vegetable market shed.
- Establishment of temporary shelters for immediate housing needs.
- Technical experts visits to provide coordination with provincial officers for data entry regarding the flood situation and response at the provincial level.
- Coordination and dissemination of disaster response data and rescue intervention activities through public and private media.

The second phase of response includes:

- Distribution of immediate relief materials such as tarpaulin sheets, family kits and meals.
- Provision of logistical support including retrieval of property and transportation.
- Setup of WASH facilities to maintain health and hygiene standards.
- Government preparation of safe areas for rescue and relief operations during flooding events, including stockpiling necessary medicines.
- Provision of permanent shelters to house people temporarily displaced by flooding.

The second phase of response lasts from about 10 days to 2 months.

## Recovery

Recovery takes about 3 months to 5 years and is triggered when basic utilities services like electricity, telecommunications and road connectivity are restored, indicating the beginning of a return to normal life.

First phase of recovery includes:

- Implementation of comprehensive damage assessments to inform recovery and reconstruction plans, including evaluation of the impact on housing, infrastructure and agriculture.
- Prioritization of recovery efforts for schools and hospitals for quick recovery
- Pumping out water and cleaning households in flooded areas.
- Provision of emergency rice seeds to residents to restore damaged crops in time for the upcoming harvesting season.
- **Rebuilding Efforts:**
  - Reconstruction of homes and provision of livelihood opportunities to support economic recovery.
  - Rebuilding of infrastructure and public amenities, with an emphasis on "Build Back Better" principles to enhance resilience.
  - Development of comprehensive recovery and reconstruction plans that incorporate disaster risk reduction and resilience.
- Offering of financial support to affected household owners.
- Review and amendment of Action Plan for Disaster Risk Reduction (DRR) to reflect lessons learned.

The second phase of recovery, which lasts from 3-8 years, includes identifying land for permanent resettlement and offers compensation and loans for rebuilding efforts. Capacity building, particularly among the youth and on enhancing DRR strategies, is emphasized, ensuring economic recovery and increased resilience to future disasters.

## Support, gaps and needs

### Gaps

- Limited government budget and lack of a dedicated disaster fund.
- Insufficient database and early warning systems, particularly in rural areas, leading to delayed access to information for local communities.
- Lack of risk mapping and vulnerability zone assessment at the province and district levels.
- Inadequate capacity building for provincial and district national prevention and control committees.

### Needs

- Enhancement of governance structures and mechanisms to effectively manage and reduce disaster risks.
- Allocation of resources towards measures that build resilience and mitigate the impact of disasters.
- Technical Support for Vulnerability Assessment and Risk Mapping.
- Investment in the development and implementation of robust systems, tools and technologies to support monitoring, forecasting, analysis, early warning and preparedness for natural hazards.

## B. DROUGHT

*Summary of Kribati, Micronesia, Nauru, Sri Lanka and State of Palestine*

### Context

Severe drought conditions in Asia Pacific countries have resulted in substantial socio-economic implications, including water scarcity, degradation of soil quality, disruption of food supply, and strain on local economies due to expensive water procurement methods.

These drought conditions have occurred cyclically, but recent trends indicate more frequent and intense occurrences, with some regions witnessing annual droughts. In some instances, extreme weather shifts from harsh droughts to sudden flash floods, providing little time for recovery.

Various strategies have been employed to address these droughts, including reverse osmosis water supply systems, water distribution initiatives and, in some instances, alterations to agricultural practices. But, these measures often fall short during periods of acute water stress.

### Anticipatory arrangements

Some countries in the Asia Pacific provided a detailed account of their anticipatory arrangements for drought, which includes a tiered alert system to facilitate preparedness and response. They noted that they have alert levels 1-3. During the first two alert levels, the drought committee collects data on impacts in various sectors, to initiate public

awareness campaigns on water conservation. Alert Level 1 denotes a watch phase triggered when a 3-month index falls below the 40th percentile, while Alert Level 2 indicates a warning phase when a 12-month index dips below the 25th percentile.

If the situation escalates to Alert Level 3, severe attention is given to resource mobilization. At this stage, reviews of water resources and early action activities are prioritized, and the drought management plan is reassessed and updated as necessary.

Anticipatory arrangements (before the declaration of drought) mentioned by countries include the setting up of an up-to-date asset register on water-related assets and surveys to determine access to clean drinking water. Additionally, data sharing agreements are established.

An Emergency Operations Centre is put on standby, with increased water salinity monitoring on a monthly basis. For e.g. the Federated States of Micronesia (FSM) weather stations monitor day-to-day conditions, and the FSM President may issue declarations ahead of expected events.

In some countries, although clear thresholds have not been established, the government starts with awareness campaigns and water conservation alerts. During prolonged dry spells, affected districts receive supplied drinking water, and early warning systems are in place for agricultural drought monitoring.

Below is a detailed account of actions provided by one of the countries on each phase of its anticipatory arrangements for drought:

### **Phase 1: Monitoring and awareness**

- When rainfall levels drop below 40 per cent over three months, Alert Level 1 is declared, prompting data validation, enhanced monitoring, reporting, coordination, and public awareness campaigns.
- Actions include quarterly monitoring of water reserves, monthly monitoring of gallery salinity, and daily checks of trunk salinity. The provision of daily pumping rates allow for rainfall assessments on a 12-month index.
- If a 12-month rainfall index falls below 25 per cent, Alert Level 2 is triggered. If the index remains under 25 per cent or water salinity falls below 1000 microsiemens per cm, Alert Level 3 is activated.
- Local authorities respond by installing water purification plants and tanks, and distributing drinking water in six provinces.

### **Phase 2: Collaboration and assessment**

- Regular meetings with development partners are held for updates. Contributions such as water storage cans from agencies and the increased use of desalination plants are noted.
- Fresh groundwater is made available by the public utilities board at specified costs, and needs and vulnerability assessments are conducted to identify water support requirements.

### **Phase 3: Water supply and conservation efforts**

- The government commences the distribution of water by ship, especially to outer islands, focusing on potable water.
- Community awareness programmes on water conservation are intensified through collaborations with Island and District Councils and NGOs.

## Response

In response to drought, a phased approach is activated over several months. Initially, relief items are distributed, and reviews are conducted to glean lessons for future events. Clean water is supplied by governments, with community outreach programmes teaching water treatment methods such as boiling or using bleach. Additionally, water management is improved through conservation efforts and restricted non-essential usage.

At the onset of severe drought (Alert Level 3), international support is solicited, with triggers including water salinity, scarcity, agricultural damage and health issues. The National Drought Committee intensifies its meetings, shifting leadership to coordinate broad-based response efforts. Localized actions include rapid assessments to confirm needs, government distribution of water to critical areas, and international partnerships to bolster humanitarian assistance.

For longer-term response (lasting up to a year), strategies involve increasing water storage, enhancing rainwater harvesting, providing insurance for farmers and ensuring the availability of drinking water. Awareness campaigns on water conservation are intensified, and development partners work on projects like WASH in schools and communities. The Nauru Utilities Corporation faces challenges in meeting water demands, prompting the government to assist farmers with alternative crops and conduct vulnerability assessments for strategic support.

The response transitions as technical advisors signal improvements in rainfall indices and water salinity levels, gradually reducing the alert status while continuing to engage with international and national entities to plan future community aid.

## Recovery

During the recovery phase after a drought, countries focus on continued implementation and monitoring of drought response actions across various government sectors. This process is gradual due to the extended time frames required for intervention. Evaluations are conducted with communities to assess the effectiveness and reach of support, especially focusing on the initial recipients and vulnerable communities.

Community plans are revised to reflect any changes, and the drought management response matrix for earlier alert levels is updated to reinforce early warning systems and proactive action.



Throughout periods of "normal rainfall," risks are assessed and addressed to ensure that mitigation strategies are effective and that communities are better prepared for future droughts.

## Support, gaps and needs

### Gaps

- International response is forthcoming but not applicable and not in direct response to countries' immediate requests.

### Needs

- Support for access to technology and mapping.
- Equipment to support government with water quality testing to ensure it is safe.
- Technical support to conduct post-drought (disaster) needs assessment from economic, social and environmental perspectives (using baseline data) to identify damage and loss.
- Develop report and recommendations from findings of economic, social and environmental impact of the drought and determine the best way to integrate into appropriate plans, where possible.
- Need for sustained funding to maintain community awareness throughout the duration of the drought.

## C. TROPICAL CYCLONES

*Summary of Samoa, Fiji, Indonesia, Maldives, Solomon Islands, Philippines and Bangladesh*

### Context

Tropical cyclones in the Asia Pacific region are a significant and recurring threat to many countries, often resulting in substantial loss of life, widespread destruction to infrastructure, and profound economic impacts. Several examples of the cyclones in the region that caused substantive loss and damage are below:

The 2012 Tropical Cyclone Evan, which hit Samoa shows the region's susceptibility to cyclones. With wind speeds exceeding 185 km per hour, the cyclone claimed lives, displaced thousands, and inflicted damage on critical infrastructure equivalent to 30 per cent of Samoa's GDP.

In February 2016, Tropical Cyclone Winston in Fiji marked the first Category 5 cyclone to directly impact the country. This affected entire communities, with a substantial proportion of the nation's population affected and a significant toll exacted on housing and agriculture. Likewise, the severe impacts of Cyclone Seroja in East Nusa Tenggara, Indonesia, triggered floods and landslides.

Typhoon Odette made a series of landfalls in the Philippines in 2021, across several islands including Siargao and Southern Leyte, causing widespread destruction. In May 2020, Super Cyclonic Storm Amphan affected Eastern India and Bangladesh, particularly impacting West Bengal.

### **Anticipatory arrangements**

In anticipation of the cyclone, the countries have noted several proactive measures and frameworks to mitigate the risk and prepare communities. Key financial strategies include investments in parametric insurance and the establishment of disaster risk financing instruments, particularly for countries like Samoa. Governments also allocate funding from national budgets to support comprehensive disaster management initiatives, including risk awareness, planning, prevention and efficient response actions.

The countries also highlighted having adaptive social protection frameworks, establishing Disaster Management Plans, and ensuring that emergency operation centers are activated well before a cyclone makes landfall. These centers, along with designated evacuation sites, stand ready to shelter those displaced by storms. Information dissemination is crucial and hence effort is put into improving public messaging through regular drills and communication exercises through various channels - SMS, radio and TV.

Meteorological services in most of the countries maintain vigilant weather monitoring, issuing forecasts and alerts based on current and historical weather data. A cyclone event gets declared 7-10 days ahead.

Once the event is declared, in the first stage, countries prioritize regular briefings and information dissemination. There are also adjustments to planning and contingency protocols are made in real-time based on evolving forecasts and potential needs, including the identification of evacuation sites and necessary supplies such as water, food and medical equipment.

In instances like Fiji's state of natural disaster declaration in 2016, the government spearheaded the coordination of response efforts, supported by a coalition of humanitarian partners and international aid. Social protection programmes were activated to offer tangible assistance to affected households, demonstrating the importance of financial readiness in disaster response.

Mobilization of basic supplies for victims is a priority, which includes establishing temporary shelters that are equipped to provide refuge during evacuations. These shelters are supported by a logistics plan, which is informed by impact forecasts to ensure that they are adequately stocked and ready for incoming evacuees.

There is continuous monitoring in most of the countries right before the event, ensuring that all updates related to rainfall, gale warnings, weather advisories and flood are widely disseminated through SMS, social media, etc.

## Response

The duration of the event lasts 1- 4 days in Asia Pacific and its overall effects span about 2 years.

The first phase of response lasts from 14 days to 1 month. Second phase response spans 1 to 6 months.

Local governments declare an emergency response status that triggers the establishment of command centers and the initiation of search and rescue operations. Essential supplies such as food, water, clothing, sanitation, health supplies and temporary clinics are mobilized. Facilities for food supplies and temporary shelters are set up too.

At the divisional and district levels, the local jurisdictions are typically responsible for direct action in the field, such as conducting surveys and assessments, rescue operations, providing medical treatment and care for casualties, ensuring clear road access through clearance operations, establishing communication lines and coordinating evacuations. They also focus on providing shelter, food, water and power supplies, maintaining health and sanitation services, and securing affected areas.

Additional specific measures include evacuations, draining of floodwaters via pumping, and the placement of sandbags to mitigate flooding. There is a coordinated effort to distribute food and provide support for WASH and shelter repair, and to monitor health impacts. Coordination with NGOs present in the area is vital to ensure that efforts are not duplicated and resources are used efficiently. When necessary, requests for international support are made, and internal resources are mobilized to back the response efforts.

During the first phase of response, at national level, the countries conduct comprehensive surveys and assessments to understand the extent of the impact, mobilize urgent support personnel and equipment, and facilitate international assistance and appeals.

During the second phase, post-disaster needs assessment is conducted to fully understand the extent of the damage and identify the needs of affected population. This phase is characterized by the urgent delivery of ongoing relief to disaster victims while carrying out detailed damage assessments. These assessments are crucial for preparing and implementing rehabilitation programmes.

Also, financial assistance is prioritized in this second phase of response, with cash transfers utilized to support affected people.

## Recovery

The recovery phase following a cyclone is a critical period where affected communities begin the process of rebuilding and healing.

Some countries mentioned prioritizing psychological support. For example, in Fiji, organizations like Empower Pacific provided counseling to around 7000 individuals in the three weeks following a cyclone. Also financial assistance played a significant role in

aiding recovery, with initiatives such as the "Help for Homes" programme, which allocated FJ\$70 million to assist lower-income families in reconstructing their homes.

In other countries, infrastructure recovery projects are launched to repair and enhance roads and support the agricultural and fisheries sectors.

Specific measures for rehabilitation included:

- Restoration of agriculture, such as cash and subsistence crops, livestock, garden seeds and fishing equipment.
- Repair and risk reduction in urban and rural housing, including the distribution of cyclone-resistant building materials.
- Reconstruction programmes for public and community-run schools, along with the replacement of study materials lost in the disaster.
- Rebuilding of health facilities and replenishment of medical supplies.
- Rehabilitation of crucial infrastructure, including roads, bridges and government buildings.
- Restoration of urban and rural water supply systems.
- Reconstruction of damaged bridges, dams and irrigation networks, and the construction of new settlements for relocation, providing resilient housing solutions.

## Support, gaps and needs

### *Gaps*

- Not all local governments are able to produce a rehabilitation and recovery plan.
- Uneven/patchy local government compliance and implementation of their respective Local Disaster Risk Reduction and Management Plan.
- Relocation does not account for loss of livelihoods and loss of identity, and evidence based relocation is lacking.

### *Needs*

- New evacuation sites need identification and supply stocking.
- Confirmation of response teams and their alternates is necessary.
- Structural engineers are required for accurate damage assessment.
- Assessment of non-economic losses following the event is crucial.
- Proper relocation centers must be identified.
- Capacity building to enhance climate change literacy at community levels is essential.
- Financial preparedness should include catastrophe insurance, disaster financing instruments and budget reserves, with development partner support.
- Multi-hazard early warning systems require updates and modernization, including the expansion of disaster plan coverage to smaller localities.
- DAC meetings should be scheduled based on the cyclone season to review and replenish response equipment.

- Recognition needed of limited resources to address the increasing intensity and frequency of events.
- Need for increase in community awareness and mechanisms for Early Warning Systems.
- Technical assistance for early warning system modernization, including software system development, required
- Update and completion of community plans, along with the refreshment of hazard and exposure risk data, are needed.

## D. LANDSLIDES

*Summary of Nepal and Timor Leste*

### Anticipatory Arrangements

Anticipatory measures for landslides in regions like Nepal, with its hilly terrain and history of earthquakes, include comprehensive pre-planning by local and national disaster risk reduction and management committees. These plans are executed in coordination with the police, military and various volunteer organizations, ensuring a swift response to landslides.

The local municipal governments, supported by other levels of government, focus on minimizing risks in their areas, including landslides that may lead to flooding and subsequent disasters. These plans are informed by case studies and risk area identifications carried out by the DRR department and geological institutions.

### Response

The duration of response spans 4 to 7 days.

In response to disasters, district disaster management committees work alongside local residents, police, army and local governments to initiate search and rescue operations. They also provide essential services including temporary shelter, food, drinking water, and clothing for those affected. Additionally, community efforts, supported by the government, Red Cross, WHO and other organizations, focus on relocating affected individuals, locating missing persons and providing basic medical services and food.

Part of the immediate response includes clearing and rehabilitating roads to ensure access and transportation, managing clean drinking water supplies, and reconstructing homes, schools and other critical infrastructure. There's also a concerted effort to set up temporary shelters and mobilize the heavy equipment necessary for debris removal, which is a crucial step in the early stages of recovery and re-establishing normalcy in affected areas.

### Recovery

Over a span of 2-8 years, recovery actions from landslides focus on strategic, long-term planning and community engagement. This recovery period involves regular analysis of

disaster trends and outcomes to inform and update the contingency plans related to landslides. There is a strong emphasis on community sensitization efforts aimed at building resilience within local populations, empowering them with knowledge and strategies to better withstand future disasters.

### Gaps and needs

- Implementation of local-level forecasting and pre-alert systems for landslides based on weather forecasts.
- Creation of a fast relief fund specifically for landslides.
- Need for improved coordination among stakeholders, including local governments, NGOs and INGOs.
- Preparation of national and subnational maps identifying areas most susceptible to landslides.
- Development of municipal-level plans to minimize and manage landslide damage.
- Capacity development at local government levels to understand and disseminate national-level forecasting.
- Provision of daily alerts to the public about potential threats of landslide.
- Government support may be insufficient, necessitating appeals for additional help from external organizations.
- Need for early involvement of other agencies to provide basic needs such as shelter, food, clothes and clean drinking water during landslide.
- Assistance from donor agencies and technical experts for infrastructure development and risk zone mapping.
- Formulation of long-term risk management plans and construction of alternative emergency shelters.
- Establishment of sound coordination policies among different government tiers for effective reconstruction efforts.
- Providing more training in data collection, analysis and mapping to understand and quantify economic and non-economic losses and damages.

## E. HEATWAVE

### Context

In the Asia Pacific region, heatwaves are a growing concern with varying impacts across different countries. In Thailand, while temperatures have reached highs akin to previous records (44.6 degrees Celsius), the Thai Meteorological Department does not classify these conditions as a heatwave. The reason being, the fluctuations, with occasional rains cooling down the Northern and Central regions like Chiangmai, Bangkok and Ayuthaya, result from a low-pressure cell, not an enduring high heat event as defined by the WMO, which specifies a heatwave as temperatures 5 degrees above normal for more than 5 consecutive days.

Cambodia is experiencing increased heatwaves, exacerbated by climate change, with national averages of 64 days per year reaching high temperatures between 36°C and 41°C, particularly in the plains and urban centers. The heatwaves pose significant health risks, especially to the vulnerable groups including the elderly, children, and those with pre-existing conditions, leading to illnesses like heat exhaustion and heatstroke. In recent years, such conditions have also led to adverse effects on agriculture in provinces like Siem Reip, Kandal and Svay Rieng.

Palestine, too, observes a change in seasonal patterns, with a delay in the usual rain season from early September to December and unexpected rains in June. High temperatures have been noted as heatwaves, primarily in summer and sometimes in April, significantly affecting the eastern parts of the country, such as Jericho. This shift impacts agriculture, the sector most susceptible to these climatic variations, affecting both crop yields and farming practices.

### Anticipatory arrangements

Countries in the region have mentioned several anticipatory measures to deal with heatwaves. For example, in Thailand, the Thai Meteorological Department, Public Health Department, and the Ministry of Agriculture and Cooperatives make official announcements on impending heatwaves. They maintain constant communication with other departments to coordinate response efforts.

There is a focus on allocating national funds well ahead of time (about 7 days before expected high temperatures) to support risk awareness, planning, preventive measures, risk reduction, and response actions, which include heatwaves preparation and managing consequences. Also, relevant national committees are activated to provide advice, decision-making and continuous monitoring of the situation as needed.

Early warnings by disaster management and local authorities help in securing preemptive actions in some countries.

Compensation and basic necessities are also provided to victims, with budget requests for preventative measures and implementation plans like digging ponds for rainwater harvesting and tree planting.

Lastly, information about the potential risks of heatwaves is disseminated through television, Facebook, radio and other media platforms.

## Response

The overall effects of heatwaves last for about 5-7 days. Response duration varies from 3 days to 1 year.

Response is triggered when heatwaves elevate temperatures and increased the health risks they pose, especially heatstroke among vulnerable populations. In Cambodia, the impact of heatwaves in 2022, which affected around 2.2 million children and damaged approximately 288 rice fields due to heat and drought, prompted the Committee for Disaster Management to allocate funds for response. In other countries, feedback from farmers to the Ministry of Agriculture is also a crucial component of the response.

The following actions are taken in response phase:

- Mobilization of basic supplies to areas identified as vulnerable to support residents during heatwave events.
- Provision of public health services and medical assistance to manage health-related impacts.
- Targeted awareness-raising campaigns in vulnerable communities, informing them about heatwaves and how to adapt and prevent related risks.
- In some countries, medical alerts are issued.

## F. SEA-LEVEL RISE

### Context

Sea level rise presents a critical challenge in the Asia Pacific region, with various countries grappling with its consequences. Assessments in places like Cambodia are restricted to specific provinces, such as Koh Kong, where the impacts are most acutely felt. By the end of the century, Cambodia has noted that its coast could see a rise exceeding half a meter, potentially submerging substantial land areas and exacerbating storm vulnerability, with serious implications for coastal tourism and the broader Mekong delta region. The phenomenon could lead to mass displacement.

In Southeast Asia, many economic centers are coastal cities that now face the dual threat of sea level rise and land subsidence, complicating efforts to maintain infrastructure and economic stability. For example, Java Island in Indonesia, where over half of its villages have been submerged, have seen massive loss of agricultural land, fisheries, mangroves and cultural sites. Similarly, Pacific island countries, with a significant portion of their populations living close to the coast, are experiencing increased risk to their communities and habitats.

Flooding, disease outbreaks, and forced relocations are becoming more common due to sea level rise. The Bay of Bengal's low-lying coastal areas are particularly prone to enhanced flooding and salinity, while in Cambodia, soil salinity and groundwater contamination are pressing issues. Sea level rise is also eroding cultural sites, cemeteries



and ecosystems, leading to the loss of biodiversity and traditional knowledge particularly in the Pacific.

### **Scoping and assessment phase**

Comprehensive climate vulnerability and risk assessments have been conducted in most of the countries to evaluate the impacts of sea level rise in vulnerable areas, including detailed studies on increasing water levels and their effects on different sectors. Countries have also undertaken technical feasibility studies for hard infrastructures like sea walls, raising polder height for rehabilitation and assessment of damages to crops, livestock, fisheries and territory due to inundation. Additionally, storm surge models have been developed in some countries for impact-based early warnings, allowing for analysis through modeling of population and asset exposure to coastal flooding .

### **Planning and preparation phase**

In this phase, countries have conducted risk-informed development planning for areas vulnerable to sea level rise, extreme storm surges and flooding. Countries integrate coastal adaptation into their development planning agendas, like coastal zone management plans, climate-resilient infrastructure projects, water resource management strategies, and new building codes. As part of preparation and planning, they have been strengthening institutional capacities, preparing financial plans and developing disaster risk screening tools to ensure that national budget projects can respond to sea level rise impacts such as ocean acidification and saline intrusion.

### **Adaptation action phase**

In this phase, countries have utilized nature based solutions for coastal ecosystem restoration and conservation, like mangrove plantation and vetiver grass cultivation. Community capacity building is also carried out. There are programmes such as the coral reef resiliency programmes to implement ecosystem based adaptation to enhance coastal ecosystem resilience, coastal erosion protection works to plan and build seawalls, groynes and wave breakwaters. There are also efforts to construct heightened dikes and freshwater retention ponds to halt salinity ingress due to storm surges. Other measures include adaptive social protection schemes, planting of climate resilient crops and saline tolerant seeds.

### **Retreat phase**

Some countries like Fiji have developed relocation policies, trust funds for relocation and standard operating procedures with directions for each sector to carry out assigned duties. Others have also begun the process of identifying new relocation sites and the establishment of legal frameworks for resettlement. Notable initiatives include Nauru's Higher Ground Initiative, which aims to migrate populations to higher elevations in response to sea level rise threats and involves economic diversification, energy and food security, cultural restoration, and environmental rehabilitation. Land reclamation efforts are also reviewed, with pilot sites undergoing environmental investigations.

## Monitoring and Evaluation phase

At this phase, there is continuous monitoring of sea level changes, salinity and high tide levels using modern systems to track impacts over time and identify gaps for future enhancements.

In this phase, monitoring and evaluation systems for polder and embankment management are operationalized and expansion of hydrometeorological observation networks and climate information services are employed to ensure updated data acquisition and analysis.

## Needs, gaps and support

### *Needs*

- Allocating funds specifically for disaster readiness to include sea level rise scenarios.
- Carrying out studies to determine the risk and vulnerability of different areas and sectors to the impacts of sea level rise.
- Educating and training relevant officials and authorities to effectively manage and respond to sea level rise threats.
- Collecting data, models and satellite imagery related to meteorology, ecosystems and marine life to forecast and prepare for sea level rise.
- Developing digital tools to improve the management of small-scale fisheries.
- Strengthening local institutions' ability to gather and analyze data on sea level rise, following the best scientific methods.
- Advancing scientific knowledge and obtaining equipment to evaluate the effects of sea water encroachment on land salinity and degradation.
- Identifying suitable locations for the resettlement of populations affected by sea level rise.
- Formulating strategies to manage displaced populations, adapt crop patterns and alter economic activities.
- Securing the financial and technical resources needed to implement relocation plans to safer, higher grounds.

### *Gaps*

- Human resource capacities as well as technology and equipment needed to conduct surveys and analysis of land conditions, subsoil water conditions and needs assessment for artificial and natural barriers to rising sea water levels.
- Financing hard adaptation measures for areas already severely impacted.
- Guidelines for mapping and relocating most vulnerable and high risk locations and communities.
- Lack of localized data on sea level rise occurrence.
- Lack of homegrown sea level rise prediction tools and models.
- Lack of national framework on sea level rise.
- No dedicated funding mechanism to address sea level rise.

## G. INCREASING TEMPERATURES

### *Summary of Federal State of Micronesia and Thailand*

#### **Context**

In the Asia Pacific region, increasing temperatures are bringing about substantial environmental and social changes. The Federal State of Micronesia (FSM), with a population of just under 115,000, is grappling with a range of issues as the heat intensifies, including health challenges like heat-related illnesses. Water resources are under stress due to increased demand. Agriculture is another sector facing the heat; erratic weather patterns are disrupting crop growing seasons, resulting in missed harvesting times and reducing crop yields. Moreover, rising sea levels due to thermal expansion as a result of increased temperatures pose a severe existential threat to the FSM, exacerbating coastal erosion and increasing the risk of submersion of the island nation.

Thailand is also witnessing similar effects due to temperature increase - six sectors are particularly vulnerable, namely, water, agriculture, food security, tourism, natural resources, human settlements and health. Higher temperatures benefit various disease vectors, including mosquitoes that breed in stagnant water, heightening health risks. Water systems are also compromised, facing depletion from both overuse and reduced replenishment. Additionally, the agricultural sector is disrupted; plants and crops are failing to thrive in the shifting conditions, impinging further on food security. Other challenges include environmental damage such as coral bleaching due to warmer seas and coastal erosion from rising sea levels.

#### **Scoping and assessment Phase**

Countries like FSM are taking proactive steps to deal with challenges posed by increasing temperatures. Key to their strategy is the regular conduct of risk and vulnerability assessments. These assessments help in identifying areas that are most at risk from the impacts of rising temperatures and determining the populations and sectors that are most vulnerable.

Furthermore, they have instituted a monitoring system to track the impacts of increasing temperatures, with evaluations taking place at regular intervals.

#### **Planning and Preparation Phase**

As part of the planning and preparation phase, countries are proactively adopting climate change policies and implementation plans – for example, establishing legal frameworks for action and integrating these actions across various sectors and policies. On infrastructure, plans are being developed to maintain and adapt critical infrastructure, including exploring alternative energy sources to mitigate the risk of disruptions.

Thailand is setting an example by preparing a comprehensive Climate Change Act that will provide a legal framework for climate action. The Act is set to align measures and mechanisms with international standards, including greenhouse gas inventory management, carbon credit administration and incentives for emission reduction. Carbon

pricing, through mechanisms like a carbon tax and emission trading schemes, is also being considered, complemented by a thorough regulatory impact assessment.

Additionally, Thailand has crafted a Climate Change Master Plan for 2015-2050, outlining long-term strategies for climate mitigation, adaptation and enabling climate change management, aiming for a holistic and sustainable approach.

There is also a concerted effort to weave climate change adaptation into sector-specific action plans, covering critical areas such as public health, agriculture and human settlements. The objective is to ensure these sectors are resilient to and can thrive despite changing climate conditions.

Resource management, particularly urban green space management, is being promoted to enhance urban environments and provide ecological benefits.

Lastly, sector-specific plans are being rolled out, targeting critical areas such as health, agriculture, water and energy. These plans are tailored to increase literacy in health responses, prepare for increased capacity needs, enhance crop heat resilience, and manage water supply and demand. The energy sector is preparing for potential demand spikes through ensuring that its infrastructure can withstand and respond to fluctuating needs as temperatures rise.

### **Adaptation Action Phase**

The adaptation action phase is triggered when there is an escalation of health hazards, ecosystem distress, rising sea levels, shift in energy and water usage patterns and/or an increase in the economic burden of extreme weather events.

Action countries described in this phase included managing water resources, adjusting irrigation systems, optimizing water consumption and power generation capacities, preparing the healthcare system to deal with increased heat-related challenges, closing tourist destinations under significant heat stress, etc. Additionally, warnings about imminent heat waves are issued to keep the population informed and ready to respond. Furthermore, a gradual transition to heat-resilient crops points to an agricultural shift designed to withstand future climates, ensuring food security.

### **Retreat Phase**

This phase entails longer-term planning and potentially radical shifts in response to the enduring consequences of climate change. It includes the strategic foresight present in Micronesia's 2050–2100 plan and Thailand's long-term strategies, where there's an integration of climate change considerations into all facets of development, energy, agriculture, water resources and disaster preparedness policies. The potential for relocation and the deployment of emergency response services signal a readiness for planned retreats from areas that are no longer liveable.

## Needs and gaps

### Needs

- More comprehensive information and knowledge of climate change impacts on vulnerable sectors, including downscaled climate scenarios, and greater technical knowledge and capacity of concerned sectors.
- Climate data projection and information distribution system.
- National level experts on loss and damage.
- Technology development and transfer (innovative and practical technologies to support climate actions such as the development of infrastructure and climate-related technology such as **EV** infrastructure, clean and renewable energy development, and **GHG** reduction technology).
- Financial support in terms of funds or financial instruments such as grants, soft loans, equity or guarantees to support and leverage government and private sector investment in climate actions.
- Technical support needs in terms of non-financial assistance from international specialists, taking the form of sharing information and expertise, the transmission of working knowledge, etc.
- Loss and damage assessment for priority sectors that considers socioeconomic aspects.

### Gaps

- Climate information data and effective data communications.
- Gap in energy affordability for vulnerable groups (i.e., increased electricity price is not as affordable in months when existing prices double).
- Mechanisms to monitor SOE impact.
- Lack of proper indicators for SOE impact on biodiversity.
- Lack of sufficient national climate information such as seasonal projection and long-term projections.
- Lack of climate modelling capacity in long-term projection of impacts.

## H. DESERTIFICATION

### *Summary of Iran and Palestine*

#### Context

Desertification poses a significant environmental challenge in Iran and Palestine. In Iran, situated in an arid and semi-arid region, desertification is a critical concern. Human interventions like the unsustainable cutting of bushes, overgrazing and out-of-season grazing are major contributors to desertification. Agricultural practices in the region, such as incorrect irrigation methods and the use of unsuitable agricultural machinery, also contribute to the problem. . The reliance on rain-fed crops places additional stress on the land, especially as many of Iran's drylands are situated in marginal areas prone to erosion

and desertification. About 100 million hectares of land in Iran are facing the threat of desertification.

The impacts of desertification in these regions are profound and multifaceted. They include an increase in the frequency of sandstorms and dust storms, biodiversity loss, degraded soil quality, water scarcity, etc.

### **Scoping and Assessment Phase**

In this phase, countries have established national committees for combating desertification. They have also been engaging in international cooperation through the UN Convention for Combating Desertification (UNCCD), while researching the economic and non-economic effects of desertification. Countries also mentioned that they have been developing technology roadmaps which identify the most effective technologies for every sector, especially the agriculture and water sectors, to combat desertification.

### **Planning and Preparation Phase**

Countries have set up policies for minimizing and preventing desertification, including averting sand and dust storms. They have also been coordinating activities like soil conservation, afforestation and reforestation.

These efforts include the development of a technology roadmap tailored to the needs of critical sectors like agriculture and water. As an action plan outlined in their NDCs, countries have prioritized improving water network infrastructure, water treatments and conservation, and improving water source infrastructure.

Targets such as an annual increase of 2 per cent in the total area of forest land, rangeland and upland rehabilitation by 2040 has also been set.

### **Adaptation Action Phase**

A significant shift is occurring as countries move from cultivating water-intensive crops to those requiring less water, which is a strategic adaptation to new planting patterns and reduced water availability. The agriculture sector is undergoing changes in planting patterns to improve resilience and adapt to desertification. This includes changing not only the types of crops grown but also when and how they are planted.

To support the growing number of people migrating from rural to urban areas, cities are providing targeted services to help immigrants integrate and adapt.

There is an emphasis on building community capacity, enabling individuals and groups to better respond to and manage the impacts of desertification through educational initiatives, training programmes and distribution of resources to empower local communities.

Rainwater harvesting is also being promoted, alongside improving water network infrastructure in urban areas.

Finally, there is an effort to rehabilitate and improve the infrastructure around key water sources, such as wells and springs.

## Needs and gaps

### Gaps

- Land control disputes, land confiscation, restrictions on digging wells for irrigation and barriers to land reclamation and rehabilitation, which affect project implementation.
- Weak enforcement of legislation.
- Monitoring and evaluation system not in place.
- Lack of data and information.
- Weak institutional structure and intersectoral coordination mechanisms.
- Overlaps and over-burdening of responsibilities within ministries.

### Needs

- Providing means of implementation including finance, technology and capacity building to minimize the adverse effects of desertification and reverse this phenomenon in different phases.

## I. FOREST AND LAND DEGRADATION

*Summary of Malaysia, Lao PDR and Philippines*

### Context

Forest and land degradation in the Asia Pacific region presents a critical challenge. In Malaysia, forests are considered a vital socioeconomic resource, essential to the country's environmental well-being. The country is committed to preserving its natural heritage, maintaining at least 50 per cent of its land area as forest and tree cover, a pledge that dates back to the 1992 Earth Summit in Rio. This commitment encompasses a variety of protected areas, including permanent reserved forests, state land forests, and totally protected areas, spread across its 33 million hectares and three regions.

The Philippines likewise values its forests for the wide range of ecosystem services they provide. These range from provisioning services like food, livestock and fish to cultural services including recreation and educational experiences. However, by 2010, the country had lost 60 percent of its total forest cover, a steep decline from the 16.9 million hectares of forestlands recorded in 1934.

The degradation of forests and land in these countries have led to numerous challenges, including but not limited to flooding, soil erosion, landslides, etc. Farming in Indonesia has led to high erosion rates with nutrients and heavy metal runoff into water bodies. Sedimentation of rivers and landslides are further degrading the environment and adversely affecting human settlements and agricultural land.

Biologically, the region has experienced a loss of habitat, changes in bird migratory patterns, and significant reductions in biodiversity, with emblematic species such as the

Orangutan in Malaysia suffering drastic population declines due to habitat conversion. The shift in rainfall patterns has led to more forests being converted into agricultural land, and the combination of increased temperatures and water shortages is damaging plant tissues, reducing genetic diversity, and rendering the ecosystems more susceptible to pests.

### **Planning and preparation phase**

To address forest and land degradation, Lao PDR has a national land allocation plan that delineates the scope for managing, protecting, developing and using land sustainably. Participatory sustainable forest management by involving communities directly in forest management and giving the responsibility to communities, thus fostering ownership, is another notable practice.

Countries are developing national plans and policies aimed at reducing emissions from deforestation and forest degradation, promoting conservation, sustainable management of forests, establishing buffer zones around protected areas, and enhancing forest carbon stocks.

In Malaysia, their forest policy is underway, and will serve as a guiding framework for all forest-related activities and conservation efforts. This policy will ensure that forestry practices contribute positively to environmental conservation and socioeconomic development. The coordination related to land, mining, agriculture and forestry between different levels of government are also a focus, especially in Malaysia.

The step to gazette forest areas as “Permanent Reserved Forest” and/or “Reserved Land” in Malaysia is another crucial action to protect land and forests.

### **Adaptation Action Phase**

In response to forest and land degradation, countries are implementing a series of adaptation actions. For example, programmes to enhance connectivity and create wildlife corridors are being implemented. Notably, Malaysia's Central Forest Spine (CFS) and Heart of Borneo (HoB) programmes aim to link separate forest areas and other ecological regions to maintain biodiversity and ecosystem functions.

To protect waterways, there is a move to establish mandatory buffer strips alongside permanent streams and rivers in inland and peat swamp forests, which are critical for maintaining water quality and reducing soil erosion. The move also restricts tree felling to protect these sensitive areas. The design and layout of forest plantations are also being tailored to support the protection, restoration and conservation of natural forests.

Community engagement in tree planting is also a focal point, and features tree-planting programmes involving local communities and NGOs and the private sector.

Countries are also conducting GHG inventory assessments across multiple sectors, including energy, transport, industry, agriculture, waste and forestry, to identify sources of emissions and opportunities for carbon sequestration through forests.



Lastly, efforts are being amplified to enhance forested areas and tree cover through various reforestation programmes. This includes not only rural areas but also urban forests, emphasizing the importance of green spaces in cities for improving air quality, providing recreational spaces and mitigating the urban heat island effect.

## Needs and gaps

### *Gaps*

- Legislative power and management of forests rests with state authorities, rather than the federal government, who rely on forests as economic resources. The respective state governments have jurisdiction over land, forests, fisheries, agriculture, water resources and local power areas, including the power of disposal.
- Lack of legal mechanisms for conflict resolution between industry and indigenous communities.
- Unsustainable logging practices.
- Open vegetable farming has the highest erosion rate – runoff that flows into the water bodies together with the eroded soil, carrying a significant amount of nutrient and heavy metals.
- Limited information on potential impacts on endangered species and which ecosystems need to be prioritized.
- Forest cover data is often outdated and fails to distinguish forests from plantations, leading to flawed conservation policies and management strategies.
- Lack of good-quality data about the definition of a forest, the extent of forest cover, loss of forest and (un)sustainable yields.

### *Needs*

- Further study of the carbon sequestration rate of indigenous trees and the economic valuation of forestry and ecosystems.
- Spatial analysis of impacts of climate variability on forest cover, biodiversity loss, etc.
- Technical support for the downscaling of global and regional climate impact and vulnerability assessments for the forest sector to national and local scales in a way that can support local and sector planning, which would include the identification of practical adaptation measures.
- Improved cross-sectoral governance and coordination structures, drawing on international best practices and lessons learned.
- Investment in education and technical skills development to support planning and management of adaptation measures within broader sectoral objectives and plans.
- Provision of training to enhance knowledge of forest management certification standards to all levels of implementers.
- Data gathering, monitoring and evaluation methodology to measure the extent of deforestation and land degradation due to climate change.
- More frequent, up-to-date monitoring of national climate plans to include milestones, gaps and challenges in the implementation of activities and outputs.

- Strengthen monitoring of survival rates of planted trees/reforestation projects.
- Establishing compensatory plantations of fast-growing species in damaged, degraded or unproductive forest areas.
- Planting trees that require the least earthwork and minimal soil erosion for cultivation and that produce dense ground cover that can absorb raindrop impacts.
- Heavy metal content from agriculture activities must be below permissible levels.

## J. SALINIZATION

*Summary of Maldives, Sri Lanka and Thailand*

### Context

Salinization is having profound impacts, altering ecosystems and threatening livelihoods. The Maldives is exceptionally vulnerable to salinization as the majority of its islands are less than one meter above mean sea level. With sea levels rising at significant rates in the central and south regions, the country faces a critical water security threat as freshwater sources become increasingly saline. The Maldivian people rely on groundwater and rainwater harvesting for potable use, and thus frequently experience water shortages during the dry season.

In Thailand, the phenomenon of salinization is notably affecting the province of Samut Songkhram, known for its fruit production. Close proximity to the sea and regular exposure to brackish water have altered local lifestyles, and intense salinization episodes have led to fish migration, plant loss, and erosion due to saltwater waves.

The impact of salinization has led to a host of environmental and socioeconomic issues. Brackish water has become more widespread, making water unsuitable for drinking or irrigation. Extended dry periods contribute to the problem, as does the rising sea level, which not only exacerbates groundwater salinization but also causes erosion. Soil salinity is also affecting the health of crops and, consequently, agricultural productivity.

The intrusion of seawater into freshwater systems further damages precious aquifers and local biodiversity, particularly in lagoons and estuaries, disturbing the balance of aquatic life. Additionally, the region is experiencing more frequent storm surges and cyclonic events, which can lead to further salination of fresh water sources. This cascade of environmental changes has culminated in the loss of land, the degradation of ecosystems, and shifts in local livelihoods.

### Scoping and Assessment Phase

Countries have been monitoring groundwater and precipitation rates to understand water availability and to predict future trends. They have also produced national communications that provide risk assessments related to salinity. Additionally, there's an emphasis on the ongoing monitoring of water levels and sea-level intrusion to adaptively manage water.

## Planning and Preparation Phase

Countries noted that they have been improving policy, legal and regulatory frameworks to ensure safe water supply and sewerage services. Countries have also been budgeting for emergency water to ensure financial readiness to deal with water scarcity crises.

Other efforts include reducing salinity in agricultural lands through developing agricultural policies for managing soil salinity and ensuring water supply for agricultural practices. Further actions include raising awareness among the local population of water conservation and salinity issues and locating alternative sources of clean water.

## Adaptation Action Phase

A key response has been the provision of emergency desalinated water to ensure access to potable water. This is supplemented by the establishment of water supply systems, like reverse osmosis plants, on inhabited islands. Further, the provision and distribution of freshwater through water supply networks are also done.

To protect and conserve groundwater, countries are focusing on both supply and demand management, including the protection of existing water sources and the use of alternative water sources. For instance, new fish breeding units with facilities that control temperature and salinity are being established, helping breed strains of fish that are more tolerant to changing conditions.

On a broader scale, countries are developing comprehensive water resource conservation and management plans, as well as National Water Security Plans, to secure water for future generations. These plans include long-term strategies to address the permanent loss of homes and livelihoods due to salinization.

To support these plans, the existing water supply systems are being reviewed and revised according to the latest research and monitoring insights. Additionally, efforts are being scaled up to incorporate renewable energy and hybrid systems for operating water and sewerage facilities, which can help mitigate the energy costs associated with desalination and water treatment processes.

In regions like Sri Lanka, where river intakes face saline water intrusion, salinity barriers are being created to prevent saltwater from entering freshwater ecosystems during drought seasons.

Ecological restoration efforts are also being conducted including land restoration practices aimed at reducing the salinity of agricultural land.

## Needs and gaps

### *Gaps*

- Lack of capacity to conduct regular groundwater monitoring.
- Lack of institutional support for sustaining data and knowledge.
- Technical capacity gaps for necessary actions.

## Needs

- Improved research and evidence on water and sewerage sector to support policymaking.
- Updated data for development of risk assessments.
- Coordination support and cross-sectoral engagement for effective policy development for inter and cross-sectoral approaches.
- Sufficient resources for water distribution.
- Assessments for water and other resource needs for activities to be conducted.
- Mapping of restoration efforts, and suitable approaches for restoration based on risk assessments and soil salinity levels, etc.
- Sea level rise assessments.

## K. GLACIER RETREAT

*Summary of Bhutan, Kazakhstan, Nepal*

### Context

Bhutan's unique geophysical landscape makes it susceptible to various natural and human-induced hazards, which are exacerbated by climate change. One of the most prominent threats Bhutan faces due to climate change is the risk of Glacial Lake Outburst Floods (GLOFs), along with other hydrometeorological hazards like flash floods, landslides, windstorms, hail/snow storms, and droughts. It has a total of 700 glaciers and 567 glacial lakes, 17 of which are classified as potentially dangerous. Bhutan experienced a significant GLOF event in 1994 that had devastating effects on communities in the Punakha and Wangdue valleys. These glaciers have been receding at a rate of 12 to 16 meters annually, as noted by the Bhutan Glacial Lake Inventory 2021.

In Kazakhstan, 14 per cent of the country is mountainous with over 2,700 glaciers and more than 1,000 moraine lakes. A substantial number - about 156 - are recognized as particularly hazardous in terms of outburst potential. The observed rise in average annual air temperatures, recorded as the warmest over the last five years, signifies an ongoing trend that is contributing to glacier retreat and consequently, to water scarcity.

Nepal, with 35 per cent of its land in the Himalayan region, hosts around 3,248 glaciers, only 55 of them named, and approximately 2,315 glacial lakes. Twenty sites have been identified as potential sources of GLOF. These glaciers are critical as they provide a continuous flow to the major rivers in Nepal.

The retreat of these glaciers has led to a series of ecological and socioeconomic consequences. GLOFs pose immediate and severe risks to downstream communities and infrastructure. Soil erosion and the loss of agricultural land due to changing river paths and increased water flow are critical concerns. The subsequent flooding, particularly in lower river basins, along with the heightened risk of flash floods and

landslides, has made these countries more vulnerable. Droughts are also becoming more prevalent, as the steady water supply from glacial melt becomes less reliable.

### Scoping and Assessment Phase

Countries have conducted risk and vulnerability assessments to determine the areas and communities most at risk from GLOFs by identifying potentially dangerous lakes, mapping GLOF hazard zones, and conducting assessments of their potential to cause outbursts. Continuous monitoring of glaciers, both via air visual monitoring and on-the-ground observations, together with the scientific research of glaciers are also being done. Countries are identifying and mapping of the number of moraine lakes, glaciers and glacier lakes.

### Planning and Preparation Phase

Countries have been focusing on capacity building programmes like community-based disaster risk reduction programmes. They are also issuing notifications or circulars that discourage or regulate construction and settlement in high-risk, or 'red-zone', areas identified in the GLOF hazard **zonation** maps. Countries noted that they are also ensuring the timely testing and maintenance of early warning systems for providing communities with advanced notice of potential disasters due to GLOF.

### Adaptation Action Phase

Automatic early warning systems are being installed to provide timely alerts to settlements. Additionally, "gabion walls" are constructed to protect settlements that are too close to riverbanks.

To further mitigate the risks of mudflows and floods, particularly in densely populated regions, construction of dams is underway. Monitoring sensors are installed on lakes and in basins identified as most at risk for dangerous outbursts or mudflows, to constantly track changes and trigger alerts. Improvements in drainage systems are also part of the effort to efficiently manage excess water during heavy rainfall or snowmelt events.

The enhancement of existing early warning systems is ongoing to ensure effectiveness in a broader range of hazard scenarios.

There is also a focus on regional collaboration, with the creation of a multi-hazard Regional Early Warning System designed to serve Central Asian countries.

### Needs and gaps

#### *Gaps*

- Relocation issues (people's acceptance and land fertility).
- Lack of human resources, GIS specialists and GIS systems.
- Government has knowledge about the glacial retention and its impact but does not have a clear vision and strategy.
- Lack of baselines to conduct assessments.
- Hazard zonation mapping not completed for all GLOF vulnerable communities.

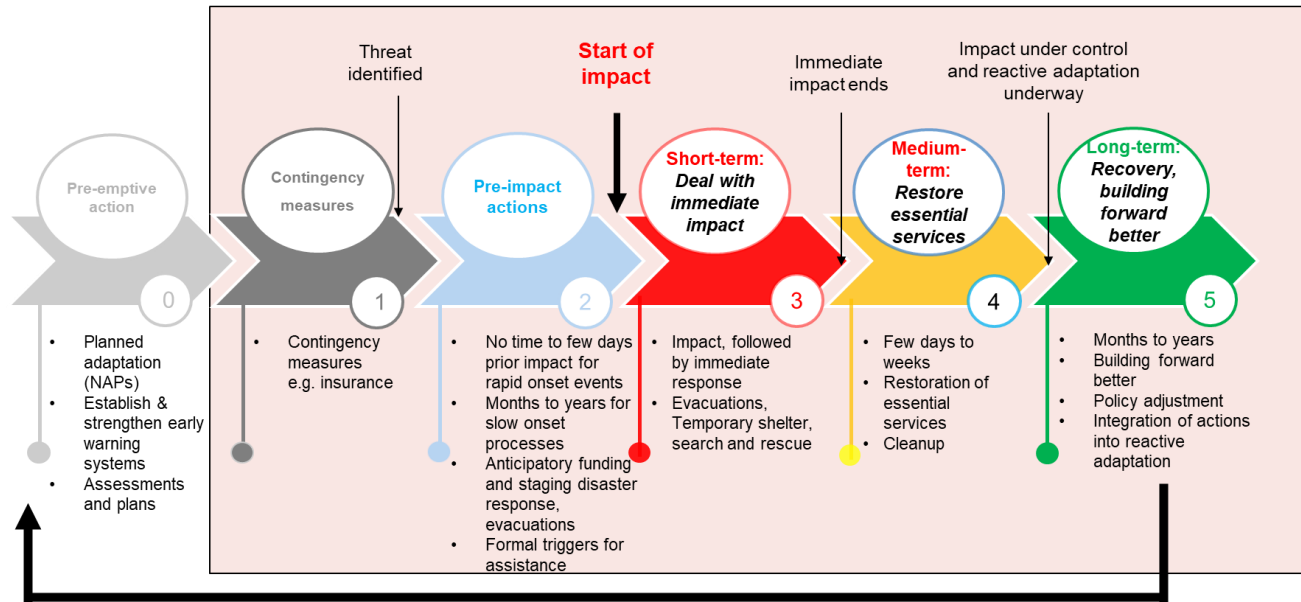
## *Needs*

- Financial and technical assistance to conduct comprehensive assessments.
- Much greater awareness on the impact of GLOF at the community level and at the decision makers level to gain financial support.
- Expansion of the number of automated monitoring stations in mudflow prone areas.
- Development of the Scientific Methodology for DRR including process and approach of emptying moraine lakes.
- Database on spatial distribution of glaciers.
- Creation of GIS system that will be capable of processing data from both hydrological posts and satellite data and could lead to recommendations for action to be taken in concrete situations.
- Vulnerable communities should be aware and pre-notified of the probable occurrence of disaster.
- Glaciological study should be included in school and university courses.

# 4. ANNEX

## A. TEMPLATE TO CAPTURE INFORMATION ON IMPACTS DUE TO A CLIMATIC HAZARD AND HOW COUNTRIES RESPOND OVER TIME

Spectrum of actions in responding to climate impacts



Explanatory notes	Country	XXX			
Single event causing adverse impacts and loss and damage	Hazard Event	Flood/pluvial flash flood in City XX			
Describe the event and its context	Description & context	After intense rainfall of 642mm in 24 hrs (equivalent to 1 month total average rainfall for this humid region), flash			

		floods in extensive areas of xxx with more than 3 meters of rain in roads, inundating houses to the roof, bridges in area impassable and some damaged or washed away, roads eroded and impassable			
			Needs	Sources of support	Gaps
Anticipatory arrangements are those trigger actions after event occurs (eg. payouts)	1. Anticipatory Arrangement (Pre-Phase 1: before event)	<ul style="list-style-type: none"> <li>• XX Insurance</li> <li>• Social protection measures</li> <li>• Create contingency funds</li> <li>• Create Forecast-based finance solutions</li> </ul>			
After event declared/announced, before event hits, more anticipatory actions are possible	1. Anticipatory Arrangement (Phase 1)	<ul style="list-style-type: none"> <li>• Procurement of disaster response supplies</li> <li>• Logistics to stage the supplies</li> </ul>			
	1. Anticipatory Arrangement (Phase 2)	<ul style="list-style-type: none"> <li>• Advance cash transfers</li> <li>• Evacuations</li> </ul>			
	1. Anticipatory Arrangement (Phase 3)	<ul style="list-style-type: none"> <li>• xxx</li> </ul>			
	2. Date start of event or process declared	Day 0			



	2. Start of actual event	+ 5 days			
	2. Duration of the primary event	3 days			
	2. Overall duration of event and its related effects	[Weeks/months/year+]			
Indicate the number of days for first phase of response. (Name the second phase as appropriate).	3. Response (Phase 1) - Duration	0 – 3 days			
What triggers community, national and international action? (Name the second phase as appropriate).	3. Response (Phase 1) - Triggers	<ul style="list-style-type: none"> <li>• [5] lives lost</li> <li>• National declaration of emergency/appeal for support</li> <li>•</li> </ul>			
What are the key actions for this first phase of the response? (Name the second phase as appropriate).	3. Response (Phase 1) - Actions	<ul style="list-style-type: none"> <li>• Search and rescue</li> <li>• Evaluations</li> <li>• Shelters/set up temporary shelter (tents etc)</li> <li>• Mobilize basic supplies</li> <li>• Mobile clinic</li> </ul>			
Describe the duration of response for the second phase? (Name the second phase as appropriate).	4. Response (Phase 2: name?) - Duration	3 days – 3 weeks			
What triggers a shift to a next phase of support/action? Name the second phase as	4. Response (Phase 2: name?) - Triggers	<ul style="list-style-type: none"> <li>• Flood waters subsided</li> </ul>			

appropriate. (Name the second phase as appropriate).					
What are the key actions for the second phase of response? (Name the second phase as appropriate).	4. Response (Phase 2) - Actions	<ul style="list-style-type: none"> <li>• Cash transfers for rebuilding livelihoods</li> <li>• Cleanup</li> <li>• Restoration of public services</li> </ul>			
Are there other phases for Response? What is the duration? (Name the phase as appropriate).	5. Response (Phase Other) - Duration	xxx			
What is the trigger for this response phase? (Name the phase as appropriate).	5. Response (Phase Other) - Triggers	•			
What are the actions for this response phase? Name the phase as appropriate.	5. Response (Phase Other) - Actions				
Shifting from immediate response to restoration and recovery efforts from the immediate to the long term. Describe the duration of recovery for the first phase of recovery. (Name the phase as appropriate).	6. Recovery (Phase 1) - Duration	Weeks to a year or two			
What triggers action for recovery on the first phase?	6. Recovery (Phase 1) - Triggers	<ul style="list-style-type: none"> <li>• Basic services restored</li> <li>• Life starting to come to normal</li> </ul>			
What are the actions for this recovery phase?	6. Recovery (Phase 1) - Actions	<ul style="list-style-type: none"> <li>• Rebuilding critical infrastructures (bridges, hospitals)</li> </ul>			

		<ul style="list-style-type: none"> <li>• Livelihoods restructuring eg. technologies for farming, drought resistant crops</li> <li>• Plans for resilient rebuilding</li> <li>• Rebuilding homes</li> <li>• Review construction standards</li> <li>• Propose policy changes based on experience and lessons learned</li> </ul>			
Describe the duration of recovery for second phase. (Name the phase as appropriate).	7. Recovery (Phase 2) - Duration	2 – 5 years			
What triggers action for the second phase of recovery? (Name the phase as appropriate).	7. Recovery (Phase 2) - Triggers				
What are the key actions for the second phase of recovery? (Name the phase as appropriate).	7. Recovery (Phase 2) - Actions	<ul style="list-style-type: none"> <li>• Revising disaster mitigation</li> <li>• Reactive adaptation integrated into National Adaptation Plans measures to reduce risk of similar loss and damage</li> </ul>			
Are there other phases for Recovery? What is the	8. Recovery (Phase Other) - Duration				

duration? (Name the phase as appropriate)					
What triggers action for the this phase of recovery? (Name the phase as appropriate).	8. Recovery (Phase Other) - Triggers				
What are the key actions for this phase of recovery? (Name the phase as appropriate).	8. Recovery (Phase Other) - Actions				

Web links for additional information (if available):

- XX
- XX

## B. AGENDA

### REGIONAL SCOPING WORKSHOP ON LOSS AND DAMAGE UNDER THE SANTIAGO NETWORK: AFRICA REGION

Conference room 1, UN Campus, Nairobi, Kenya

10 – 12 May 2023

#### DAY I

TIME	ITEM
09:00 – 9:15	<ul style="list-style-type: none"><li>• <b>Opening and introduction</b></li></ul>
09:15 – 09:45	<p><b>Introduction and approach for the workshop</b></p> <ul style="list-style-type: none"><li>• Goals and objectives</li><li>• Overview of terms used: event, climatic modulator/associated weather system, hazard, impacted system, loss, stages of action, rapid and sudden onset, slow onset event or process, risk, impact</li><li>• Interactive exercise with country maps</li></ul> <p>Worked example of a profile for a hazard</p>
09:45 – 10:15	<b>Tea/coffee break</b>
10:15 – 12:30	<p><b>Breakout groups (first round)</b> <i>Interactive session on stages of evolution of support-anticipatory arrangements, response, recovery and other phases and sub-phases, through a dialogue including countries and other relevant stakeholders</i></p>
12:30 – 13:30	<b>Lunch</b>
13:30 – 15:00	<p><b>Plenary</b> <i>Feedback and further co-creation</i></p>
15:00 – 15:30	<b>Tea/coffee break</b>
15:30 – 17:00	<p><b>Breakout groups (second round)</b> <i>Interactive session on stages of evolution of support-anticipatory arrangements, response, recovery and other phases and sub-phases, through a dialogue including countries and other relevant stakeholders</i></p>

## DAY 2

TIME	AGENDA ITEM
09:00 – 10:30	<p><b>Plenary</b> <i>General feedback from facilitators on results from Day 1</i></p> <p><b>Introduction to slow onset events or processes</b> <i>Interactive session on stages of evolution of support-anticipatory arrangements, response, recovery and other phases and sub-phases, through a dialogue including countries and other relevant stakeholders</i></p>
10:30 – 11:00	<b>Tea/coffee break</b>
11:00 – 12:30	<p><b>Breakout groups (third round)</b> <i>Feedback and further co-creation</i></p>
12:30 – 13:30	<b>Lunch</b>
13:30 – 15:00	<p><b>Plenary</b> <i>Focus on sources of support, gaps, and potential future best practices for each event profile</i></p>
15:30 – 16:00	<b>Tea/coffee break</b>
16:00 – 17:00	<i>Interactive session on cross-cutting considerations including compound/complex hazards</i>

## DAY 3

TIME	AGENDA ITEM
09:00 – 10:30	<p><b>Plenary</b> Introduction to case studies on loss and damage (see announcement <a href="#">here</a>) Co-creation of case studies in groups</p>
10:30 – 11:00	<b>Tea/coffee break</b>
11:00 – 12:30	<p><b>Breakout groups (third round)</b> Technical assistance needs under the Santiago network Country survey on needs for technical assistance under the Santiago network</p>
12:30 – 13:30	<b>Lunch</b>
13:30 – 14:30	<p><b>Plenary</b> Final reflections, next steps and closing</p>
14:30 – 15:00	<b>Tea/coffee break</b>

Further details are available on the workshop page: [Regional scoping workshop on loss and damage under the Santiago network – Africa region | UNFCCC](#)

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