

**An assessment of mainstreaming climate change concerns into  
institutions and policies for disaster risk reduction in ASEAN**

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## Introduction and background

Countries in Southeast Asia are highly vulnerable to climate change as is evident from the rise in disaster events, including flood, storm, storm surge, rain-induced landslide and drought, and the severity and scale of their impact (JICA et al., 2018). The member states of the Association of Southeast Asian Nations (ASEAN) are on the pathway to rapid economic and social development, but their prospects are at risk if threats posed by climate change and associated disaster risks are not addressed adequately with a sense of urgency (ASEAN, 2017).

The Sendai Framework for Disaster Risk Reduction 2015-2030 (SFDRR) advocated coordination among all the relevant institutions and stakeholders for effective DRR (UNISDR, 2015). It also recognized the importance of addressing climate change and related vulnerabilities for overall risk reduction. Practitioners and policy makers have been called for coordination between climate change adaptation (CCA) and disaster risk reduction (DRR) agencies in their risk reduction strategies (UNISDR, 2012; Leitner et al., 2018; Forino et al., 2015). Such a coordination will help in efficient implementation of projects and programmes as well as integration of relevant policies with greater effectiveness (Mitchell & Aalst, 2008).

The ASEAN Committee on Disaster Management (ACDM) has a legally-binding regional agreement called the ASEAN Agreement on Disaster Management and Emergency Response (AADMER) that corresponds to the Hyogo Framework for Action 2005-2015 (ASEAN, 2014). Associated periodic work programmes have been adopted to implement it and coordination of policies and activities for DRR and CCA has been listed as one of the priority programmes. Particularly the Work Programme 2013-2015 selected the 'Strengthening institutional and policy framework on disaster risk reduction (DRR) and climate change adaptation (CCA) integration' as a Concept Note No. 20 (CN20) of the flagship and priority projects (ASEAN, 2013). In addition, leaders of the ASEAN adopted the Declaration on Institutionalising the Resilience of ASEAN and its Communities and Peoples to Disaster and Climate Change at the 26<sup>th</sup> ASEAN Summit in 2015, in which the ACDM was appointed as a focal point for cross-sectoral cooperation on resilience building at regional level (ASEAN, 2015).

Keeping the above background in view, a study was carried out to assess the status of DRR-CCA coordination and integration in ten ASEAN Member States (AMS) in cooperation with the ASEAN Working Group on Prevention and Mitigation (WG P&M) of the ACDM with support from the technical cooperation project of the Japan International Cooperation Agency (JICA) (JICA et al., 2018). This paper presents the results of the study succinctly and outlines salient features of the Priority Work Plan for 2020 (PWP 2020) developed to facilitate integration of

DRR and CCA in the ASEAN region<sup>1</sup>.

## Methodology

### Assessment framework

A framework for assessing the status of DRR-CCA coordination and integration among the AMS was developed based on the review of literature, and in consultation with the ACDM members, i.e. national disaster management offices (NDMOs) of each country (Table 1 and 2). The brief review of literature is discussed in the subsequent parts of the methodology section. Further, the consultations strengthened the importance of six key areas, which formed the basis for the assessment framework, in line with the aims and specific objectives of the Concept Note No. 20 (ASEAN, 2013) and synergies with the SFDRR (United Nations, 2015).

**Table 1: Key areas for assessing the status of DRR and CCA integration**

Assessment area	Key text from the CN20*	Relevant Priorities for Action of SFDRR
1. Policies and regulations	Umbrella laws and regulations Institutional and policy framework	Priority 2
2. Management system	Relationships between national agencies responsible for DRR and CCA Partnership in linking DRR and CCA at all levels	
3. Financial arrangement	Joint funding mechanism	
4. Risk assessment	Participatory risk assessment	Priority 1
5. Planning and	Integrated planning of DRR and CCA	Priority 3

<sup>1</sup> The full results of the assessment are available in the report entitled 'Project for Strengthening Institutional and Policy Framework on Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA) Integration. Final Report' (JICA et al., 2018). The JICA technical cooperation project was implemented by Institute for Global Environmental Strategies, Kanagawa, Japan and CTI Engineering International Co., Ltd., Tokyo, Japan.

Assessment area	Key text from the CN20*	Relevant Priorities for Action of SFDRR
implementation		
6. Capacity building	Support joint training and meetings	Priority 1-4

\*CN20 refers to the priority project identified as the ‘Strengthening Institutional and Policy Framework on DRR and CCA Integration’ under the Strategies and Priorities for AADMER Work Programme, Phase II (2013-2015) (ASEAN, 2013).

The first three key areas of the framework are policies and regulations, management system, and financial arrangement, which correspond to the Priority 2 of the Priorities for Action of the SFDRR (ibid). Similarly, key areas of risk assessment and planning and implementation correspond to Priority 1 and 3 of SFDRR respectively. The area on capacity building cuts across the previous five areas and is well represented in all priorities of the SFDRR. These six areas were further broken down to sub-areas with associated validation conditions to easily and clearly determine if an AMS has satisfied the condition or not (Table 2). In the remaining part of this section, a succinct review of literature is presented to support the methodological framework used in this study that exemplifies the importance of the identified elements for assessing the level of DRR and CCA integration.

**Table 2: Sub-areas and conditions for validation for assessing DRR and CCA integration**

Assessment areas and sub-areas	Condition for validation
<b>1. Policies and regulations</b>	
1) National socio-economic development plan	DRR and CCA concepts are incorporated in the national socio-economic development plan.
2) DRR policies and regulations	DRR laws, regulations and policies are enforced with consideration of CCA; DRR is mainstreamed in each ministry’s policies.
3) CCA policies and regulations	CCA laws, regulations and policies are enforced with consideration of DRR; CCA is mainstreamed in each ministry’s policies.
4) Relevant sectoral policies and regulations	DRR and CCA concepts are incorporated in relevant sectoral laws, regulations and policies including local land-use and urban plans, building codes, water resources and river basin management, forestry

Assessment areas and sub-areas	Condition for validation
	management etc.
<b>2. Management system</b>	
1) National disaster risk management system	A national disaster risk management committee has been set up for inter-ministerial coordination and it also coordinates with the CCA committee; A national-subnational disaster risk management system has been set up for integrated disaster risk management.
2) National CCA system	A national CCA committee has been set up for inter-ministerial coordination and it also coordinates with the disaster risk management committee
3) Transboundary disaster risk management	A multi-stakeholder transboundary disaster risk management system has been set up for floods, storms and droughts.
<b>3. Financial arrangement</b>	
1) Financial arrangement for DRR	Funds are allocated for DRR activities with a monitoring and tracking system.
2) Financial arrangement for CCA	Funds are allocated for CCA activities with a monitoring and tracking system.
3) Payment for ecosystem services	Payment for ecosystem services is implemented based on the economic assessment.
<b>4. Risk assessment</b>	
1) Disaster database	Disaster data is recorded and used for science-based analysis.
2) Hydro-meteorological data management and climate risk analysis	Climate risk is analysed based on hydro- meteorological data monitoring and downscaling from Global Climate Models (GCMs).
3) Hazard and risk mapping	Hazard maps and risk maps for flood, storm surge, landslide and drought are prepared by assessing the damages of the past disasters, the capacity and vulnerability of local authorities and communities, and the climate risk and they are provided with high resolution for local land-use

Assessment areas and sub-areas	Condition for validation
	planning.
4) Data sharing and dissemination	Disaster and climate risk data including hazard and risk maps are accessible.
5) Early warning system and disaster risk communication	Early warning system is set up and disaster risks are communicated through traditional media, social media and mobile phone networks.
<b>5. Planning and implementation</b>	
1) Guideline and standard	Guidelines and standards incorporating disaster and climate risk are developed and used.
2) Land-use and urban planning	Land-use and urban plans are prepared by incorporating disaster and climate risk and with an assessment of ecosystem services.
3) Disaster-resilient investment	Public and private investments are channelled to strengthen resiliency of critical facilities and they are upgraded in a stage-wise manner.
4) Drought risk reduction	Drought risk reduction measures including water resources management and agricultural measures are implemented.
<b>6. Capacity building</b>	
1) DRR and CCA training	DRR and CCA trainings for national and local government officials and other stakeholders are provided.
2) Sector-wise training	Special training programmes are implemented for specific purposes such as a climate school for farmers.

Source: (JICA et al., 2018)

*Laws, regulations and policies:* Laws, regulations and policies play an important role in promoting the integration of disaster risk reduction and climate change adaptation at the national and sub-national levels (Rego, 2012). Laws, regulations, policies and guidelines act as incentive creators and as facilitators for such integration to happen at project and programmatic levels. Laws and policies can call for improved coordination between relevant institutions, departments and programs and can even promote such integration between governmental and non-governmental institutions. They can ensure developing specific codes and guidelines, provide a structured framework to track the progress, promote accountability for such integration to materialize, and help allocate required resources for facilitating integration (UNDP and IFRC, 2014). Policies can also help mobilise

required financial resources for national and sub-national government bodies to actually implement programmes and projects addressing DRR and CCA (NDRRMC, 2011). Developing sector-specific action plans can bring the agenda of climate change to individual sector level for making actual difference in the activities of line ministries (OECD, 2009). The sectoral plans can set precedence for accountability and increasing the ownership of interventions at the ministry level. The local level DRR and CCA plans at the community level can provide an opportunity for integrating DRR and CCA at the local level while the national level plans provide similar opportunity for integration at the national level (Amaratunga et al., 2018).

*Institutional arrangements:* Mere promulgation of laws, regulations and plans are of no use if the supporting institutional mechanisms do not exist and unless countries are progressively harmonising their institutional mechanisms in line with the newly set laws and regulations (Amaratunga et al., 2018). These institutional arrangements can span from national level to local level in accordance with the set laws and regulations. The national institutional systems, some of which were originally developed with a focus on response, are increasingly being modelled after disaster risk mitigation, long-term risk reduction and building resilience. By streamlining planning departments, line ministries can be successful in setting policies, plans, strategies, standard operating procedures and guidelines at the sectoral level (Benson, 2009). Similarly, memorandum of understanding between different bodies of DRR and CCA can help enhance cross-sectoral coordination and cooperation (NDRRMC, 2018). At the local level, the river basin management offices can help in promoting cross-boundary coordination and collaboration for river basin management and can play a major role in integrating DRR and CCA (ADB, 2016).

*Financial arrangements:* Financing is an important ingredient for policies and plans to shape them into tangible projects and programmes leaving long-lasting impacts on the ground (Kellett et al., 2014). Limited funding can lead to limited implementation and integration. Initiatives such as establishing national to local level disaster risk reduction funds, financial inclusion measures, and public-private partnerships can help countries to enhance funding for risk reduction (ibid). Innovative measures such as expenditure tagging can help countries to track, monitor and evaluate the budgetary allocations made to DRR and CCA activities (DILG, 2016). These measures will go a long way in sustaining and reforming risk governance in general.

*Risk Assessments:* Risk assessments inform stakeholders of the probable impacts associated with a given level of disaster so that appropriate strategic decisions can be made (UNISDR, 2007). Putting in place a

dependable disaster impact database is the first step for the robust risk assessments, with or without climate change impacts (UNDP, 2010). Measures to integrate, standardise and harmonise disaster loss and damage and weather and climate-related databases based on open-source software provide ability to do simple analysis of historical disaster losses and to understand disaster trends and impacts with limited financial burden on national governments (Currian et al., 2007). Regional level data sharing and flood forecasting system can help alert the countries of the impending disasters (WMO, 2010). Risk assessments are part of the DRR planning that are often done based on the knowledge on the historical disaster impacts and understanding the implications of climate change on the intensity and duration of natural hazards is necessary to fine-tune risk assessments for the future (Higgins and Steinbuck, 2014).

*Planning and implementation:* Planning and implementation aggregates all the knowledge and resources for tangible interventions at an appropriate scale of interest (OECD, 2013). Strategic planning has been found to play a vital role in risk reduction for a variety of hazards including for floods, storms, landslides and droughts. This is where guidelines, tools, and on-the-ground activities start showing their impact on the ground. Commitment of countries to strengthen on-the-ground implementation and the rich presence of development partners with willingness to work with governments and communities can lead to strong networks for planning and implementation (Leitner et al., 2018).

*Capacity Building:* Capacity here refers to the human technical capacity as other kinds of capacities such as financial capacity, and institutional capacities are covered above. Human technical capacity is the ultimate limiting factor that need to be addressed for efficiency and effectiveness of DRR and CCA integration due to the technical nature of the subject (Chmutina et al., 2016). Sustainability of initiatives can be at risk due to fragmented implementation and the lack of coherent approaches which could be resultant of human capacity constraints (Gero et al., 2011). Capacity building requires multi-stakeholder approaches where collaboration between national and local governments and with other development partners is to be promoted (Begum et al., 2014).

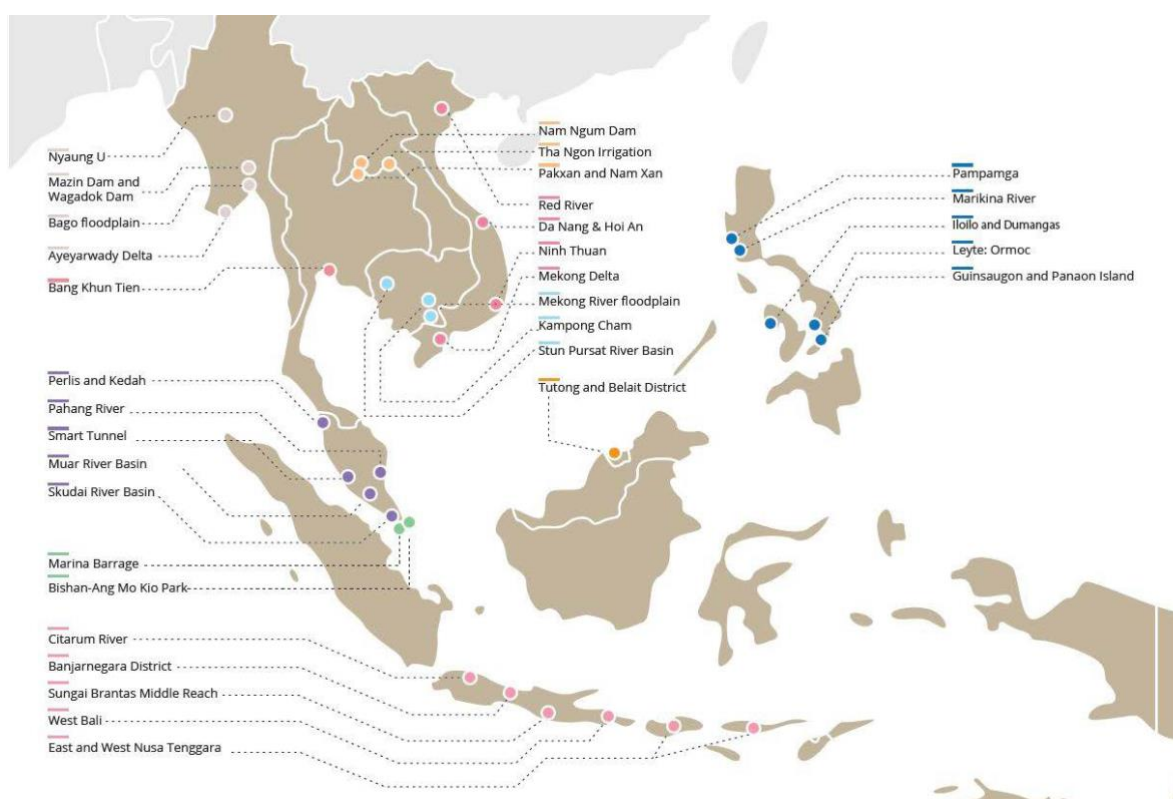
## **Assessment procedure**

The study team consisting of a group of experts on disaster risk management, organisational, legal, and institutional matters, and climate change adaptation undertook the assessment on each key area. These included review of disasters and climate change policy documents and plans, visiting each AMS for an average duration of two weeks for interviewing relevant government agencies and non-governmental stakeholders, and visiting



relevant sites to understand the disaster management and climate change adaptation practices on the ground as shown on Figure 1. As the subject of DRR and CCA covers extensive areas, relevant agencies interviewed in each country include departments responsible for disaster management, water resources management, irrigation and drainage, hydrology and meteorology, agriculture and forestry, construction and public works, mineral resources, and climate change. Joint interaction with all relevant agencies was conducted at the NDMO, whenever feasible, to understand the overall role and responsibilities and initiatives being taken on disaster risk management and climate change adaptation. Provincial, local level agencies and communities in-charge of implementing disaster management or climate change adaptation practices are interviewed. At the end of field survey, a review meeting with the country focal point was organised at NDMO to share the findings of the field study.

**Figure 1. Sites visited by the study team to understand the DRR-CCA practices on the ground**



Source: (JICA et al., 2018)

The study flow and key events are summarised in Table 3. Study results were presented to ACDM members and other government officials and feedback was obtained from them through three national workshops held in Myanmar, Viet Nam and the Philippines. Subsequently, a regional forum and a senior official-level forum were held to develop and finalize a Priority Work Plan 2020 (PWP 2020) for Strengthening DRR and CCA Integration in the ASEAN Region.

**Table 3: Study flow and key events**

Events	Details
Field surveys	Field visits were conducted in Thailand, Lao PDR, Myanmar, Cambodia, Viet Nam, Malaysia, Singapore, Brunei Darussalam, Indonesia, and the Philippines during August 2016-February 2017. Interviews with relevant agencies and site visits were conducted during the field visits.
National workshops	National Workshops were organized in Nay Pyi Taw, Myanmar; Hanoi, Viet Nam; and Quezon, the Philippines during May -July 2017. Representatives from a total of 26 ministries from several AMS, in addition to several development partners,

	attended these three events.
Regional forum	Representatives from 11 ministries and agencies from 6 countries discussed the work plan for strengthening DRR and CCA integration in the ASEAN region in the Forum on 5-6 September 2017 in Bangkok, Thailand.
31 <sup>st</sup> ACDM Meeting; and 5 <sup>th</sup> ASEAN Ministerial Meeting on Disaster Management (AMMDM)	Outputs of the regional forum were reported to ACDM and AMMDM on 17 & 19 October 2017 respectively in Luang Prabang, Lao PDR.
20 <sup>th</sup> ASEAN-Japan Summit	Results of the ACDM Meeting and AMMDM were presented at the Summit on 13 November 2017 in Manila, the Philippines.
Senior Official-level Forum (SOF)	The Priority Work Plan for 2020 for Strengthening DRR and CCA Integration in the ASEAN Region was approved at the SOF, with representatives from 19 ministries/agencies from 8 AMS participated on 16 November 2017 in Jakarta, Indonesia.

Source: (JICA et al., 2018)

## Results and Discussion

The overview of the DRR-CCA integration in each AMS is shown in Table 4. In general, institutional arrangement for DRR and CCA in terms of policy formulation and organisational setup from national to subnational levels is well developed in each AMS. However, coordination among national disaster management offices (NDMOs), or ACDM members, and other agencies in charge of DRR and CCA is not so strong in many AMS. This is due to the barriers related to sectoral laws and associated institutional setup, such as different laws for the management of water resource, river structure, irrigation, land-use, forest, road, hydrology, meteorology and disaster, which are not necessarily well-coordinated in terms of policy formulation, planning and implementation. Particularly for subjects that require intensive coordination among relevant agencies and local governments in a wide geographical coverage, such as river basin management, water resources management and river management

from upstream to downstream, it is still at a development stage in most countries. Details for individual area are further discussed below:

**Table 4. Overview of the DRR-CCA integration among the ASEAN Member States**

No.	Item	Brunei	Cambodia	Indonesia	Lao PDR	Malaysia	Myanmar	Philippines	Singapore	Thailand	Viet Nam
<b>1. Laws, regulations and policies</b>											
	National development plan (with DRR and CCA)										
	Disaster risk management (DRM) law										
	National DRM policy										
	Responsible agency for DRM										
<b>2. Institutional arrangement</b>											
	National DRM committee										
	Subnational DRM system										
	National CCA policy										
	Responsible CCA agency										
	National CC committee										
	River basin (land-use) management system										
	Water resource management system										
	River management system										
<b>3. Financial arrangement</b>											
	Funding for DRM and DRR										
	Funding for community-based DRM										
	Funding for CCA										
<b>4. Risk assessment</b>											
	Major water-related disasters	F, L, S	F, L, D	F, L, S, D	F, L, D	F, L, D	F, L, S, D	F, L, S, D	F, S	F, L, S, D	F, L, S, D
	Disaster data management										
	Meteorological data management										
	Downscaling from global climate models										
	Flood hazard map and risk map										
	with CC impact										
	Landslide hazard map and risk map										
	with CC impact										
	Storm surge hazard map and risk map										
	with CC impact										
<b>5. Planning and Implementation</b>											
	Policy and strategy of DRR with CCA										
	Guideline and standard of DRR with CCA										
	Flood risk management with CCA										
	Potential good practices										
	Landslide risk management with CCA										
	Potential good practices										
	Storm and storm surge risk management with CCA										
	Potential good practices										
	Drought risk (water resources) management										
<b>6. Capacity building</b>											

F: Flood, L: Landslide, S: Storm surge including flood caused by high tide and coastal erosion, D: Drought

 Not prepared or conducted yet (or not relevant) Possessing direction or moving forward Existing or being conducted

Source: (JICA et al., 2018)

## 1. Policies and regulations

One of the significant achievements of AMS has been that they have been successful in outlining the importance of DRR and CCA directly or indirectly in their national socio-economic development plans. For example, the Five-Year National Socio-Economic Development Plan VIII (2016-2020) in Vietnam (Ministry of Planning and Investment, 2016) and the Philippine Development Plan (2017-2022) (National Economic and Development Authority, 2017) clearly indicate DRR and CCA as a main cross-cutting concern. Such integration will increasingly help AMS to mobilise required financial resources for national and sub-national government bodies to

actually implement programmes and projects addressing DRR and CCA. In addition, the countries have promulgated national disaster risk management policy and designated disaster management organisation based on the law, order, decree or directive set forth in each AMS.

Several countries have addressed climate change through various instruments such as policy, strategy, programme or plan and designated an agency mostly under the ministry of environment. For example, Cambodia (Department of Climate Change, 2014) and Indonesia (National Development Planning Agency 2013) stand out in terms of mainstreaming climate change at the ministry level by putting in place sectoral action plans. These sectoral plans are setting precedence for accountability and increasing the ownership of interventions at the ministry level.

What is ubiquitous in the region are the local level DRR and CCA plans. DRR plans at the community level are more prominent in the region than the local level CCA plans. These local level plans are providing an opportunity for integrating DRR and CCA even though such examples are yet to emerge clearly.

## **2. Institutional Arrangements**

The national disaster risk management (DRM) systems of the Philippines, Cambodia and Indonesia can be seen well developed from the national level to the local level down to the community level. The institutions, some of which are originally developed with a focus on response, are increasingly adopting disaster risk mitigation, long-term risk reduction and building resilience. In addition to the dedicated institutional systems for DRR, line ministries are making efforts to streamline their own ministries by integrating planning departments. For instance, Regional Infrastructure Development Agency (BPIW) of the Ministry of Public Works and Housing (PU) of Indonesia has successfully set up policies, plans, strategies, standard operating procedures and guidelines at the sectoral level (JICA et al., 2018). Similarly, cross-sectoral coordination is being improved as in the case of the Philippines where the Memorandum of Understanding (MOU) is being drawn between the National Disaster Risk Reduction and Management Council (NDRRMC) and the Philippine Climate Change Commission for effective cooperation and collaboration (ibid).

At the local level, the river basin management offices in Indonesia are helping in promoting cross-boundary coordination and collaboration for river basin management, which can play a major role in integrating DRR and CCA (ADB, 2016). Effective coordination of the line ministries was observed in Malaysia among the National Disaster Management Agency, the Department of Irrigation and Drainage and the Public Works Department. In Viet

Nam, the General Department of Disaster Prevention and Control under the Ministry of Agriculture and Rural Development coordinates well with other departments in charge of management of flood risks, water resources, agriculture and forestry within the ministry (JICA et al., 2018).

Each AMS also has a national climate change committee consisting of multiple line ministries and agencies (ibid). The member composition is often similar to that of national disaster risk management committee, but their direct coordination is rare in many countries according to the interviews with the secretariat agencies.

### **3. Financial arrangement**

In general, the budget allocations for DRR and CCA in all AMS were found to be insufficient and the funding gap between the plans and implementation is increasing due to the repeated occurrences of water-related disasters. As a result efficient management of finances has been called for and the limited funding is found to be one of the root causes for limited implementation of plans and actions. Significant part of the NDMOs' budget is used for awareness and capacity building and emergent response while infrastructure improvements for reducing disaster risk has been relegated to line ministries. Coordinated funding is not often the case in many countries.

Several AMS, however, have taken initiatives to establish the disaster fund to finance disaster prevention and mitigation and for CCA. Mandated funding pool of 5% of local government budget for disaster management activities in the Philippines has strengthened the capacity of local governments in prevention and mitigation measures (COA, 2014). Similarly, provincial governments in Viet Nam have established natural disaster prevention and control funds (Socialist Republic of Vietnam, 2013). Some national CCA funds, including the Indonesia Climate Change Trust Fund (ICCTF, 2017) and the People's Survival Fund in the Philippines (NDRRMC, 2015), have promoted development of local adaptation and resilience projects in water resources management, land, ecosystems conservation, and installing early warning system.

Tracking of climate-related public expenditures in Cambodia, Thailand, the Philippines and Viet Nam are contributing to effective budget management (JICA et al., 2018). A payment system for forest environmental services implemented by the Vietnam Administration for Forestry under the Ministry of Natural Resources and Environment charging service fees to hydropower generators, water suppliers and other beneficiaries proved to be an effective mechanism to provide funds for forest conservation activities (Thuy et al., 2013). Similar funds have also been established by many provincial governments in Viet Nam.

#### 4. Risk assessment

AMS have made significant progress on risk assessment by developing infrastructures and systems at different level, although the level of advancement vary among the countries and for the type of disasters. All AMS record disaster data and some countries, including Cambodia, Indonesia, the Philippines, Thailand and Viet Nam, share the updated data publicly. However, the extent of the use of such data for science-based analysis is less clear. Hydro-meteorological data monitoring and management system are well established but the geographical coverage and accuracy vary from country to country. All AMS are in the process of modernising their meteorological agencies on data acquisition from satellites or automating weather stations to acquire the real-time data.

Outreaching capacity is still inadequate in many countries, while early-warning systems are being strengthened and forecasts and advisory on disaster risks are communicated through traditional media, web-based tools, social media and mobile applications to the people. Most countries have prepared hazard and risk maps for flood, storm and landslide but often the resolution including the topographic data is insufficient for quantitative risk assessment, land-use planning, evacuation planning and designing of prevention and mitigation measures. Hazard maps and risk maps for storm surge is still limited in most AMS. Good quality hazard and risk maps for landslide are available in Indonesia, Malaysia, the Philippines, Thailand and selected areas in Viet Nam (JICA et al., 2018). Drought hazard and risk maps are usually available either through government or non-government sources, but the scale and resolution vary from one country to another.

Several AMS are integrating climate change impacts when developing risk maps. For example, Indonesia, Malaysia, the Philippines, Singapore and Viet Nam are using climate data downscaled from global climate models (GCMs) for risk mapping and DRR and CCA planning (ibid). Other AMS use downscaled values provided by other research institutions and regional programmes. However, AMS countries are struggling to use the climate risks information due to high uncertainty of climate projections and a lack of standardised guideline for incorporating it into the planning and designing of DRR infrastructures. For instance, flood risk maps combining climate projections are available only in some areas in Malaysia and Mekong Delta in Viet Nam (ibid). No countries have assessed the effects of DRR and CCA measures on the economic impact quantitatively yet.



## 5. Planning and implementation

AMS are speeding-up the planning and implementation of disaster management as well as climate change adaptation measures, although the level of progress is uneven. Several promising practices were found across AMS. Risk profile changes due to an increase in the number of intense events, such as the one caused by Typhoon Haiyan in the Philippines in 2013, are adding new pressures to the AMS to improve their planning and implementation. The basic flood risk reduction measures based on current designed return periods are insufficient in many AMS. More interventions of non-structural measures including early warning, evacuation drills and land-use restriction (e.g. designation of a no built zone) and structural measures including river bank protection and construction of check-dams are needed in most countries.

AMS are experimenting and testing a range of DRR and CCA measures. Forest conservation including reforestation is actively conducted in most countries due to their effectiveness in reducing the disaster risks. National governments in Indonesia and the Philippines are guiding to integrate DRR and CCA concepts into local development and land-use planning (BAPPENAS, n.d.; HLURB, 2014). Although guidelines and standards for designing DRR plans and infrastructures incorporating climate change risks are not well developed in almost all AMS, progress are being made in some counties. For instance, it was found that all planning divisions of the Ministry of Public Works and Housing (PU), Indonesia, are integrated into one division which provides standard structural designs incorporating disaster and climate risk as also mentioned in “2. Institutional Arrangements”. Similarly, the guidelines and standards incorporating climate change risks for river structures are drafted by the Department of Public Works and Highways (DPWH) in the Philippines or being prepared by the Department of Irrigation and Drainage (DID) in Malaysia (JICA et al., 2018). A flood control plan in the Mekong Delta incorporates climate risk in the land-use plan. Landslide risk management including relocation of the affected families, land-use control and monitoring of rainfall and slope movement are implemented in Indonesia and the Philippines.

Water saving and drought risk reduction measures, including water storage of flood water for the use in a dry period, conservation farming, climate smart agriculture, sprinkler irrigation, are implemented in various countries. Some AMS have set up a water resources management committee with involvement of multiple stakeholders and started implementing drought mitigation pilot projects at selected sites. Malaysia and Thailand have established drought information platform (DID, 2018; TDMS, 2018). Water resources management is actively implemented in Singapore particularly with rainwater harvesting by a network of rivers and canals connected to 17 reservoirs covering two-thirds of the land surface as a catchment area (PUB, 2018). Weather index insurance is being piloted

in Indonesia, the Philippines and Thailand to hedge climate risk for agriculture (Sompo, 2010; MOA, 2016; PCIC, 2018).

## **6. Capacity building**

Capacity building activities have been implemented at regional, national and local levels in ASEAN. DRM capacity building is at the core of AADMER and it is done at various levels such as establishment of ASEAN Coordinating Centre for Humanitarian Assistance on disaster management (AHA Centre), trainings for intra-ASEAN capacity building to facilitate the movement of humanitarian assistance within ASEAN, and for building disaster resilient nations and safer communities. Regional collaboration for downscaling from GCMs is being implemented with the involvement of national agencies from Indonesia, Lao PDR and Malaysia (JICA et al., 2018). Formulation of ASEAN Disaster Management Training Institutes Network (ADTRAIN) envisions as a centre of excellence in training and knowledge management in ASEAN.

Disaster risk management training is actively conducted in each country particularly for local communities and schools. The National Development Planning Agency (BAPPENAS) in Indonesia provides two-week training for integrating disaster risk reduction and climate change concepts in local development plans for national and local government officials (ibid). Provision of location-specific weather and rainfall forecast and training of farmers to use it proved to be effective in increasing the crop yields in Indonesia, Myanmar and the Philippines. Disaster-hit or -prone areas often improve their DRR capacities that can be observed from flood warning signs, evacuation centres, and cyclone-proof housing. One such example is management of telemetric rain gauges and extensometers by the communities in landslide risk areas under the supervision of the Regional Disaster Management Agency (BPBD) in Indonesia.

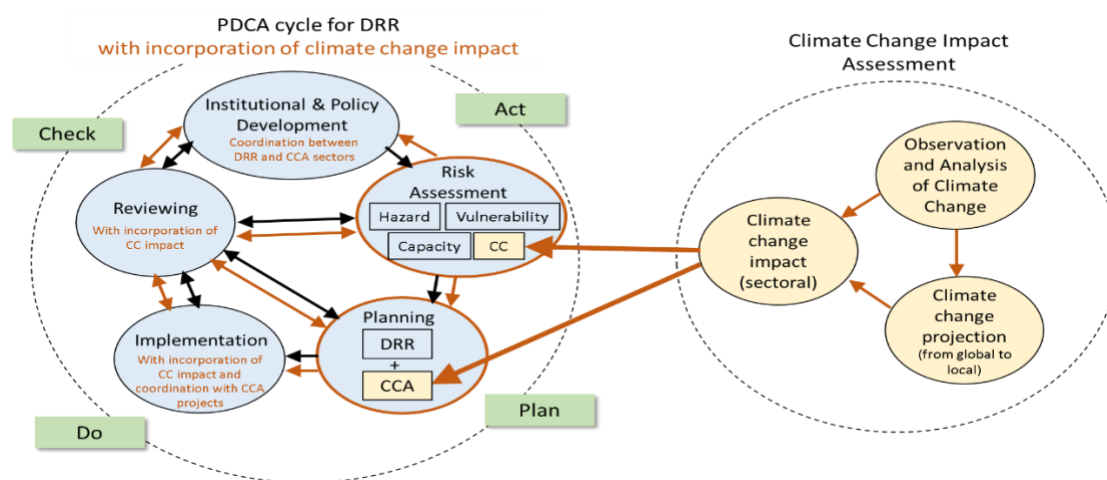
Existing efforts, however, are insufficient to deal with new risks associated with climate change due to high uncertainty of climate projections and lack of standardised guideline for incorporating it as explained in the section of risk assessment. Capacity building in areas such as climate risk assessment and risk mapping is further needed as a first step to design effective risk mitigation measures. As climate change risks are still new, there is a need for efforts for continuous improvement in risk assessment methodologies and risk assessments, and cross-learning between departments and countries in the region, where geographical and social similarity exists in terms of vulnerabilities and capacities.

## Development of a Priority Work Plan for 2020

In response to these gaps and needs, members of the ACDM Working Group on Prevention & Mitigation agreed to develop a Priority Work Plan for 2020 (PWP 2020) to track the progress of integration of DRR and CCA policies and institutions among AMS. The PWP 2020<sup>2</sup> was developed in a consultative manner with particular focuses on a) capacity building for planning and implementation with a focus on risk assessment and risk mapping by incorporating climate change impacts; and b) integration of DRR and CCA policies through coordination of relevant agencies. The PWP 2020 identified target areas for DRR-CCA integration and spelt out annual activities for the next three years, including stocktaking of capacities in 2018, implementation of case studies and development of training modules in 2019, and development of guidelines and organising training programmes in 2020.

Suppose DRR management cycle consists of five stages, such as institutional and policy development, risk assessment, planning, implementation, and reviewing, like a Plan-Do-Check-Act (PDCA) cycle, the AMS have agreed to limit the PWP 2020 to integrate climate change elements into mainly risk assessment and planning stages as a means of prioritisation as illustrated in Figure 2.

**Figure 2: Incorporation of climate change impact in a PDCA cycle for DRR**

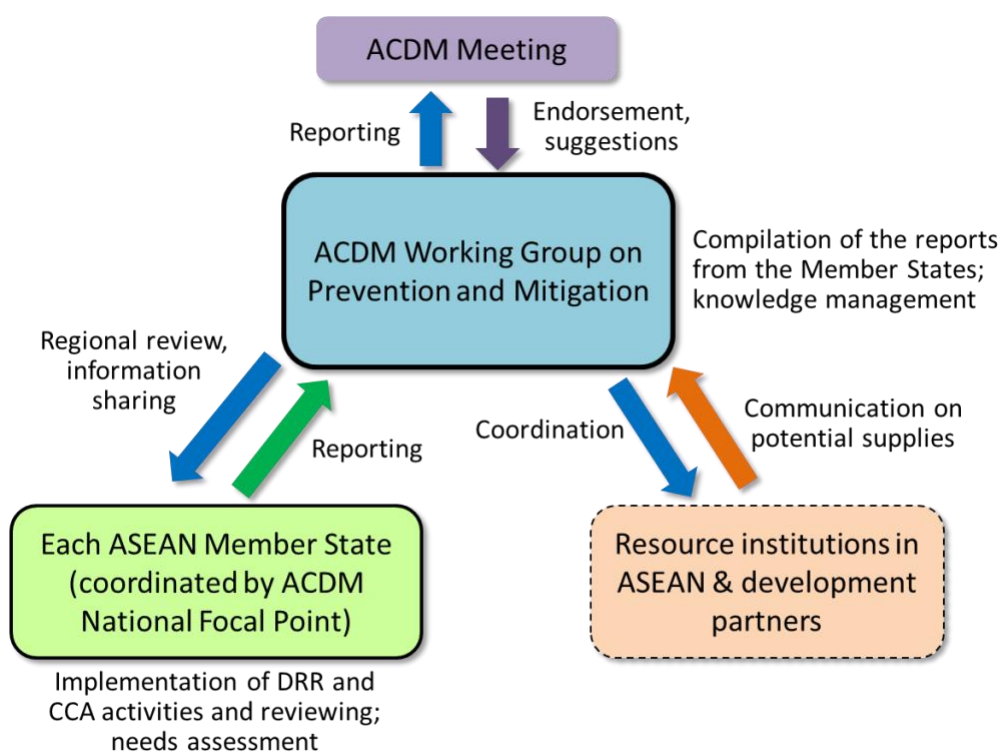


<sup>2</sup> The full PWP 2020 is available at page 211 in JICA, IGES and CTII. (2018). Project for Strengthening Institutional and Policy Framework on Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA) Integration: Final Report. Tokyo, Japan: JICA. Available at [http://open\\_jicareport.jica.go.jp/pdf/12303509.pdf](http://open_jicareport.jica.go.jp/pdf/12303509.pdf).

Source: (JICA et al., 2018)

PWP 2020 helps ACDM members to continuous monitoring and evaluation of the status of integrating DRR and CCA in the ASEAN region in the years to come. Development of PWP 2020 asks AMS to pursue the integration of DRR and CCA with an agreed timeline and provides them sufficient incentive to develop follow up projects that in turn help achieving it. Each AMS represented by the national project focal point of ACDM will report the progress of PWP2020 to the Working Group on Prevention and Mitigation (WG P&M) annually. The WG P&M plays a pivotal role in coordinating and monitoring the implementation of the PWP 2020, while compiling the progress reports from AMS as a regional report to submit to the annual ACDM meeting as well as the United Nations Office for Disaster Risk Reduction (UNISDR), the secretariat of the SFDRR (See Figure 3). AMS and WG P&M will provide full support to the successful implementation of regional projects and programmes meant for showcasing good practices and facilitating regional cross-learning.

**Figure 3: Implementation structure of the priority work plan for 2020**



Source: (JICA et al., 2018)

## Conclusions

The ASEAN region is highly vulnerable to climate change impacts and safeguarding the developmental gains made in the region needs sufficient and timely integration of climate change considerations into disaster risk

reduction initiatives. Global processes such as the SFDRR, the Paris Agreement and the Sustainable Development Goals (SDGs) encourage cross-sectoral coordination and integration of strategies to address the emerging disaster and climate change risks. Similar emphasis on integration and coordination between DRR and CCA can be found in various regional and national processes in the ASEAN. This paper presented a summary of the extent to which DRR and CCA approaches have been coordinated and integrated in the ASEAN region using a six-area framework based on the AADMER Work Programme and the SFDRR.

The ASEAN-regional initiatives such as AADMER and ACDM WG P&M have ushered a host of actions regarding projects and programmes that helped the region to make meaningful progress in improving institutional mechanisms. The assessment revealed that the ASEAN region has made a good beginning in the direction of integrating DRR and CCA. One of the main findings of the study was that institutional arrangement regarding policy formulation and organisational setup from national to subnational levels for DRR and CCA has been well developed in each country. Similarly, institutional mechanisms and policy measures are rapidly improving to accommodate cross-sectoral coordination and cooperation necessary across the region; however the reflection of these efforts in terms of actual implementation is rather slow primarily due to the incomplete development of such coordination systems. Coordination between the national disaster management office (NDMO) and those responsible for planning and implementation of disaster risk reduction and climate change adaptation measures is limited in many countries. For example, integrated river basin management for flood and drought risk management through coordination of relevant agencies and multiple local governments from upstream to downstream is still at a nascent stage in many countries. The level of risk assessment with and without climate change projection and the capacity to incorporate it in the national and local development plans vary widely from country to country.

The region still has a vast ground to cover in several areas for DRR-CCA integration. Some of the important areas include developing sufficient technical capacities to downscale climate change projections with incorporation of risk and vulnerability assessments; promotion of spatial planning and area-based approaches such as integrated river basin approaches, river management, coastal management; and developing guidelines and standards that help to mainstream CCA into DRR activities. The region also needs to scale up the good practices that have been championed in various areas of DRR and CCA by addressing the capacity constraints the region is facing.

In response to these challenges, a Priority Work Plan for 2020 was developed to stocktake each country's

status and progress and share among countries for cross- learning. The advantage of the ASEAN region is its vast collection of DRR and CCA measures, in terms of policies, institutional setup, risk assessment, planning and implementation, under different geographical and climate background and development stages that provides various kinds of lessons catering for each demand. Various initiatives taken by the ASEAN, discussed in this paper, are worth monitoring in that sense and the role of ACDM WG P&M as a facilitator of learning across the region is highly important to enhance risk reduction in the region.

## Bibliography

ADB. 2016. *River Basin Management Planning in Indonesia: Policy and Practice*. Asian Development Bank, Manila, the Philippines.

ADB. 2016. *River basin management planning in Indonesia: Policy and practice*. Asian Development Bank: Manila, The Philippines. <https://www.adb.org/publications/river-basin-management-planning-indonesia>, cited on 16 Feb 2019

Amaratunga, D., Malalgoda, C., Haigh, R., Panda, A., Rahayu, H. 2018. Sound practices of disaster risk reduction at local level. *Procedia Engineering*, 212: 1163-1170

ASEAN. 2013. *Strategies and priorities for AADMER Work Programme Phase 2 (2013-2015)*. ASEAN, Jakarta, Indonesia.

ASEAN. 2014. ASEAN Agreement on Disaster Management and Emergency Response. <http://agreement.asean.org/media/download/20140119170000.pdf>, cited on 16 Feb 2019

ASEAN. 2015. *ASEAN Summit, April 26-28, Kuala Lumpur, Malaysia*. Retrieved from ASEAN. ASEAN Secretariat, Jakarta, Indonesia. Available at <http://asean.org/asean/asean-structure/asean-summit/#bb8d90f6623a980d9>

ASEAN. 2017. ASEAN cooperation on climate change. <https://environment.asean.org/asean-working-group-on-climate-change/>, cited on 15 Feb 2019

BAPPENAS. N.d. *Integration of CCA – DRR programmes into national and sub-national development planning (in Bhasha)*. Kementerian Perencanaan Pembangunan Nasional/ Badan Perencanaan Pembangunan Nasional (BAPPENAS)/ Ministry of National Development Planning/National Development Planning Agency, Indonesia.

Begum, R. A., Sarkar, S.K., Jaafar, A. H. and Pereira, J.J. 2014. Towards conceptual frameworks for linking disaster risk reduction and climate change adaptation. *International Journal of Disaster Risk Reduction*, DOI: 10.1016/j.ijdr.2014.10.011

Benson, C. 2009. *Mainstreaming disaster risk reduction into development: Challenges and experiences in the Philippines*. Provention Consortium and IFRC.

- [https://www.preventionweb.net/files/8700\\_8700mainstreamingphilippines1.pdf](https://www.preventionweb.net/files/8700_8700mainstreamingphilippines1.pdf), cited on 16 Feb 2019
- Chmutina, K., Jigyasu, R. and Bosher, L., 2016. *Integrating disaster risk reduction and climate change adaptation into the built environment*. IN: Proceedings of the International Conference on Building Resilience, Auckland, New Zealand, 7 - 9 September 2016
- COA. 2014. *Assessment of Disaster Risk Reduction and Management*. Commission on Audit. 2014. The Philippines
- Currian, P., Silva, C., and Walle, B.V. 2007. Open source software for disaster management. *Communications of the ACM*, 50 (3): 61-65
- Department of Climate Change. 2014. *Climate Change Action Plan*. Department of Climate Change, National Council for Sustainable Development, Government of the Kingdom of Cambodia, Phnom Penh, Cambodia.
- DID. 2018. *INFOKEMARAU- The drought information website*, Department of Irrigation and Drainage, Ministry of Natural Resources and Environment, Malaysia, <http://infokemarau.water.gov.my/>, cited on August 13, 2018
- DILG. 2016. *Climate change expenditure tagging for local governments*. DILG, CCC, AusAid, and DBM: Manila, The Philippines
- DOA. 2018. *The Philippine Crop Insurance Corporation*. Department of Agriculture (DOA), <http://pcic.gov.ph/>, cited on August 13, 2018
- Forino, G., J. Meding and G.J.Brewer. 2015. A conceptual governance framework for climate change adaptation and disaster risk reduction integration. *International Journal of Disaster Risk Science*, 6 (4): 372-384
- Gero, A., Meheux, K., Dominey-Howes, D. 2011. Integrating disaster risk reduction and climate change adaptation in the Pacific. *Climate and Development*, 3(4): 310-327
- Higgins, P.A.T., and Steinbuck, J.V. 2014. A conceptual tool for climate change risk assessment. *Earth Interactions*, 18: 1-15
- HLURB. 2014. *The Comprehensive Land Use Plan (CLUP) Guidebook 2013-2014*. Housing and Land Use Regulatory Board, the Philippines
- <http://www.ndrrmc.gov.ph/attachments/article/1638/NDRRMC-and-CCC-memo.pdf>, cited on 16 Feb 2019



- ICCTF. 2017. Annual Report 2017. *Indonesia Climate Change Trust Fund*. National Development Planning Agency, Jakarta, Indonesia.
- JICA, IGES, and CTII. 2018. *Project for Strengthening Institutional and Policy Framework on Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA) Integration: Final Report*. JICA, Tokyo, Japan.
- Kellett, J., Caravani, A., and Pichon, F. 2014. *Financing disaster risk reduction: Towards a coherent and comprehensive approach*. London, United Kingdom: ODI.
- Leitner, M., Schmidt, A., Laurenco, T.C., Prtusch, A., Liehr, C., Pulquiro, M., Steenbergen, M. and Schipper, L. 2018. *Draft guidelines to strengthen CCA and DRR institutional coordination and capacities*. PLACARD. <https://www.placard-network.eu/wp-content/PDFs/PLACARD-Insitutional-strengthening.pdf>, cited on 15 Feb 2019
- Ministry of Planning and Investment. 2016. *8th Five-Year National Socio Economic Development Plan (2016-2020)*. Ministry of Planning and Investment, Government of Vietnam. Vientiane, Vietnam.
- Mitchell, T. and Aalst, M. V. 2008. *Convergence of disaster risk reduction and climate change adaptation*. DFID, London, UK.
- MOA. 2016. *Guidelines for rice farming insurance premium aid (in Bhasha)*. Ministry of Agriculture, Indonesia
- National Development Planning Agency. 2013. *National Action Plan for Climate Change Adaptation (RAN-API): Synthesis Report*. National Development Planning Agency, Jakarta, Republic of Indonesia.
- National Economic and Development Authority. 2017. *Philippine Development Plan 2017-2022. National Economic and Development Authority*. Government of the Philippines, Pasig City, Philippines.
- NDRRMC. 2011. *National Disaster Risk Reduction and Management Plan (NDRRMP) 2011-2028*. Office of Civil Defence, Government of the Philippines: Manila, The Philippines. [http://www.ndrrmc.gov.ph/attachments/article/41/NDRRM\\_Plan\\_2011-2028.pdf](http://www.ndrrmc.gov.ph/attachments/article/41/NDRRM_Plan_2011-2028.pdf), cited on 15 Feb 2019
- NDRRMC. 2015. *National Disaster Preparedness Law 2015-2028*. National Disaster Risk Reduction and Management Council, the Government of the Philippines, Manila, the Philippines.
- NDRRMC. 2018. *Memorandum of understanding between national disaster risk reduction and management council and climate change commission for collaboration program on Philippine climate risk reduction*. NDRRMC:

Manila, The Philippines.

OECD. 2009. *Integrating climate change adaptation into development cooperation. Policy Guidance*. OECD: Paris, France. <http://www.oecd.org/env/cc/44887764.pdf>, cited on 16 Feb 2019

OECD. 2013. *Development results: An overview of results measurement and management*. OECD: Paris, France

PUB. 2018. *Singapore Water Story*. The Public Utilities Board (PUB),

<https://www.pub.gov.sg/watersupply/singaporewaterstory>, cited on August 13, 2018

Rego, L. 2012. Linking DRR and CCA in policy, programming and institutional partnerships.

<https://www.preventionweb.net/posthfa/dialogue/discussion/22/linking-drr-and-cca-in-policy-programming-and-institutional-partnership/p1>, cited 15 Feb 2019

Socialist Republic of Vietnam. 2013. *Order No. 07/2013/L-CTN of June 28, 2013, on the Promulgation of Law on Natural Disaster Prevention and Control*. Vientiane, Socialist Republic of Vietnam.

Sompo. 2010. *Weather Index Insurance Launched for Drought Risk in Northeast Thailand: Provision of adaptation measure for climate change utilizing insurance*, Sompo Insurance Japan, [http://www.sompo-hd.com/~media/SJcms/english/news/2010/20100125\\_1.pdf](http://www.sompo-hd.com/~media/SJcms/english/news/2010/20100125_1.pdf), cited on August 13, 2018

TDMS. 2018. *Thailand Drought Monitoring System*. GISTDA, <http://drought.gistda.or.th/>, cited on August 13, 2018

Thuy, P.T., Bennett, K., Phuong, V.T., Brunner, J., Dung, L.N., Tien, N.D. 2013. *Payments for forest environmental services in Vietnam: From policy to practice*. Occasional Paper 93. CIFOR, Bogor, Indonesia.

UNDP and IFRC. 2014. *Effective law and regulation for disaster risk reduction: A multi-country report*. Summary. UNDP and IFRC: New York, USA.

[https://www.undp.org/content/dam/undp/library/crisis%20prevention/UNDP\\_IFRC\\_CPR\\_DRRLaw\\_summary\\_final.pdf](https://www.undp.org/content/dam/undp/library/crisis%20prevention/UNDP_IFRC_CPR_DRRLaw_summary_final.pdf), cited on 15 Feb 2019

UNDP. 2010. *Disaster risk assessment*. New York, USA: UNDP

UNISDR. 2007. *Disaster risk reduction tools and methods for climate change adaptation*. Inter-Agency Task Force on Climate Change and Disaster Risk Reduction. UNISDR.

[https://www.unisdr.org/files/5654\\_DRRtoolsCCAUNFCC.pdf](https://www.unisdr.org/files/5654_DRRtoolsCCAUNFCC.pdf), cited on 17 Feb 2019

UNISDR. 2012. *Disaster risk reduction and climate change adaptation in the Pacific. An institutional and policy*

*analysis*. UNISDR, GFDRR and UNDP.

[https://www.unisdr.org/files/26725\\_26725drrandccainthepacificaninstitu.pdf](https://www.unisdr.org/files/26725_26725drrandccainthepacificaninstitu.pdf), cited on 15 Feb 2019

UNISDR. 2015. Sendai Framework for Disaster Risk Reduction, <https://www.unisdr.org/we/coordinate/sendai-framework>, cited on 15 Feb 2019

United Nations. 2015. *Sendai Framework for Disaster Risk Reduction 2015-2030*. United Nations, Geneva, Switzerland.

WMO. 2010. *Flood forecasting initiative: Strategy and action plan*. Geneva, Switzerland: World Meteorological Organization