

# Overview of DRR and CCA Integration status in ASEAN

An overview of DRR and CCA integration status in ASEAN Member States and relevant names of agencies, laws, regulations, policies and activities are summarised in the following table:

**Table 2-1 Overview of DRR and CCA Integration Status in 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)	3rd RPJMN 2015-2019	NSDP 2014-2018	RPJPN 2005-2025	8th NSERP 2016-2020	11th MP 2016-2020	NCDP 2011-2030	FDP 2017-2022	Singapore 2030	11th NSDP 2012-2016	10th SEDP 2016-2020
	Disaster risk management (DRM) law	DMO 2006	Law on DM (2015)	DM Law (2007)	PM Decree 220 (1999); NPDM (2001)	<i>Being developed;</i> NSC Directive No.20	NDM Law (2013)	RA10121 DRRM Act (2010)	Civil Defence Act (1986)	DPM Act (2007)	Law on DPC (2013)
	National DRM policy	SNAPDRR (2012)	NAP-DRR (2014-2018)	RENAS PB (2010)	NSPDRM (2003)	NPDRR (2013)	MAPDRR (2016)	NDRRMP (2012)	SCDF EPP	NDRMP (2015)	NSNDRM to 2020
	Responsible agency for DRM	NDMC	NCDM Secretariat	BNPB	NDMO / DDMCC	NADMA	RRD	OCD	SCDF	DDPM	GDNDPC
<b>2. Institutional arrangement</b>											
	National DRM committee	NDC/NCDM	NCDM	DMSC	NDPCC	NDMRC	NNDMC	NDRRM Council	Government Network	NDFMC	CSCNDPC
	Subnational DRM system	DCDM	PCDM/DCDM /CCDM	BPBD	DDPCC	DDMRC	DDDMC	LDRRM Office	District Network	DDPMC	DNDPC
	National CCA policy	Sector-wise CC policies	CCCSP	RAN-API	CCAP	NPCC	MCCSAP	NCCAP (2011-2038)	NCCS	CCMP	NAPCC
	Responsible CCA agency	EIDPMO	MOE	DGCC, KLHK	DDMCC, MONRE	PASPI, NRE	ECD, MONREC	CCC	Resilience WG, MEWR and MND	ONEP, MONRE	DMHCC, MONRE
	National CC committee	SCCCC	NCSD	BAPPENAS/ LHK	NSCCC	NCCC	NECCC	CCC	IMCCC	NCCC	NCCC
	River basin (land-use) management system	PWD	MOWRAM/ LGUs	DGWR, PU (Bare) / LGUs	DWR, MONRE/ MPWT	DID/ States	DWIR, MOTC/ LGUs	RB CO & LMB, DENR/ HLURB	PUB/ BCA/ HDB	DWR, MONRE/ LGUs	DWRM & DLA, MONRE
	Water resource management system	PWD	MOWRAM	PU	DWR, MONRE	DID/ States	DWIR/ IWUMD, MOALI	NWRB, DENR/ NIA	PUB	DWR/ RID	DWRM
	River management system	PWD	MOWRAM/ MAFF	DGWR, PU/ Bare/ LGUs	DWR/ Depart. Waterways, MPWT	DID/ States	DWIR, MOTC/ LGUs	LGUs/ DPWH	PUB	DWR/ LGUs	DWRM/ DWR, MARD/ IWA, MOT
<b>3. Financial arrangement</b>											
	Funding for DRM and DRR	Domestic Fund	Domestic fund	Domestic Fund	Domestic fund	Domestic Fund	Domestic fund	NDRRM Fund	Domestic Fund	Domestic Fund	Domestic Fund
	Funding for community-based DRM	CBDRM Program	Domestic fund	APBN	Emergency Response Fund	KWABBN Fund	CBDRR Fund	LDRRM Fund	Disaster Response Fund	IDRM Fund	CBDRM Fund
	Funding for CCA		Tracking by CPEIR	ICCTF				People's Survival Fund		Tracking by CPEIR	Tracking by CPEIR
<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	NDMC	NCDM	BNPB	NDMO / DDMCC	NADMA	RRD	OCD	No info.	DDPM	DMC
	Meteorological data management	BDMD	MOWRAM	BMKG	DMH	MMD	DMH	PAGASA	MSS	TMD	NHMS
	Downscaling from global climate models (GCM)			BMKG		MMD		PAGASA	MSS		IMHEN
	Flood hazard map and risk map	PWD	MRC	BNPB/ BMKG	ADCP/ MRC	DID	DMH	MGB/ PAGASA		DWR/ RID	NHMS/ SWWRP
	with CC impact					DID					SWWRP
	Landslide hazard map and risk map	PWD		PVMBG	MPWT	JKR / JMG		MGB	-	DMR	MOT
	with CC impact										
	Storm surge hazard map and risk map	PWD	-	-	-	-	DMH	MGB	No info.		
	with CC impact		-	-	-	-					
<b>5. Planning and Implementation</b>											
	Policy and strategy of DRR with CCA	NDMC/ PWD	NCDM	BNPB/ PU	DDMCC/ DWR	NADMA/ DID	RRD/ DWIR/ IWUMD	OCD/ DPWH/ DENR/ LGUs	BCA	DDPM/ DWR	GDNDPC / DWRM
	Guideline and standard of DRR with CCA	PWD				DID		DPWH	BCA		
	Flood risk management (FRM) with CCA: Good practices			Semarang rivers with Sea Level Rise							Mekong Delta FRP with sea level rise
	Potential good practices	Elevated house	Elevated house	River improve Etc.	River dikes	River improve etc.	River improve etc.	River improve etc.	River improve etc.	River improve etc.	River improve etc.
	Landslide risk management (LRM) with CCA: Good practices								-		
	Potential good practices			Land-use management		Land-use management		Land-use management	-	Land-use management	
	Storm and storm surge risk management (SRM) with CCA: Good practices	Coastal dikes with sea level rise	-	Coastal reclamation with sea level rise	-	-			Coastal reclamation with sea level rise		
	Potential good practices	Mangrove reforestation	-	Mangrove reforestation	-	Mangrove reforestation	Mangrove reforestation	Mangrove reforestation	Mangrove reforestation	Mangrove reforestation	Mangrove reforestation
	Drought risk (water resources) management								Water saving measures		
<b>6. Capacity building</b>											
		CBDRM program	CBDRM program	2-week training by BAPPENAS	CBDRM program	CBDRM program	CBDRM program	CBDRRM program	CBDRM program	CBDRM program	CBDRM program

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

DRM: Disaster risk management, DRR: Disaster risk reduction, CCA: Climate change adaptation, FRM: Flood risk management, LRM: Landslide risk management,

SRM: Storm and storm surge risk management (including high tide and coastal protection)

- Not related

Not prepared or conducted yet (or not relevant)

Possessing direction or moving forward

Existing or being conducted

## List of Acronyms

Brunei		Lao PDR	
BDMD	Brunei Darussalam Meteorological Department	ADPC	Asian Disaster Preparedness Center
DCDM	District Level: District Committee for Disaster	CCAP	Climate Change Adaptation Project
EID	Energy and Industry Department	DDMCC	Department of Disaster Management and Climate
EIDPMO	Energy and Industry Department at the Prime	DMH	Department of Meteorology and Hydrology
NCDM	National Committee on Disaster Management	DSW	Department of Social Welfare
NDC	National Disaster Council	DWR	Department of Water Resources
NDMC	National Disaster Management Centre	MAF	Ministry of Agriculture and Forestry
PMO	Prime Minister's Office	MLSW	Ministry of Labour and Social Welfare
PWD	Public Works Department	MOA	Ministry of Agriculture
RKN	National Development Plan	MONRE	Ministry of Natural Resources and Environment
RPJMN	National Medium-Term Development Plan	MPI	Ministers of Planning and Investment
SCCCC	Stakeholders Consultative Committee on Climate	MPWT	Ministry of Public Works and Transport
SNAPDRR	Strategic National Action Plan for Disaster Risk	MRC	Mekong River Commission
Cambodia		NDMO	National Disaster Management Office
CCSP	Climate Change Strategic Plan	NDPCC	National Disaster Prevention and Control
CCDM	Commune Committee for Disaster Management	NSCC	National Strategy on Climate Change
DCC	Department of Climate Change	NSCCC	National Steering Committee on Climate Change
DCDM	District Committee for Disaster Management	NSEDP	National Socio-Economic Development Plan
LGUs	Local Government Units	NSPDRM	National Strategic Plan on Disaster Risk Reduction
MAFF	Ministry of Agriculture, Forestry and Fishery	WREA	Water Resources and Environment Administration
MOE	Ministry of Environment	Malaysia	
MOP	Ministry of Planning	DDMRC	District Disaster Management and Relief
MOWRAM	Ministry of Water Resources and Meteorology	DMRC	Disaster Management and Relief Committee
MRC	Mekong River Commission	DID	Department of Irrigation and Drainage
MPWT	Ministry of Public Works and Transport	JKR	Jabatan Kerja Raya
NCCC	National Climate Change Committee	JMG	Jabatan Mineral dan Geosains
NCDM	National Committee for Disaster Management	JPS (DID)	Department of Irrigation and Drainage
NCSD	National Council for Sustainable Development	KWABBN	Kumpulan Wang Amanah Bantuan Bencana Negara
NSDP	National Strategic Development Plan	MADA	Agricultural Development Authority
PCDM	Provincial Committee for Disaster Management	MET	Mineski Malaysia
SNAP-DRR	Strategic National Action Plan for Disaster Risk	NADMA	National Disaster Management Agency
Indonesia		NCCC	National Steering Committee on Climate Change
BAPPENAS	Badan Perencanaan Pembangunan	NDMRC	National Disaster Management and Relief
BMKG	Badan Meteorologi, Klimatologi, Dan	NPCC	National Policy on Climate Change
BNPB	Badan Nasional Penanggulangan Bencana/National	NPDRR	National Platform for Disaster Risk Reduction
BPBD	Badan Penanggulangan Bencana Daerah/Regional	NRE	Ministry of Natural Resources and Environment
BPIW	Badan Pengembangan Infrastruktur dan	NSC	National Security Council
DGCC	Directorate General of Climate Change	NSD	National Security Division
DGWR	Directorate General of Water Resources	PASPI	Department of Environmental Management and
DMSC	Department of Medical Sciences		
ICCTF	Indonesia Climate Change Trust Fund		
LGUs	Local Government Units		
KLHK	Kementerian Lingkungan Hidup dan Kehutanan		
NSEDP	National Socio-Economic Development Plan		
MOA	Ministry of Agriculture		
MOEF	Ministry of Environment and Forestry		
PU	Kementerian Pekerjaan Umum dan Perumahan		
PVMBG	Pusat Vulkanologi dan Mitigasi Bencana		
RAN-API	National Action Plan on Climate Change		
RAN-GRK	National Action Plan for GHG Emission Reduction		
RENAS PB	National Disaster Management Plan		
RPJPN	National Long-Term Development Plan		

# List of Acronyms (continued)

Myanmar		Singapore	
DDDMC	District Disaster Management and Relief	BCA	Building and Construction Authority
DMH	Department of Meteorology and Hydrology	CCPD	Climate Change Programme Department
DWIR	Directorate of Water Resources and Improvement	HDB	Housing and Development Board
ECD	Environment Conservation Department	IMCCC	Inter-Ministerial Committee on Climate Change
IWUMD	Irrigation and Water Utilization Management	IMCSD	Inter-Ministerial Committee on Sustainable
LGUs	Local Government Units	MEWR	Ministry of the Environment and Water Resources
MAPDRR	Myanmar Action Plan for Disaster Risk Reduction	MSS	Meteorological Service of Singapore
MCCA	Myanmar Climate Change Alliance	NCCS	National Climate Change Strategy
MCCSAP	Myanmar Climate Change Strategy and Action Plan	NCCS	National Climate Change Secretariat
MDPA	Myanmar Disaster Preparedness Agency	NEA	National Environment Agency
MOALI	Ministry of Agriculture and Irrigation	PUB	Public Utilities Board
MOTC	Ministry of Transport and Communications	SCDF	Singapore Civil Defense Force
MONREC	Ministry of Natural Resources and Environmental	SCDF EPP	Singapore Civil Defense Force Extended Police
MSWRR	Ministry of Social Welfare, Relief and Resettlement	Thailand	
NDM	Natural Disaster Management	CCCO	Climate Change Coordination Office
NDPCC	National Disaster Preparedness Central Committee	CCMP	Climate Change Master Plan
NNDMC	National Natural Disaster Management Committee	CDMC	Central Disaster Management Centre
RRD	Relief and Resettlement Department	DDPM	Department of Disaster Mitigation and Prevention
Philippines		DMR	Department of Mineral Resources
CCC	Climate Change Commission	DWR	Department of Water Resources
DENR	Department of Environment and Natural Resources	MONRE	Ministry of Natural Resources and Environment
DOF	Department of Finance	NCCC	National Committee on Climate Change
DPWH	Department of Public Works and Highways	NDCH	National Disaster Command Headquarters
HLURB	Housing and Land Use Regulatory Board	NDPMC	National Disaster Prevention and Mitigation
LDRRMF	Local Disaster Risk Reduction and Management	NDPMP	National Disaster Prevention and Mitigation Plan
LDRRMP	Local Disaster Risk Reduction and Management	NESDB	National Economic and Social Development Board
LGUs	Local Government Units	NESDP	National Economic and Social Development Plan
LMB	Land Management Bureau	NMPCC	National Master Plan on Climate Change
MGB	Mines and Geosciences Bureau	ONEP	Office of Natural Resources and Environmental
NCCAP	National Climate Change Action Plan	RID	Royal Irrigation Department
NIA	National Irrigation Administration	TGO	Greenhouse Gas Management Organisation
NDRRMC(O)	National Disaster Risk Reduction and Management	TMD	Thai Meteorological Department
NDRRMF	National Disaster Risk Reduction and Management	Viet Nam	
NDRRMF	National Disaster Risk Reduction and Management	CCNDPC	Central Committee for Natural Disaster Prevention
NDRRMP	National Disaster Risk and Management Plan	DLA	Department of Legal Affair
NSFCC	National Strategic Framework on Climate Change	DMC	Disaster Management Centre
NWRB	National Water Resources Board	DMHCC	Department of Meteorology, Hydrology and
OCD	Office of the Civil Defense	GDNDPC	General Department of National Disaster
PAGASA	Philippine Atmospheric Geophysical and	DPC	National Disaster Prevention and Control
RBCO	River Basin Control Office	DWRM	Department of Water Resources Management
PDP	Philippine Development Plan	IWA	Inland Waterways Administration
PSF	People's Survival Fund	MARD	Ministry of Agriculture and Rural Development
SNAP	Philippine Strategic National Action Plan for	MOF	Ministry of Finance
PDP	Philippine Development Plan	MONRE	Ministry of Natural Resources and Environment
		MOT	Ministry of Transport
		MPI	Ministry of Planning and Investment
		NCCC	National Committee on Climate Change
		NHMS	National Hydro-Meteorological Service
		NSCC	National Strategy on Climate Change
		NSNDPRM	Natural Disaster Prevention, Response and
		NTP-RCC	National Target Programme to Respond to Climate
		SEDP	Socio-economic Development Plan
		SIWRP	Southern Institute for Water Resources Planning

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 Member State. 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 countries. Particularly for subjects that require intensive coordination among relevant agencies and local governments, such as river basin management, water resources management and river management from upstream to downstream, an essential approach to reduce disaster risk in the area, it is still at a development stage in most countries.

The level of risk assessment for water-related disasters is advanced in Indonesia, Malaysia, the Philippines, Thailand and Viet Nam, but climate risk assessment and its incorporation is still limited, such as at selected areas in Malaysia and Viet Nam. Similarly, the level of planning and implementation of DRR and CCA integrated projects vary from country to country. Development of guidelines incorporating disaster and climate risk is observed in Indonesia, Malaysia and the Philippines, but there is room to improve them by enhancing the science-based analysis.

It is inferred from that strengthening coordination among NDMOs and DRR and CCA line agencies for mainstreaming DRR and CCA policies and capacity building for DRR and CCA integrated risk assessment, planning and implementation are the two main areas ASEAN Member States need to improve. In other words, these two areas could be the focus for developing a regional collaborative activity to improve the current situation. Excerpts of the assessment in the six categories are shown below as well as in Annex 1:

## **1) Laws, regulations and policies**

### **National development plan**

- Each Member State has outlined the importance of DRR and CCA directly or indirectly in their respective national development plan. Among them, the Five-Year National Socio-Economic Development Plan VIII (2016-2020) in Lao PDR and the Philippine Development Plan (2017-2022) in the Philippines clearly indicate DRR and CCA as a main cross-cutting concern.

### **DRM policy and the responsible agency**

- Each Member State has a national DRM policy and a designated DRM organisation based on the law (Cambodia, Indonesia, Myanmar, the Philippines, Singapore, Thailand and Viet Nam), order (Brunei), decree (Lao PDR) and directive (Malaysia).

### **CCA policy and the responsible agency**

- Each Member State has either climate change policy, strategy, programme or plan and a designated agency mostly under the ministry of environment. CCA is mainstreamed in each ministry's action plan in Cambodia and Indonesia.

## **2) Institutional arrangement**

### **National DRM committee**

- Each Member State has a national DRM committee consisting of multiple line ministries and agencies responsible for DRR and CCA.
- Often National Disaster Management Offices (NDMOs), i.e. ACDM members, focus on improving the awareness, preparedness and response to disasters while other line ministries/agencies, which are in charge of flood, storm, landslide and drought risk reduction are responsible for prevention and mitigation measures. Coordination between

them is essential for effective DRR, but it is still a challenge in many Member States. Some good practices are: the National Disaster Management Agency (NADMA) of Malaysia coordinates well with the Department of Irrigation and Drainage (DID) and other line agencies and the General Department of Disaster Prevention and Control (GDDPC) under the Ministry of Agriculture and Rural Development (MARD), Viet Nam, coordinates well with DRR-related agencies within the ministry.

#### National CC committee

- Each Member State also has a national CC committee consisting of multiple line ministries and agencies. The member composition is often similar to the one for the national DRM committee, but their direct coordination is rare. One good practice is in the Philippines where the DRR and CCA focal points signed a cooperation agreement to coordinate their works.

#### Vertical DRM system

- Each Member State has a vertical DRM system from national, state/provincial, district/municipal to village/community level. Some countries have direct command line of the NDMO to village/community level (e.g. the Office of Civil Defense in the Philippines), while most countries' system consists of subnational committees for disaster management often headed by the leader of the subnational government with participation of relevant agencies and departments.

### **3) Financial arrangement**

#### Funding for DRM and DRR

- NDMOs' budgets are usually used for strengthening awareness, preparedness and response capacity of the institution at national and local levels. Investment for prevention and mitigation measures are often managed by other relevant line ministries/agencies based on their priorities.
- Funding pool for disaster management is mandated for local governments in the Philippines as the Local DRR and Management Fund (LDRRMF). Thirty percent of the LDRRMF is automatically allocated as Quick Response Fund (QRF) which serves as a stand-by fund for relief and recovery; while the rest is used for pre-disaster measures. In this way, the QRF incentivises local governments to invest in prevention and mitigation.

#### Funding for CCA

- Some Member States have CCA funds to promote implementation of local actions. For example, the Indonesia Climate Change Trust Fund (ICCTF), the only national trust fund for climate change in Indonesia, promotes land-based mitigation projects (forestation and conservation) and adaptation and resilience projects by providing small-grants; and the People's Survival Fund in the Philippines promotes projects for water resources management, land management, natural ecosystems conservation, forecasting and early warning systems, institutional development for droughts and floods, among others, based on the risk and vulnerability assessment.
- In Cambodia, Thailand and Viet Nam, a systematic qualitative and quantitative analysis of country's climate change-related public expenditures called Climate Public Expenditure and Institutional Review (CPEIR) has been implemented since 2011. By that, total climate change related expenditures are estimated at 6.3 percent and 2.7 percent of the total government expenditures in Cambodia and Thailand, respectively.

- The Vietnam Administration for Forestry has created a Payment for Forest Environment Services (PFES) system which collects service fees from hydropower generators, water suppliers and others. The annual revenue, about USD50 million - 60 million, is used for forest protection by the communities, forest owners, national parks and nature reserves.

#### **4) Risk assessment**

##### Disaster data management

- All Member States record disaster data and some of them disclose it (e.g. Cambodia, Indonesia, the Philippines, Thailand and Viet Nam).

##### Meteorological data management and downscaling from Global Climate Models (GCMs)

- All Member States have a meteorological data management system and some of them are downscaling from GCMs to provide climate risk information for risk mapping and DRR and CCA planning (e.g. Indonesia, Malaysia, the Philippines, Singapore and Viet Nam). Other countries collect downscaled values from national research institutes or domestic or foreign universities such as Tokyo University, CSIRO (Commonwealth Scientific and Industrial Research Organisation, Australia), NIES (National Institute for Environmental Studies, Japan), and SEA START RC (Southeast Asia START Regional Center, Thailand).

##### Hazard and risk map

- Most Member States have prepared hazard and risk maps for flood, storm and landslide but mostly the resolutions including the topographic data are insufficient for quantitative risk assessment and associated evacuation planning and designing of effective prevention and mitigation measures.
- Flood risk maps incorporating CC impact are prepared only in some areas in Malaysia and Mekong Delta in Viet Nam.

##### Quantitative evaluation of the effects of DRR and CCA

- Quantitative evaluation of the effects of DRR and CCA measures on human and economic impacts has not been implemented in any Member States yet.

#### **5) Planning and implementation**

##### Good practices

- There are some good and potential good practices of flood risk management incorporating CC risk in the design. However, as implementation of basic flood risk reduction measures based on a current designed return period is insufficient in many places, continuous implementation of such measures is needed.
- Landslide risk areas are often well-versed for non-structural measures including early warning, evacuation and restricted land-use (e.g. no built zone) to reduce potential risk. Implementation of such measures, as well as structural measures including check dams, is needed in the region.
- Forest conservation including reforestation is actively conducted in most Member States.
- There are some water-saving and drought risk reduction measures (see Box 1) implemented in various countries such as storage of flood water for the use in drought period, conservation farming, sprinkler irrigation, formulation of water user association and farmer association, among others.
- Integration of DRR and CCA concepts in a local development plan and a land-use plan guided by the national government is observed in some Member States (e.g. Indonesia, the Philippines).

#### Guiding tools for DRR and CCA integration

- The Department of Public Works and Highways (DPWH), the Philippines, has developed a guideline and standard for incorporating CC impacts into flood control planning. The Ministry of Public Works and Housing (PU), Indonesia, has developed a similar one and the Department of Irrigation and Drainage (DID), Malaysia, is also developing one.

#### **6) Capacity building**

- DRM training is actively conducted in each Member State particularly for local communities and other stakeholders including schools, hospitals and private companies, among others.
- The National Development Planning Agency (BAPPENAS) in Indonesia is providing a two-week training course for integrating DRR and CCA in local development plans for national and local government officials.
- Provision of location-specific weather and rainfall forecast and training of farmers to interpret the usage of the data proved to be effective in increasing the crop yields in some Member States (e.g. Indonesia, Myanmar and the Philippines).

#### **DRR and CCA institutions in each ASEAN Member State**

##### **Brunei Darussalam**

- The National Disaster Management Centre (NDMC) is responsible for disaster response and preparedness including community-based DRM with awareness raising and education programmes. Structural measures for DRR (prevention, mitigation and recovery) are implemented by the Public Works Department (PWD), Ministry of Development (MoD). The Brunei Darussalam Meteorological Department (BDMD) provides meteorological data to the PWD for the design of infrastructures.
- Forest cover is about 75% of the total land which is managed by the Forestry Department, Ministry of Primary Resources and Tourism. The coverage is much larger than the average of Borneo Island which is less than 50%. The large forest cover seems to be functioning as a buffer for reducing disaster and climate risk as the country has not faced any severe potent natural hazard. Water demand from the agricultural sector is modest as the total cultivated area is less than 2% of the total area.
- The Energy and Industry Department under the Prime Minister's Office coordinates climate change issues.
- Urbanisation is progressing but the population pressure is low as the total population is still a little over 400,000 in an area of 5,765km<sup>2</sup>.

##### **Cambodia**

- The National Committee for Disaster Management (NCDM) is headed by the Prime Minister as president with comprising of 37 memberships from all line ministries and the concerned agencies which has a vertical network extending to province, district, commune and village levels. It is recognised as the headquarters of the Royal Government to lead, administer and coordinate all disaster management activities induced by either natural or human-made disasters in Cambodia.
- The Department of Hydrology and River Works (DHRW), Ministry of Water Resources and Meteorology (MOWRAM), manages main rivers and the Department of Irrigation (DI), MOWRAM and the Ministry of Agriculture, Forestry and Fisheries (MAFF) manage irrigation facilities. Water resources management is under the Department of Water

Resources Management Conservation (DWRMC), MOWRAM. Since the Department of Meteorology (DM) is also under the MOWRAM, most water-related data management, planning and implementation comes under the MOWRAM while the MAFF manages the agriculture, forestry and fisheries sectors. Coordination between the two ministries is essential for reducing flood and drought risk.

- Cambodia faces floods and droughts regularly. According to the NCDM, the 2013 floods affected 1.8 million people in 20 provinces of which damages and losses were estimated to be a total of over USD350 million. The 2016 drought was the worst after 2004 drought that impacted millions of people which was exacerbated by the low water level of the Mekong River. The fisheries sector contributing to 12% of the national GDP is also highly vulnerable to drought. In general, more structural measures are required to co-manage flood and drought risks such as by constructing more road dikes, evacuation facilities, irrigation canals and water retention facilities.
- In 2006, the Royal Government of Cambodia established the National Climate Change Committee (NCCC), a cross-sectoral and multi-disciplinary body with the mandate to prepare, coordinate and monitor the implementation of policies, strategies, legal instruments, plans and programmes related to climate change. With an amendment in 2014, the NCCC has functioned as an inter-ministerial mechanism for coordination of climate change response in the country. Its functions have recently been taken over by the National Council for Sustainable Development (NCSDD) established in May 2015. The Council comprises high-level representatives (Secretaries and Under-Secretaries of State) of concerned government ministries and agencies, with the Prime Minister as its Honorary Chair and the Minister of Environment as its Chair. Council membership has increased compared to the NCCC, covering a greater number of ministries and agencies, including provincial governors. General Secretariat of the NCSDD is the Department of Climate Change, Ministry of Environment.

## Indonesia

- The National Disaster Management Authority (BNPB) was created in 2008 by the National Disaster Management Law 2007. In line with the National Disaster Management Plan 2015-2019, all 34 provinces and more than 90% of districts and cities have established local disaster management agencies (BPBDs). The BNPB has a disaster database and a disaster risk assessment tool, while the Directorate General of Climate Change (DGCC), Ministry of Environment and Forestry (KLHK), also has a vulnerability assessment tool, and integration of them are being attempted. Integrating DRR and CCA risks in local development plans are coordinated by the National Development Planning Agency (BAPPENAS), the Ministry of Agrarian and Spatial Planning and the Ministry of Home Affairs.
- The BAPPENAS conducts a two-week training programme for DRR and CCA integration in local development plan for national and local government officials. The BAPPENAS also promotes development of local CCA projects with incorporation of DRR concepts by supporting the operation of the Indonesia Climate Change Trust Fund (ICCTF) which provides small grants to local organisations.
- The Directorate General of Water Resources (DGWR), Ministry of Public Work and Housing (PU), is responsible for river management and flood risk reduction. There are 34 Basin WRM Centres (*Balai*) responsible for development of framework (*Pola*) and master plan (*Rencana*) of river basin management. *Balai* also coordinates stakeholders for spatial planning under the associated Basin WRM Councils (TKPSDA) comprising related government and nongovernment members. Integrating the river basin management plan further with forestry and mangrove management plans at the upstream and downstream managed by the KLHK is a remaining challenge.



- The PU has integrated planning divisions of all departments to formulate a Regional Infrastructure Development Agency (BPIW) in 2015 which develops technical guidelines for rivers, roads, buildings and housings incorporating disaster and climate risks for relevant departments.
- The Ministry of Energy and Mineral Resources (ESDM) is largely responsible for geological hazards, particularly volcanic eruption and landslide.
- The Agency for Meteorology, Climatology and Geophysics (BMKG) provides necessary meteorological data and its analysis with downscaled global climate models (GCMs) to relevant agencies.

## **Lao PDR**

- The National Disaster Management Office (NDMO), Department of Social Welfare, Ministry of Labour and Social Welfare (MLSW), is the ACDM focal point, having local offices in charge of disaster management at provincial and district levels. However, the Department of Disaster Management and Climate Change (DDMCC), Ministry of Natural Resources and Environment (MONRE), is the secretariat of the National Disaster Prevention and Control Committee (NDPCC) since 2013. It is still in the transition phase between the two ministries to demarcate their roles and responsibilities. The NDPCC is chaired by the Deputy Prime Minister/Minister of Defence and has Provincial DPCC and District DPCC at subnational level.
- Three departments under the Ministry of Public Works and Transport (MPWT) are responsible for: river course management by the Department of Waterways, slope and landslide management along roads by the Department of Roads and Bridges and urban planning and building design by the Department of Housing and Urban Planning.
- Departments under the MONRE are mainly responsible for planning and data management: meteorological and hydrological data management by the Department of Meteorology and Hydrology (DMH), water resources management by the Department of Water Resources (DWR), and disaster data management and climate change policy formulation by the DDMCC. Data management capacity including hazard and risk map preparation which is being supported by development partners requires improvement.
- The Department of Forestry, Ministry of Agriculture and Forestry (MOAF), is responsible for forest management and maintenance of irrigation facilities. More water retention ponds and irrigation networks are required to reduce drought risk, but available resources are limited – a common constraint for all agencies.

## **Malaysia**

- The National Disaster Management Agency (NADMA) established in 2015 under the Prime Minister's Department works closely with other line ministries/agencies, especially the Department of Irrigation and Drainage (DID), Ministry of Natural Resources and Environment (NRE), the Malaysia Meteorological Department (MMD), Ministry of Science, Technology and Innovation (MOSTI) and the Public Works Department (JKR), Ministry of Works (KKR), which assess disaster and climate risk and implement DRR measures (prevention, mitigation and recovery). There is a Central Disaster Management and Relief Committee (CDMRC) at national level and State DMRC and District DMRC at subnational level.
- The DID is responsible for river management and flood risk reduction and prepares flood hazard and risk maps by incorporating meteorological data provided by the Malaysian Meteorological Department (MET Malaysia), Ministry of Science, Technology and Innovation (MOSTI). The JKR is responsible for management of national roads and slopes along them and operates a Disaster Operation Room to respond to emergencies in cooperation

with the NADMA. Landslide hazard and risk maps are prepared by the Department of Minerals and Geoscience (JMG), NRE and shared with the Slope Protection Department of KKR.

- State Government has the authority of land-use and river basin management and the Federal Department of Town and Country Planning (JPBD), Ministry of Urban Wellbeing, Housing and Local Government (KPKT), gives the direction.
- The Environment Management and Climate Change Division (PASPI), NRE, is responsible for promoting CCA but its outreaching capacity to local authorities is limited due to many other tasks and limited human resources.

## **Myanmar**

- The Ministry of Social Welfare, Relief and Resettlement (MSWRR) is responsible for DRM and the Relief and Resettlement Department (RRD), the ACDM focal point, was established to provide relief for victims of natural hazards. The National Disaster Preparedness Central Committee (NDPCC) under the Prime Minister is the inter-agency DRM body which has a vertical network from national to subnational levels including Disaster Preparedness Committees at region, state, district, township and village. Main task of the RRD is preparedness and response, but it is coordinating with other line ministries, namely the Ministry of Transport and Communications (MOTC), the Ministry of Agriculture, Livestock and Irrigation (MOALI) and the Ministry of Natural Resources and Environmental Conservation (MONREC), to implement more proactive DRR measures including prevention and mitigation.
- Coordination between the MOTC and the MOALI, two ministries managing river and water resources, is needed for efficient flood risk reduction and water resources management. The Department of Meteorology and Hydrology (DMH), MOTC, manages meteorological and hydrological data and the Irrigation and Water Utilisation Management Department (IWUMD), MOALI, also manages hydrological data. The Directorate of Water Resources and Improvement of River Systems (DWIR), MOTC, maintains river courses of main rivers for inland waterway transport while the IWUMD, MOALI, maintains other river courses mainly for irrigation purpose.
- Slope protection as well as quick recovery from slope failures along main roads is managed by the Ministry of Construction but proactive preventative measures are limited.
- Drought is a serious issue in the central dry zone where multiple interventions have been implemented including establishment of a regional water management committee, introducing new crop varieties, greening by afforestation, among others. Among them, one of the successful ones is a location-specific weather advisory programme for farmers with the DMH's intervention.
- The Environment Conservation Department (ECD), MONREC, the focal point for climate change, is actively engaging other agencies/ministries by playing a coordinating role of the Technical Working Group of Myanmar Climate Change Alliance (MCCA).

## **The Philippines**

- The Office of Civil Defense (OCD), the administrator of the National Disaster Risk Reduction and Management Council (NDRRMC) with 44 member agencies, manages a vertical network of Local DRRM Offices at regions, provinces, cities, municipalities and barangays. The DRRM Act (2010) mandates local authorities to set aside 5% of the budget for DRRM activities and to set up a local DRRM office with at least four members.
- Local authorities develop a Local DRRM Plan and a Comprehensive Land-Use Plan (CLUP) by incorporating hazard and risk map provided by the Mines and Geoscience Bureau (MGB), Department of Natural Resources and Environment (DENR), and the OCD, the National

Economic and Development Authority (NEDA) and the Housing and Land Use Regulatory Board (HLURB) review it.

- The Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) provides meteorological data and its analysis with downscaled global climate models (GCMs) to relevant agencies.
- The Flood Control Management Cluster (FCMC), Department of Public Works and Highways (DPWH), is responsible for river management and flood risk management. The River Basin Control Office (RBCO), DENR, is responsible for development of river basin master plan for the 18 major river basins but the planning and enforcement capacity is limited due to the limited human resources allocation. For an effective river basin management as well as water resources management, coordination of relevant agencies is required including the National Water Resources Board (NWRB), the Land Management Bureau (LMB) and the Forest Management Bureau (FMB) under the DENR and the National Irrigation Authority (NIA) and the Bureau of Soil and Water Management (BSWM) under the Department of Agriculture, among others.
- The Climate Change Commission (CCC) supports local authorities to develop Local Climate Change Action Plan and manages the People's Survival Fund to provide necessary financial support for the implementation.

### **Singapore**

- The Singapore Civil Defence Force (SCDF) provides emergency services including firefighting, rescue and ambulance services and preparedness programmes for DRR activities. Singapore does not face severe natural hazards in general.
- Singapore has progressively transformed almost two-third of the land surface into water catchment through constructing a network of rivers, canals and drains channelled to 17 reservoirs to address the water security issue which also has a flood and storm DRR function. The Public Utilities Board (PUB, Singapore's National Water Agency) under the Ministry of the Environment and Water Resources (MEWR) is responsible for water resources and river management. The Building Construction Authority (BCA) under the Ministry of National Development (MND) works closely with PUB. The Meteorological Service Singapore (MSS) provides meteorological advice to the PUB. The Housing & Development Board (HDB) and the Urban Redevelopment Authority (URA) both under the MND, together with BCA, are involved in the land-use management.

### **Thailand**

- The Department of Disaster Prevention and Mitigation (DDPM), Ministry of Interior, is responsible for DRM in line with the National Disaster Risk Management Plan 2015 and the Disaster Prevention and Mitigation Act 2007. Both Master Plan and Act stress the importance of proactive approach for prevention and mitigation, however still main activities are on preparedness and response. The National Disaster Prevention and Mitigation Committee (NDPMC) formulates national DRM policy and the vertical operational network extends from the National Disaster Command Headquarters (NDCH), the Central Disaster Management Centre (CDMC) to Provincial, District and Municipal Disaster Management Centres.
- The Department of Water Resources (DWR), Ministry of Natural Resources and Environment (MONRE), is the agency for coordinating river basin management and water resources management including drought, flood and landslide risk management. The Water Law is being developed to mandate the role of the DWR. The Royal Irrigation Department (RID), Ministry of Agriculture and Cooperatives (MOAC), also manages rivers and water resources for irrigation purpose. The National Water Resources Committee chaired by the Prime Minister has set up Basin Committees in 25 major river basins for the river basin management.

- The Thai Meteorological Department (TMD) provides meteorological data and forecast to relevant agencies. Flood hazard maps and landslide hazard maps prepared by the DWR and the Department of Mineral Resources (DMR), MONRE, respectively, are shared with the DDPM.
- The Royal Forest Department (RFD), MONRE, proactively promotes community-based forest management by engaging more than 11,000 communities. The Department of Marine Coastal Resources (DMCR), MONRE, rehabilitates mangrove forest along the Gulf of Thailand.
- The Office of Natural Resources and Environmental Policy and Planning (ONEP), MONRE, is the national focal point for climate change matters. The National Committee on Climate Change (NCCC) chaired by the Prime Minister formulates climate change policies with the line ministries and agencies. The composition of the members of the NCCC and the NDPMC are similar but direct policy coordination between them is rare.

## **Viet Nam**

- The Department of Natural Disaster Prevention and Control (DNDPC) under the Directorate of Water Resources (DWR), Ministry of Agriculture and Rural Development (MARD), has been upgraded to the General Department of Natural Disaster Prevention and Control (GDNDPC) in August 2017 by merging other agencies that have the same function. The newly established department monitors all natural disasters throughout the country, advises the Central Steering Committee on Natural Disaster Prevention and Control (CSCNDPC) headed by the Minister of the MARD for disaster management and provides timely guidance to local authorities regarding disaster prevention and post-disaster reconstruction. Viet Nam is the only country in ASEAN which has a DRM organisation under the river and water resources management authority.
- The Department of Water Resources Management (DWRM), Ministry of Natural Resources and Environment (MONRE), is responsible for water resources and river basin management. However, the law on river basin management including water resources management has not been enacted yet and the demarcation between the DWR, MARD is not so clear.
- The National Hydro-Meteorological Service (NHMS), MONRE, forecasts floods based on real-time meteo-hydrological observation data. The DNDPC uses it for flood warnings and the DMC prepares flood hazard maps based on that. The flood and drought risk management plan in the Mekong Delta incorporating climate risk is one of the most advanced in the country.
- There are no nation-wide landslide hazard maps except in some pilot areas along national roads prepared by the Ministry of Transport.
- Viet Nam Forest Administration, MARD, promotes community-based forest management and rehabilitation of mangrove forest. The Payment for Forest Environmental Services which levies hydropower generators and water suppliers for the service fees is a successful model for raising funds for forest protection and rehabilitation activities.
- The Department of Meteorology, Hydrology and Climate Change (DMHCC), MONRE, serves as the secretariat of the National Committee on Climate Change (NCCC) headed by the Prime Minister which coordinates the line ministries to implement the National Strategy on Climate Change (NSCC) and the National Target Programme to Respond to Climate Change (NTP-RCC).