Disaster Management System in participating Countries（Workshop Group 3:Climate Change Adaptation in Disaster Management）

	Cambodia	Indonesia	Lao PDR	Malaysia	Myanmar	Philippines	Singapore	Thailand	Viet Nam
Possible Natural Disasters	Flood, Drought, Typhoon, Surge, Flash Flood	Earthquake (Share of Number of Cases 22%), Landslide/Sediment Disasters (21%), Volcano Eruption (7%), Flood (30%), Forest Fire (5%), Storm (2%), Tidal Wave/Surge (2%) (Average annual number of cases 1982~1994: Flood 410, Sediment Disasters 207, Earthquake and Tsunami 8.4, Volcano Eruption 2.5)	Flood, Storm, drought, Earthquake, Extreme temperature, Landslide and Sediment Disasters, Volcano Eruption, Surge, Forest Fire	Flood and Flash Flood （28 times since 1980), Landslide(5 times since 1980), Forest Fire and Haze (4 times since 1980), Storm (6 times since 1980), Tsunami (2004)	Tropical Cyclone（3 times since May 2004）, Flood（2 times）, Landslide （Once）, Tsunami （Once）	Earthquake (2000.1-2007.9 Share of Number of Victims 0.3%), Volcano Eruption (0.8%), Flood (5.3%), Cyclone/Storm(92.5%), Drought(0.0%), Forest Fire(0.2%), Landslide/Sediment Disaster(0.9%), Tidal Wave/Surge(0.0%)	Singapore does not have tropical cyclone, earthquake nor volcano eruption. (Possibility of man-made disasters in urban area where various human activities concentrate.)	Torrential Rain and Flood （14 times during the last decade since Jan. 1999), Flash Flood/Landslide/Mud Flow（5 times in the last decade), Tsunami(2004), Tropical Cyclone (4 times per annum), Drought (every 3 years), Earthquake(M5.9 in 1983), Surge, Forest Fire, Windstorm	Areas along Rivers and Coastal Areas / Storm, Floods, River Bank Erosion, Tornado
Features of Disasters	・ Tonle Sap Lake serves as a natural flood control reservoir. Scales of floods is heavily dependent on the capacity of the Lake. ・ Phnom Penh and its surrounding area have floods every year. ・ Recent Major Natural Disasters : Flood(2000), Flood and drought (2001), Flood and drought(2002), drought(2005)	・ Indonesia is situated in seismic belt. Time from occurrence of earthquake to arrival of Tsunami is short. ・ Indonesia has 128 volcanoes (1/7 of volcanoes in the world), including 78 active ones. ・ Landslide and forest fire show tendency of increase. ・ Recent Major Natural Disasters : Tsunami (2004), Volcano Eruption, Earthquake (2005), Flood, Earthquake, Flash Flood, Tsunami (2006), Flood, Earthquake, Volcano Eruption (2007), Flood (2008), Flash Flood (2009)	・ Tropical Cyclones pass through Lao PDR 3-5 times every year during later stage of rainy season, which is from July to September. Until around the season, water level has become high and storm rain make damages of flood more serious. ・ 90% of national land of Lao PDR is Mekong River Basin. Flood damages concentrate in plain area along Mekong River down Vientiane	・ Most rivers are steep stream in upper river basin and low gradient stream in down stream basin. This causes sedimentation and consequent floods. ・ Damages by landslides are increasing because of housing and commercial area developments on steep slopes.	・ Number of natural disasters excluding fires in 15 years from 1988 to Jan. 2003 is 1,478, including 411 floods (38%), 541 storms (50%), 124 high tide (12%). ・ Long west coast area along the Bay of Bengal is prone to tropical cyclone. ・ In the mid of monsoon season, from August to October, Myanmar has frequent floods. 4 major rivers flow from the north to the south. Southern part of the nation, especially delta area, is frequently flooded in monsoon season. Floods tend to occur when high tide and heavy rain come at the same time. ・ Myanmar is situated in seismic belt from the Mediterranean Sea to Himalaya, where 15% of world's earthquakes occur, and has earthquakes. There are 3 major epicenters in the nation and had many earthquakes in the past. 23 tremors are monitored in 3 and half years form May 2001 to December 2004.	・ Annually some 30 tropical cyclones are formed near the Marian Trench. Some 20 out of 30 approach to Philippines. 4-5 out of 20 hit Philippines and bring storms, floods and sediment disasters.		・ 36% of national land is Mekong River Basin. Most of the other area is Chao Phraya River Basin. In mid-downstream basin of Chao Phraya River, flooding proceeds slowly and continues for 3-5 months	・ Inland Areas and Mountain Areas / Forest Fire, Landslide, Sediment Disaster ・ Records of Natural Disasters in the last 11 years: 50 events (23 Floods, 11 Cyclones/Storms/Torrential Rains, 11 Flash Floods/Sediment Disasters/Landslides, 2 Droughts, 1 Forest Fire) ・ Most densely-populated areas are prone to floods. 70% of population is living with risks of tropical cyclone, flood and surge. ・ Flood damages are serious in rainy season especially in Central Region. Flood in Mekong Delta covers 25% of Mekong Delta Area and continues for more than 3 months. ・ Floods tend to occur when high river water level during rainy season and tropical cyclone come together. Viet Nam has 6.2 tropical cyclones per annum in average. ・ DfID points out the possibility that Viet Nam will be the most affected country by sea level rise due to global warming.
Organization in charge of Meteorology	・ Ministry of Water Resources and Meteorology ・ General Department of Water Use Integration, Ministry of Forestry and Fishery (MFF) ・ Mekong River Commission	・ Ministry of Agriculture ・ Meteorological and Georological Agency (BMG)	・ Ministry of Labour and Social Welfare ・ Science, technology and Environment Agency (STEA) ・ Department of Meteorology and Hydrology (DMH) of the Ministry of Agriculture and Forestry (MAF) ・ Mekong River Commission	・ Malaysian Meteorological Service (MMS) of the Ministry of Science, Technology and Environment	・ Department of Meteorology and Hydrology	・ Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) of the Department of Science and Technology (DOST)	Department of Meteorology of the National Environment Agency	・ Dep. of Meteorology ・ Mekong River Commission	・ Meteorology and Hydrology Services(MHS) of the Ministry of Natural Resources and Environment ・ Mekong River Commission
Organization in charge of water-related disasters (mainly of structural measures)	・ Department of Road and Bridge, Ministry of Public Works and Transportation ・ Ministry of Water Resources and Meteorology ・ Ministry of Rural Development ・ General Department of Water Use Integration, MFF	・ Directorate General of Water Resources of the Ministry of Public Works ・ Ministry of Forestry ・ BMG ・ Provincial Governments	・ Ministry of Public Works	・ River Division / Drainage Division / Shore Division of Department of Irrigation and Drainage (DID) ・ State DID ・ Local governments ・ Tin mining companies	・ Irrigation Department	・ Department of Public Works and Highways (DPWH) ・ Department of Environment and Natural Resources (DENR)	National Critical Infrastructure Authority	・ Royal Irrigation Department (RID)/ Dep. of Forestry of the Min. of Agriculture and Cooperation (MAC) ・ Dep. of Water Resources ・ Thai Power Agency	・ Department of Dike Management and Flood Control (DDMFC) of the MARD ・ River basin management organizations ・ Central Committee for Storm and Flood Control (CCSFC) ・ National Water Resources Board ・ Department of Infrastructure of Ministry of Planning & Investment ・ Sewerage & Drainage Corporation

	Cambodia	Indonesia	Lao PDR	Malaysia	Myanmar	Philippines	Singapore	Thailand	Viet Nam
Integrated Water Resources Management		・ Law on Water Resources(2004) stipulates the preparation of comprehensive master plan which includes water resources, flood control and environment, for each river. ・ No organizations are responsible for integrated river basin management. Organizations concerned implement river management measures without coordination.		・ Integrated River basin Management Plan which covers all the 189 river basins was developed. ・ River management is implemented by various stakeholders as necessary. Plans and information are limited and dispersed and this leads to difficulty in implementing integrated river basin management. ・ Coordinating organization or mechanism across ministries for integrated river management does not exist.		・ DPWH, which is not an organization for integrated flood and sediment disaster, mainly undertakes disaster risk mitigation by structural measures, and do not engage in hydrological analysis and flood analysis using monitoring data. ・ National Flood Management Committee (NFMC) was formed in 2006 as an cross-ministerial organization to coordinate and integrate flood control administration.		・ There is no organization that manages whole the river system. Construction of dikes and dredging are done locally. ・ Comprehensive national flood control plan or master plan for each river system is not prepared. ・ Flooding areas that serve as storm water reservoir are designated as urban development area in land use plan.	・ Basic data (hydrology, meteorology and geology), information and knowledge on integrated river basin development and management planning should be better equipped with. ・ National Water Resources Board, which is composed of 14 organizations, was established in 2000.
Facts and Efforts around climate change adaptation	・ Floods are increasing due to extreme climate ・ Cambodia ratified United Nations Framework Convention on Climate Change (UNFCCC). ・ National Adaptation Programme of Action to Climate Change (NAPA) was developed by Ministry of Environment in 2006.	・ National Action Plan for Climate Change Adaptation was announced in 2007.	・ Average temperature has risen more than 1℃ in all of the northern, central and southern meteorology monitoring stations according to the monitoring records since 1976 to 2006. ・ STEA is drafting National Climate Change Adaptation Action Plan, which is supposed to be in line with national Climate Change Strategy (-2020) (as of 2002). ・ Climate Change Executive Committee was established.			・ DOST developed National Science Intervention Plan, which will be a guideline for policymakers to build strategies based on climate change vulnerability assessment. PAGASA will lead efforts of geo-hazard mapping, data collection and capacity development of researches on climate change. ・ Climate change task force directly under the President was formed. ・ Local Governance Resource Center of the Department of Interior and Local Government started 3-day program in 2008 for the local governments to understand the impacts of climate change and adaptation and mitigation measures.	・ There is a study on-going on the impact of climate change on Singapore.		・ Increase of natural disaster events by climate change and difficulties in coping with them are reported in the 8th five-year social and economic development plan (2000~2005). ・ National Goals Program on climate change and sea-level rise was approved in 2008. Besides national budget, Denmark and IUCN will fund. ・ Viet Nam is listed as one of the five countries that are most susceptive to negative impacts of climate change. It is estimated that average temperature has risen 0.7℃ in the last half century and will rise 3℃ by 2100. Sea level is also estimated to rise 50-60cm by 2100. With 1m of sea-level rise, 5% of national land, 11 % of population, 7 % of agriculture are estimated to be affected and GDP is estimated to decrease 10%.