Examples of Setting Indicators for Each Development Strategic Objective

Grant Aid Projects/Standard Indicator Reference (Disaster Management)

Disaster cycle (*1)	Development strategic objectives (*2)	Mid-term objectives	Sub-targets of mid-term objectives	Types of infrastructure	Standard indicator		Policy and methods for setting indicators	Examples of project objectives (getting a clear image of the project)	Country name	Project name	FY of evaluation
Prevention (prevention/ mitigation) and Preparedness	1. Development of disaster-resistant communities and societies	1-2. Improvement on response to disasters by communities and societies	1-2-3. Improving disaster prevention capabilities by structural measures	[Earthquake disaster control measures] [Volcanic disaster control measures] Equipment for seismic observation at seismographic stations and for data transmission from the stations; equipment for the observation at intensive volcano observatories and equipment for data transmission from the stations and from the relay points for transmitting intensive observation data; etc.	Operation indicators	Basic indicators An increased number of seismic observation stations An increased number of seismic volcanic observatories An increased number of data transmission stations		• The project was conducted with the following objectives: detecting all earthquakes that are around 4.0 or more on magnitude which occur in the Philippines; reducing necessary time from the occurrence of an earthquake to the announcement of earthquake parameter to around 10-15 minutes; improving abilities to monitor the activities of the six main volcanoes; etc.	The Philippines	The Project for Improvement of Earthquake and Volcano Monitoring System (Phase 2)	2007
					Effect indicators	Basic indicators An increased capacity in earthquake detection and accuracy (becoming able to detect all earthquakes which are around 4.0 or more on magnitude) An increased capacity in volcano monitoring and accuracy (becoming able to issue detail warning) A reduction of necessary time to transmit information on earthquake parameter					
				[Earthquake disaster control measures] Improving the earthquake resistance of schools	Operation indicators	Basic indicators The number of enrolled students in target schools The maximum number of people who can evacuate in disaster time	From the view point of the effectiveness and sustainability of the project, it is needed to be confirmed that: the school facilities are being appropriately maintained after the project; all residents have been informed that the school facilities are evacuation facilities too; and evacuation drills are being conducted in that area.	The objectives of the project are to develop schools which can make safe for students to learn and to provide evacuation facilities for local residents in disaster time. Through the project, schools facilities which were devastated by the earthquake which occurred offshore of Padang in the West Sumatra Region, were reconstructed as well as improved the earthquake resistance. And the project contributed to reducing disaster risk in those areas. (Note: In Indonesia, there were the criticisms that the maintenance of tsunami evacuation buildings in Aceh was insufficient and that people are not fully informed about the buildings being evacuation facilities.)	Indonesia	The Project for Safe School Reconstruction in Devastated Area as of Earthquake in Offshore of Padang in West Sumatra Region	2010
					Effect indicators	Basic indicators The utilization of the school facilities as evacuation places by local residents					
				[Flood control measures] The provision of trucks loaded with portable drainage pumps and trucks loaded with stationary drainage pumps	Operation indicators	Basic indicators The operation rate and the operating time during flooding	Consider the most effective places for installing or deploying pumps during the project formulation study. In particular, it is necessary to have a plan for the effective operation of portable pumps.	• In response to the large-scale inundation damage which occurred in Jakarta and surrounding areas in 2002, the project aims to reduce inundation damage in nine areas out of 78 areas susceptible to inundation in Jakarta.	Indonesia	The Project for Improvement of Pump Drainage in Poverty District in Jakarta	2008
					Effect indicators	Basic indicators A reduction in the hours of inundation of buildings through drainage operations Supplementary indicators					
				[Flood control measures] Reinforcing external ring levees (by	Operation indicators	Basic indicators Drainage capacity (m^3/second) The capacity of drainage pump stations (m^3/second)	In order to keep track of the operation, it is desirable to check whether the actual values meet or exceed the	• Minimize flood damage by increasing safety levels against the same scale as largest flood in the past (with a return period of	Cambodia	The Project for Flood Protection and	2008

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				asphalting the levee crown roads), developing/improving drainage, constructing drainage pump stations	Effect indicators	Basic indicators A reduction in the number of inundation in the project area; a reduction in the area of inundation Supplementary indicators	design values after the construction work has been completed. The drainage capacity depends on the cross section and the inclination of the drainage. Therefore, it is important to make sure that garbage, etc. does not block the drainage. During the preparatory survey, find out the size of the area that could be inundated by rain with different return periods, so that the project effects can be presented quantitatively, for example the expected reduction in the inundated area. Peak flood discharge could increase due to development particularly in upstream areas. Therefore, it is necessary to clarify the preconditions of the plan.	approximately 30 years) of the Mekong River and the Sap River, as well as minimizing inundation in Phnom Penh.		Drainage Improve-ment in the Municipality of Phnom Penh	
Prevention (prevention/ mitigation) and Preparedness	1. Development of disaster-resistant communities and societies	1-2. Improvement on response to disasters by communities and societies	1-2-3. Improving disaster prevention capabilities by structural measures	[Flood control measures] Installation of steel sheet piles for levee reinforcement	Operation indicators	Basic indicators Water stoppage effectiveness (reductions in amount of water leakages and areas of scouring)	In case of continuous levees consisting of reinforced sections and existing sections, a levee rehabilitation plan, a land use plan (for example allowing flood water to flow into retarding basins and farmland) and an evacuation plan are recommended to be proposed for the case of the levees breaches. Floods occur only when the amount of rainfall exceeds a certain level, and therefore the design rainfall should be prepared.	• The Yangtze River is the largest river in China and the middle and lower reaches of the river are important industrial and agricultural areas. Deforestation in the upper reaches reduced the water retention capacity of the soil, and this caused the inflow and accumulation of large quantities of rainwater and soil in the middle and lower reaches of the river, which caused floods in the middle and lower reaches of the river prone areas. Therefore, afforestation has been conducted in the upper reach and levees have been constructed in the middle and lower reaches. However, these measures are insufficient with unstable levees and water leakages. Therefore, the objectives of the project are to reinforce the levees with steel sheet piles at important sections of the middle and lower reaches of the Yangtze River, thereby reducing social losses caused by floods.	The People's Republic of China	The Project for Improve-ment of Dikes in Yangtze River	2006
					Effect indicators	Basic indicators A reduction in the flood damage caused by the design rainfall (a reduction in the number of floods, a reduction in casualties and economic damage caused by floods) Supplementary indicators					
				[Landslide measures] The construction of sabo dams and roads for maintaining the dams	Operation indicators	Basic indicators Sediment trapping capacity A reduction in sediment discharge	For these indicators, a debris flow disaster is defined as a disaster which is associated with casualties, damage to infrastructure, buildings,	• Construct sabo dams and repair a bridge on Camiguin Island, thereby contributing to the prevention of debris flow disasters in the river basins and the improvement of	The Philippines	The Project for Flood Disaster Mitigation in	2009

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							agricultural facilities, etc. In the preparatory survey, past disaster records should be studied and the project effects should be calculated based on the expected damage. Determine the effectiveness of sabo dams by comparing the number of incidents occurred within the range of design rainfall.	river-crossing transportation. • "The Project for Flood and Erosion Control in the Chamelecón River Tributary Areas" was conducted in 1992. Based on the results of the study, the project aims to take flood and erosion control measures for the Choloma River area (a tributary of the Chamelecón River, which is considered to be a priority area and have the highest economic effect), thereby contributing to increase the safety of the area against natural disasters.	Honduras	Camiguin Island The Project for Flood and Erosion Control Measures for the Choloma River	2005
					Effect indicators	Basic indicators Number of debris flows occurred by the design rainfall Supplementary indicators A reduction in the number of affected households A reduction in the amount of damages					
				[Tsunami and storm surge control measures] The development of seawalls, dredging water areas in front of seawalls	Operation indicators	Basic indictors	There were no deaths in Malé Island by Indian Ocean tsunami in 2004. The economic value of Malé Island having been protected is not clear because the asset values of the various types of infrastructure on Malé Island are unknown. In the project formulation study, etc., it is important to examine casualties and economic damage so that disaster prevention effects can be presented quantitatively. *1 Identify the sentiments of the islanders and residents through interviews, etc.	• (a) Construct strong shore protection structures on the southern shores of Malé Island, thereby contributing to strengthening the disaster management functions on the island, in combination with other grant aid projects (the construction of western seawalls, eastern seawalls, northern offshore breakwaters and southern offshore breakwaters). (b) Adopt durable shore protection structures, thereby contributing to the reduction maintenance cost for shore protection in Malé Island.	Maldives	The Project for the Seawall Constructio n in Malé Island (Phase 3)	2006
					Effect indicators	Basic indicators Disaster risk reduction effects in tsunami (a reduction in the number of deaths and the missing; a reduction in the number of fishing vessels affected; economic effects) Securing safe moorings for small vessels A reduction necessary cost for shore protection maintenance as a result of developing strong shore protection structures Supplementary indicators Sentiments of the islanders and residents regarding the disaster prevention effects that seawalls have (a safe and providing secure living environment)*1					
Prevention (prevention/ mitigation) and Preparedness	1. Development of disaster-resistant communities and societies	1-2. Improvement on response to disasters by communities and societies	1-2-3. Improving disaster prevention capabilities by structural measures	[Landslide measures] Structures for preventing landslides (drainage well, water collecting works and drains, horizontal drainage, channel works, the soil removal, counterweight)	Operation indicators	Basic indicators Mitigation of landslide movements	*2 The death toll will be reduced by issuance of evacuation advisories through monitoring of landslides. Properties such as buildings are generally difficult to protect, although it depends on the size of the landslide. *3 The safety factor is a ratio between the sliding force and the resistance. The current safety factor is assumed to be in a range between 0.95 and 1.00 depending on the current landslide conditions. Thus, the design safety factor is generally set to be between 1.10 and 1.20 considering the	• Construct structures for preventing landslides, conduct landslide monitoring activities and develop warning and evacuation systems in El Berrinche and El Reparto in Tegucigalpa City in order to reduce the landslide disaster risk.	Honduras	The Project for Landslide Prevention in Tegucigalpa Metropolita n Area	2011
					Effect indicators	Basic indicators A reduction in the death toll caused by landslides *2 The safety factor *3 Supplementary indicators					

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							landslide occurrence and movement mechanisms, the importance of the objects that are to be protected, the level of damage expected, etc.				
			1-2-4. Establishment of forecasting, warning and evacuation systems	Aviation weather observation systems, aviation weather observation data display systems, automatic weather observation systems, weather observation data communication systems, centralized control systems for automatic weather observation devices, GTS message switching systems, etc.	Operation indicators	Basic indicators A reduction in casualties through issuing warnings on torrential rainfall, hurricanes, etc. •Upper air observation abilities (When there is no precipitation: <the wind direction and velocity> at an altitude of approx. XX km. When there is precipitation: <the wind direction and velocity> at an altitude of approx. XX km to XX km; <the temperature> up to the altitude of approx. XX km.) •The number of terminal area forecasts (TAF) •The number of weather forecasts		• Improve the country's weather observation capacities and reduce its vulnerability to disasters by developing weather observation and disaster warning systems for the entire country, thereby contributing to the accumulation of climate change data in Oceania.	The Independent State of Samoa	The Programme for Improving the Weather Forecasting System and Meteo-rological Warning Facilities	2009
					Effect indicators	Basic indicators A reduction in the number of victims in disasters which are the same size as that used in the scenario in the disaster management plan					
				Doppler radar systems, weather radar systems, weather radar data display systems, weather data communication systems, weather data satellite communication systems, etc.	Operation indicators	Basic indicators • Annual radar operating hours (hours/year) • Observation of the wind velocity up to 75 meters/second (within XX km radius) • The detection range for rainfall with the rainfall intensity of 1 mm/hour or more (XX km radius) • The spatial resolution and observing interval for precipitation data within the weather radar detection range (XX km radius, the XX-minute interval observation) • The spatial resolution and observing interval of the automatic weather observation device (the XX-minute interval, the observation data of XX per year, the collection of all observation data in XX minutes) • When a cyclone enters the radar observation range: the observation interval for the wind velocity, the rainfall intensity, the location and the course of the cyclone (the XX-minute interval in PPI mode, the XX-minute interval in CAPPI mode with XX elevation angles) • The objective observation of turbulence and wind shear by the weather radar system (within XX km radius) • Short-term forecasting of rain cloud movements (within XX hours) using		• In order to reduce damages by weather related disaster in the region around the Bay of Bengal including Myanmar, the project aims to strengthen the ability to monitor weather phenomena which cause disasters such as cyclones and torrential rain by installation of Doppler radar systems, weather data display systems and weather data communication systems in Myanmar as well as capacity enhancement of human resources. Thereby, the project aims to improve monitoring of weather events such as cyclone, weather forecasting and warnings in the country, and contribute to reducing damage caused by natural disasters. • The objectives of the project are to strengthen the monitoring capacities for localized and short-term weather disasters such as cyclones and torrential rain as well as to improve the accuracy and the ability to provide cyclone information, weather forecasts and warnings in Mauritius and in the Southwest Indian Ocean region, by installing or renewing weather Doppler radar	Myanmar Mauritius	The Project for Establish-ment of Disastrous Weather Monitoring System The Weather Service Project	2012 2012

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						weather radar observation data (images)		systems, weather data display systems and weather data communication systems. Thereby, the project aims to contribute to reducing the damage caused by natural disasters.			
					Effect indicators	Basic indicators A reduction in the number of victims in disasters which are the same size as that used in the scenario in the disaster prevention plan					
				Weather information networking equipment including automatic surface observation systems, aerological observation systems, satellite communication systems (VSAT), GTS message switching systems, data analysis and processing systems, etc.	Operation indicators	Basic indicators The observation times at the meteorological observatories The time required to report to head office from the meteorological observatories Supplementary indicators		• In order to improve the promptness and appropriateness of weather information, the project aims to improve weather observation systems, information transmission systems and their analysis and processing systems, thereby meeting the needs of meteorological agencies inside and outside the country, mitigating weather disasters and supporting stable national development.	Mongolia	The Project for Improvement of Meteorological Information Network	2008
					Effect indicators	Basic indicators The types of advisories and warnings that can be issued Supplementary indicators A reduction in weather disaster-derived casualties which was achieved through improved weather observation and forecasting accuracy		• The objectives of the project are to reduce the time required to collect, process and transmit information by five hours or more, through installation of automatic telemeter systems at rainfall observation stations and water level observation stations in the basin of the Hanjiang River (a Yangtze River tributary), as well as providing information gathering and processing equipment for the system central bureau of the Yangtze River Water Resources Committee and for relevant facilities. Thereby, the project aims to reduce flood damage.	The People's Republic of China	The Project for Improvement of Equipment for the Flood Control System of the Hanjiang River	2006
Prevention (prevention/ mitigation) and Preparedness	1. Development of disaster-resistant communities and societies	1-2. Improvement on response to disasters by communities and societies	1-2-4. Establishment of forecasting, warning and evacuation systems	Hydrologic observation and data collection subsystems, data analysis and flood information transmission subsystems, warning issuance and transmission systems, etc.	Operation indicators	Basic indicators A reduction in missing hydrological observation data		• Reduce flood risk by establishing flood forecasting and warning systems in the High Atlas area.	Morocco	The Project for Flood Forecasting and Warning System in High Atlas Area	2010
					Effect indicators	Basic indicators Percentage of warnings issued at the time of rainfall events that had rainfall of the standard value or more					
				Construction of schools-cum-evacuation facilities (such as cyclone shelters) and the procurement and installation of the necessary equipment (water supply systems, toilets and school facilities)	Operation indicators	Basic indicators The number of times the schools are used in evacuations/emergency (times/year) The percentage of the local resident population that can be evacuated in the evacuation facilities Supplementary indicators		• Secure facilities where residents can evacuate safely during the eruption of the Mayon Volcano and during mudslides, debris flows and floods caused by typhoons, torrential rain, etc. as well as securing a learning environment in ordinary times, by developing school -cum-evacuation facilities in the existing schools designated as	The Philippines	The Project for Evacuation Shelter Construction in Disaster Vulnerable Areas in Province of	2011

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								evacuation sites in the Province of Albay. Thereby, the project aims to contribute to reducing disaster risks in the area.		**Albay**	
					Effect indicators	**Basic indicators The number of evacuees (i.e. the number of people saved) during severe cyclones**		**• Construct 20 primary school buildings that function as evacuation facilities during cyclones in the Labutta and Bogale township in the Ayeyarwady Division which were cyclone Nargis affected areas, thereby improving the educational environment in schools and reducing the cyclone risk existing target area.**	**Myanmar**	**The Project for Constructio n of Primary School -cum- Cyclone Shelter in the Area Affected by Cyclone "Nargis"**	**2009**
								• Enable an increased number of people to evacuate and also improve the educational environment in primary schools by constructing 20 school-cum- cyclone shelters in the districts of Chittagong, Cox's Bazar and Noakhali which have cyclone risk.	**Banglades h**	**The Project for Constructio n of Multi-purpose Cyclone Shelters (Phase 5)**	**2009**
Recovery and reconstruction	**3. Smooth transition to and implementation of recovery and reconstruction**	**3-2. Supporting victims affected by disasters to recover and regain their ordinary life**	**3-2-1. Recovery and reconstruction of social infrastructure**	**Preparation of construction machinery, work vehicles, etc. (such as bulldozers and dump trucks) needed for repair and restoration of public facilities such as roads and bridges affected by heavy flooding**	**Operation indicators**	**Basic indicators Construction machinery operating rates (%) Length of restored roads after being affected by floods Number of bridges restored after being affected by floods Annual average daily traffic (vehicles/day, vehicles/24 hours) Supplementary indicators An increase in the load capacity (axle load) of the pavement (tons)**	**It is acceptable if pre-disaster conditions are restored. It may be difficult to identify the pre-disaster conditions in the preparatory survey for this type of project, because the pre-disaster traffic and other data may be difficult to obtain.**	**• The Government of Bangladesh formulated the project in order to restore or repair public facilities including roads, levees and bridges which were affected by flood from July to September 1998.**	**Banglades h**	**The Project for Supply of Equipment and Materials for Flood Disaster Relief**	**2006**
					Effect indicators	**Basic indicators A reduction in the time required to get to the destination (hours) Supplementary indicators Passenger transport volume (passenger-km), Volume of freight (tons/year) Driving costs saved (yen and the amount in local currency per year) An increase in the average driving speed (km/hour) A reduction in the number of road shut-down days per year due to natural disasters (days/year) An improvement in access to infrastructure (schools, health centers, etc.) (people/day)**					

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				The restoration of affected bridge facilities	Operation indicators	Basic indicators The annual average daily traffic (vehicles/day, vehicles/12 hours) Supplementary indicators An increase in the load capacity (axle load) of the pavement (tons)	It is acceptable if pre-disaster conditions are restored. It may be difficult to identify the pre-disaster conditions in the preparatory survey for this type of project, because the pre-disaster traffic and other data may be difficult to obtain.	• Construct sabo dams and repair a bridge on Camiguin Island, thereby contributing to the prevention of debris flow disasters in the river basins and the improvement of river-crossing transportation.	The Philippines	The Project for Flood Disaster Mitigation in Camiguin Island	2009
					Effect indicators	Basic indicators A reduction in the time required to get to the destination (unit: hours) Supplementary indicators The passenger transport volume (passenger-km), the volume of freight (tons/year) Driving costs saved (yen and the amount in local currency per year) An increase in the average driving speed (km/hour) A reduction in the number of road shut-down days per year due to natural disasters (days/year) An improvement in access to infrastructure (schools, health centers, etc.) (people/day)					

(*1) The disaster cycle has "prevention (prevention/ mitigation) and preparedness," "emergency response" and "restoration and reconstruction" stages, but "emergency response" was omitted from the Standard Indicator Reference because no grant aid project comes under this disaster cycle stage.

(*2) Development Strategic objectives which do not apply to any grant aid projects were omitted. The mid-term objectives and the sub-targets of mid-term objectives which do not apply to grant aid projects were also omitted.