

Flood and Sediment Management in the Philippines, in view of Cooperation.

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1. Natural Disaster in the Philippines

The Philippines is one of the most severely damaged countries by natural disasters in East-Asian Region. Among the natural disasters, 92.5% is caused by typhoons which bring about heavy rainfall as well as strong wind. Approximately, twenty typhoons a year break out on the sea around Caroline and Mariana Islands and most of them pass through the Philippines. These typhoons caused floods in most cases, due to heavy rainfall. Thus, the Philippines is vulnerable to flood damage. According to the flood damage records from year of 1970 to 2003, lives of 544 people per annum were lost and a total of 1,487 people per annum including missing and injured. The number of damaged household and people are 500,000 and 2,800,000, respectively. The number of damaged houses is 730,000, out of which 70,000 were completely destroyed. The total damage amount is about 4.6 billion pesos a year and more than 10 billion pesos once every 6 years.

In the Philippines, among the major disasters that have occurred since 1980's, the disaster which recorded the heaviest casualties was a flood flow including debris in Ormoc, Leyte Island, brought by Typhoon Uring in November 1991 (Fatalities: 5,101 persons Missing: about 3,000 persons). The Central Luzon Earthquake in July 1990 recorded the largest property damage of about 12,200 million pesos. Another devastating disaster was the eruption of Mount Pinatubo in 1991. The eruption affected not only the regional but also the national economy, which recorded a negative growth rate in national GDP.

Master Plans for flood control projects of so-called Major River Basins (12 out of 18) with catchment area of more than 1,400 km² have been formulated in 1982 and, based on the plans, feasibility studies and project implementation have been conducted introducing ODA fund and other international funds. And, even for the Principal River Basins with catchment area of more than 40 km², urgent flood control projects, whenever severe flood damages occurred, have been implemented. However, the number of river basins, in which flood control works have been implemented so far, is very limited.

Table 1**Statistical Data of Disasters according to Disaster Type (2000 Jan. - 2008 Dec.)**

Disaster Type	Killed		Affected		Estimated Damage	
	person	ratio (%)	person	ratio (%)	USD (mil.)	ratio (%)
Storm	5,988	73.4%	33,222,044	86.6%	1,165	92.7%
Earthquake (seismic)	15	0.2%	73,451	0.2%	2	0.1%
Vocano	0	0.0%	209,532	0.5%	5	0.4%
Flood (General/Flash Flood)	379	4.6%	4,552,146	11.9%	72	5.8%
Mass Movement Wet Land Slide	1,717	21.0%	240,511	0.6%	9	0.7%
Epidemic	35	0.4%	774	0.0%	0	0.0%
Flood (Surge/Coastal)	26	0.3%	65,843	0.2%	3	0.2%
Drought	0	0.0%	0	0.0%	1	0.1%
Wildfire	0	0.0%	0	0.0%	0	0.0%
Insect Infestation	0	0.0%	0	0.0%	0	0.0%
Total	8,160	100.0%	38,364,301	100.0%	1,257	100.0%

Source:

EM-DAT: Emergency Events Database

<http://www.emdat.be/>**1.1 Floods**

The Philippines has a tropical climate. Tropical storms are common from June to October. Each year, about 20 typhoons hit the Philippines, mostly on the eastern coasts of Luzon and Samar, bringing strong winds and flooding that sometimes resulted in property damage and loss of life.

The vulnerability of the Philippines to flooding is more pronounced in the 421 principal river basins and the 76 sub basins of major rivers scattered all over the Philippine archipelago, with an average of 20 typhoons each year. Under intense rainfall, overflowing of waterways, inundation and deposition of sediment in flood plains often resulted to extensive flood damages. Monsoons also bring heavy rains that caused flooding. Flood-prone areas are extensively located in Eastern Mindanao, Northern Samar, Central Luzon and the Bicol Region. Approximately, there is a total of about 1,316,230 hectares susceptible to flooding nationwide, of which almost 423,000 hectares or 32% is located in Central Luzon alone.¹ Various

¹ Source: Philippine Flood Control 1977, NWRC

types of flood can be observed, such as, flash flood including debris, mudflow and lahar flow in the upstream, overflow and bank erosion both in the midstream and downstream and inland flood in the downstream.

1.2 Flood Damage

From 1990 to 2003 alone, the Philippines experienced an average of 3.5 destructive typhoons a year with damage amount of up to 96.6 billion pesos, mostly incurred from flood damaged properties, infrastructures and crops. Based on the record of the Office of Civil Defense (OCD) and the National Disaster Coordinating Council (NDCC), most typhoons entering the Philippine Area of Responsibility (PAR) undoubtedly take the heaviest toll on lives and properties. This incurs a heavy cost on the economy of the Philippines, especially, upon the agriculture sector. It has been reported that an average of 900 persons have died annually, and the estimated cost of approximately 8 billion pesos per annum is assumed to be due to typhoons and associated with flood events over the period covered.

The loss of human lives and damage to agricultural crops and private properties, as well as the interruption of business operations, tend to hinder economic development and the efficient delivery of basic social services. Flood damage has been estimated at 2% of the national budget, and almost double the yearly budgetary allocation of the DPWH for flood control.

Table 5 represents the amount of flood damage incurred in the last 26 years (1980-2005) in the Philippines, while **Figure1** shows the annual behavior of casualties.

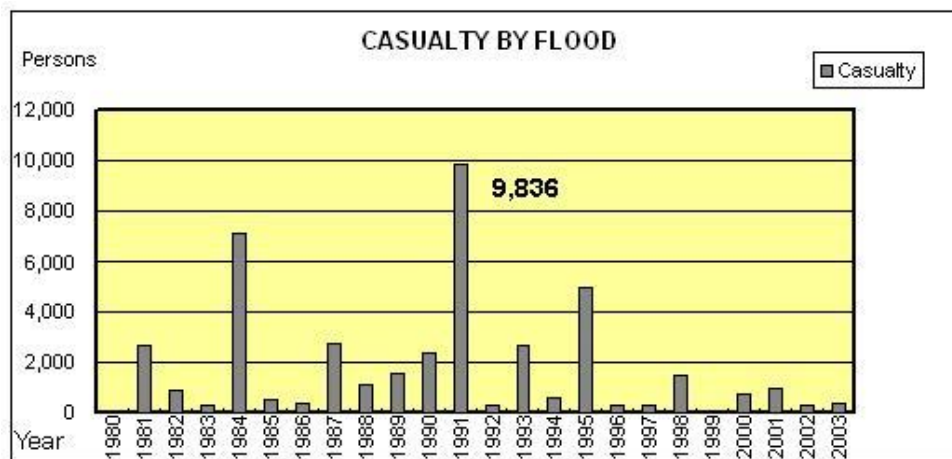


Figure 1- Behavior of Flood Casualties (1980-2003)

Table 6 summarizes the tropical cyclones, as well as the casualties and missing persons which exceeded to 100.

2. Activities of Related Agencies in the Philippines

2.1 National Disaster Coordinating Council (NDCC) and the Office of Civil Defense (OCD)

The Office of Civil Defense (OCD), a secretariat for the NDCC, has the Natural Disaster Management Center as its headquarters and 17 Regional Centers in the entire country. The OCD's duties cover a wide range of national civil defense, establishing policies and plans for protecting civilians during domestic and international conflicts, defense of the state and civilians, training of civilians, NGOs and volunteers. Through the experiences of the Central Luzon earthquake in 1990, the Mount Pinatubo eruption in 1991, and a series of large floods in the 1990s, there is a recognition and expectation for the role of the OCD during and after disasters. In the late 1990s, the OCD's structure and system was reformed so as to enhance government's administrative function of disaster mitigation, as well as the OCD's function, after coping with the experiences of the serious disasters in the 1990s. As a consequence, the OCD has recently come to play an active role in disaster mitigation in the Philippines. The major activity of the OCD is to develop frameworks and tools for local government units, which actually implement and have to play the central role in the disaster mitigation administration. Examples of consequences of the OCD's activities are the above mentioned bills regarding disasters and a manual of planning for emergency situations for local government units.

Further, floods striking the Central Luzon and the Manila Metropolitan Region in August 2004 stimulated the government, especially the OCD and DPWH, to establish the National Flood Management Committee and the Regional Flood Management Committee (tentative names). Most of the major water-related government agencies, such as NIA, NHRC, PHILVOCS, PAGASA, DILG, NEDA, OCD, and NWRB, are expected to take part in these committees.

2.1.1 Present situations and problems of Office Civil Defense (OCD)

The OCD has recently been active in developing, proposing and implementing national disaster mitigation policies. It has worked in closer cooperation with the academe, such as the Society of Civil Engineers, and with international organizations, such as UNHCR and the World Bank. The OCD said to have accumulated the latest data and information on disaster mitigation from many places of the world. Limited human resources, budget and basic tools are problems to be solved by the OCD.

2.2 Department of Public Works and Highways (DPWH)

2.2.1 Structure and budget

The headquarters of the DPWH, which is the major government agency in charge of flood control, has ten bureaus and seven Project Management Offices (PMOs) as of August 2004. The PMO-MFCP (Project Management Office – Major Flood Control Projects) and PMO-Pinatubo have responsibility for major flood control projects funded by foreign aid agencies. However, mainly because of limited human resources (only 30 to 40 members, about a half of those are engineers), major flood control projects have not been adequately implemented and managed. A smaller scale of infrastructure projects is conducted by 16 regional offices and/or 126 district offices with non-international funds. The DPWH has internally discussed their structural reformation, but its contents have not been made public. According to the budget allocation to sectors in the Medium Term Public Investment Implementation Plan (2004-2009), the share of the budget for flood control will be kept constantly low during the period, although the proportion against the total budget is planned to slightly increase from 11.4% to 17.3%. Budget available for flood control is estimated at approximately 5 billion Pesos per year.

2.2.2 Flood Control and Sabo Engineering Center (FCSEC)

FCSEC was established under DPWH in 2001. Under the Project for Enhancement of Capabilities in Flood Control and Sabo Engineering of the DPWH (ENCA) supported by JICA, technical transfer programs, such as training and seminars, have been conducted for improving technical capabilities in planning, design, construction supervision and operation and maintenance of flood control and sabo facilities. Manuals of planning and design of river structures and other manuals are being established. One of the future issues are utilizing and improving these manuals through actual projects.

2.2.3 The Study on Flood Control Project Implementation System for Principal Rivers in the Philippines

Unlike major rivers, whose flood control measures have been gradually developed under Japanese financial and technical assistance, flood control measures for small or medium-scale rivers have constantly been behind due to lack of DPWH's budget. In order to improve such a situation, the Study on the Flood Control Project Implementation System for Principal Rivers was conducted to enhance structural capabilities of project implementation on medium scale rivers under the technical and financial assistance of JICA. A medium-term action plan (2005-2010), a long-term action plan, and a long-term flood management program (including establishment of the National Flood Management Committee) were proposed.

2.3 Department of Environment and Natural Resources (DENR)

The Forestry Management Bureau and the Protected Area and Wildlife Bureau of DENR have take charge of administration and management regarding forestry, which has a strong relationship with comprehensive flood control measures and river basin management. A close coordination between DPWH and DENR should be the key to promote comprehensive watershed management. Further, coordination too with other government agencies should also be established with NWRB as introduced in the subsequent section.

2.4 National Water Resources Board (NWRB)

The NWRB has an overall responsibility for water resources development and management, and its major duty is to maintain and enforce the Water Code. The NWRB works mainly for establishing water resources development and management policies, coordinating various agencies related to water resources, approving water usage rights, and resolving conflicts between water allocation and use. The members of the NWRB are the Secretaries of DPWH, DENR, NEDA, DA, DOH, and DOT, and the heads of MWSS, LWUA, NIA and NPC. The Secretary of DPWH acts as a chairperson of the board. Each member of the government agency has to implement water-related projects, but there is no sole organization for comprehensive river basin management.

2.5 Philippine Atmospheric, Geophysical & Astronomical Service Administration (PAGASA)

PAGASA belongs to the Department of Science and Technology (DOST), one of the members of NDCC. The Flood Forecasting and Warning System (FFWS), which should play an important role for disaster mitigation, is operated and managed by the Flood Forecasting Branch (FFB) of PAGASA. The FFWS was first introduced to the Philippines by a Japanese grant aid in 1973. The system has been expanded and improved mainly with a yen loan since then. However, the existing facilities are getting deteriorated, and some problems like lack of precision of observation results can be found. Under the circumstances, PAGASA have made efforts to enhance a FFWS function through a variety of activities, such as re-development of flood forecasting models, improvement of institutional structure, and implementing programs to raise residents' understanding over FFWS with assistances from JICA. These activities have produced slight success, but not sufficient enough to reach to the radical improvement of the FFWS function. To cope with such a condition, JICA provided the technical cooperation project "the Strengthening of Flood Forecasting and Warning Administration" (April 2004 to April 2006), which is expected to enhance capabilities of operating, managing and running FFWS of PAGASA.

2.6 Philippine Institute of Volcanology and Seismology (PHIVOLCS)

PHIVOLCS has been in charge of various issues regarding volcanic eruptions and earthquakes, such as prediction, monitoring, formulation of disaster prevention plans, and research and development. Its activities cover the fields not only of social sciences but also of social matters, such as disaster reduction education and training and enlightenment of people. For instance, according to the 5-year Medium Term Business Plan issued in 2004, action plan items include earthquake education, research on social vulnerability, and risk evaluation as well as expansion of the observation network and preparation of hazard maps. Through the “Improvement of Earthquake and Volcano Monitoring System” and the “Study for Earthquake Impact Reduction for Metropolitan Manila” with the assistance of the Japanese Government, facilities and technologies have been transferred to PHIVOLCS. This agency has many educated staff and has been conducting vigorous research and activities. However, despite the fact that its successful consequences require adequate investments in facilities and technologies, its annual expenditure in the year 2003 was limited to around 152 million Pesos, and majority of that was needed to be spent on the operation of existing facilities. Hence, the progress of research and development was restricted by funds. More opportunities to utilize the acquired technologies and knowledge are to be afforded.

2.7 Metropolitan Manila Development Authority (MMDA)

The MMDA is mandated to deal with matters which have an impact on the entire Metro Manila area, affecting across administration boundaries of each local government units, and require large investment beyond capacities of an individual local government unit. Examples of its actual activities are: establishing medium-term and long-term development plans, regulating land use and development, traffic control, solid waste disposal, managing flood control and urban drainage, health and hygiene, emergency first aid training, and emergency actions during disasters. There are about 8,800 personnel as of January 2004 out of which 4,900 are permanent staff. However, manager levels, which can actually make daily decisions, are limited, and duties and work are concentrated on the limited number of staff. As for the disaster management, the Chairman of MMDA chairs the Metro Manila Disaster Coordinating Council (MMDCC) and shares the responsibility of disaster countermeasures in Metro Manila. However, the activities of MMDCC are not so active and many requests for improvement are forwarded to the member agencies.

2.8 Non-Governmental Organizations (NGOs)

More than 65,000 NGOs are officially registered in the Philippines. (This number includes NGOs which are currently not active.) The characteristics and actual activities of each NGO can hardly be grasped because of the large number of NGOs and the fact that their activities cover a wide range of areas. However, acquiring more information about NGOs should be beneficial, because cooperation with NGOs, which work with local communities, would be essential for achieving attentive assistance. For instance, NGOs, which have appropriate experience, could work efficiently to enlighten local residents and give them information regarding flood control and disaster mitigation. One of the existing NGOs that has already played an important role is the Philippine National Red Cross (PNRC). Its branch officers act as members of NDCC at local levels, and actively work on rescue operations, relief activities and reconstruction.

3. National Policy and Direction for Flood Control

In this sector, several national development plans have been prepared to orient the policy and direction for economic and infrastructure development, including flood control in the Philippines. Selected among them are the Medium Term Philippine Development Plan (2004-2010), the Medium Term DPWH Infrastructure Development Plan (2004-2010) and the National Framework for Physical Planning (2001-2004).

3.1. Medium-Term Philippine Development Plan, 2005-2010 (MTPDP 2005-2010)

The Medium Term Philippine Development Plan (MTPDP) is a detailed roadmap towards achieving the common goal of reducing poverty through job creation and enterprise.

As for natural disaster prevention, strategies are mainly divided into two; namely, Nonstructural Measures and Structural Measures. Their strategies are excerpted as below:

1. Non-structural Measures

- a. Complete the geo-hazard mapping of the remaining 13 regions;
- b. Conduct soil stability measures (e.g., reforestation and planting in river banks) for landslide-vulnerable areas; and
- c. Ensure integration of disaster preparedness and management strategy in the development planning process at all levels of governance. This shall be done through the following activities, namely, among others: periodic risk assessments, updating of respective land use policy based on the assessment, conduct of disaster management orientation/training among LGU officials and concerned local bodies, institutionalization of

community-based mechanisms for disaster management (e.g., inclusion of legitimate disaster management organization at various Disaster Coordinating Councils), and advocating for the bill on “Strengthening the Philippine Disaster Management Capability.”

2. Structural Measures

- a. Keep at the optimum the conveyance capacities of existing river channel floodways, drainage canals, esteros through riverbank protection, dredging/desilting, observance of river easements, relocation of informal settlers, proper disposal of garbage, and efficient maintenance in coordination with LGUs;
- b. Provide adequate flood control and drainage facilities in all flood/sediment disaster prone areas to mitigate flooding as well as rehabilitate and improve existing facilities.

The points to be understood in the MTPDP 2004-2010 policy are summarized as follows:

- Flooding shall be mitigated through the complex enhancement between government policies, organizations, laws, physical countermeasures, etc., under the philosophy that flooding cannot be completely controlled by human techniques.
- In addition, flood management shall be considered as one of Integrated Water Resources Management.

In accordance with the policy, the following priority flood management projects are scheduled:

- Mt. Pinatubo Hazard Urgent Mitigation II;
- Iloilo Flood Control Project;
- Lower Agusan Flood Control Project Stage 1, Phase 2
- Bicol River Basin and Watershed Management
- Agno and Allied Rivers Flood Control;
- KAMANAVA Flood Control;
- Metro Manila Flood Control Project - West of Mangahan Floodway;
- Pasig-Marikina River Channel Improvement Project, Phase II;
- Cagayan River Flood Control Project;
- Panay River Flood Control Project; and
- Lower Cotabato River Flood Control Project.

3.2 Medium-Term DPWH Infrastructure Development Plan, 2005–2010

The DPWH, which is mandated to administer flood control and Sabo projects, has set the following nine (9) tasks to be solved or improved for the implementation of effective flood and landslide disaster mitigation since the previous Medium Term Plan (1999-2004):

- Formulate an overall Master Plan for flood control program adopting the principle of management and river basin approach;
- Pursue comprehensive planning of prioritized major and principal river basins, giving priority to maintenance rather than new construction;
- Provide adequate flood control and drainage facilities in all flood/sediment disaster prone areas to mitigate flooding within tolerable levels;
- Pursue nonstructural measures to mitigate floods, such as flood forecasting and warning and monitoring system, evacuation plan, hazard mapping and reforestation;
- Keep optimum conveyance capacities of river channel floodways, drainage canals, esteros, etc., through riverbank protection, dredging/de-silting, observance of river easement, and efficient management in coordination with LGUs;
- Establish database on river information, including existing flood control, drainage, and Sabo structures;
- Strengthen and maximize the capacity of the Flood Control and Sabo Engineering Center (FCSEC) to conduct basic and applied researches and development, engineering programs and human resources development;
- Strengthen the flood management capabilities of DPWH, LGUs and other concerned agencies; and
- Establish the National Flood Management Committee (NFMC) as the inter-agency organization and policy governing body to integrate and lead all efforts on disaster mitigation and flood management, and formulate guidelines.
- To sustain the policy on development since the previous Medium-Term Plan, the DPWH have the following investment programs:

Table 2
Tentative Implementation Schedule

Project	Total Cost	Previous Year	Proposed Allocation (in thousand Pesos)							
			2005	2006	2007	2008	2009	2010	Total (2005-2010)	Later Years
National Roads										
Foreign-Assisted Project	353,770*	52,376	17,122	24,270	18,834	18,819	34,014	42,163	155,222	146,676
Locally Funded Project	142,522	1,353	9,081	11,285	18,454	37,841	30,681	33,827	141,169	
Total	496,293*	53,729	26,203	35,555	37,288	56,660	64,695	75,990	296,391	
Flood Control										
Foreign-Assisted Project	93,422	17,414	5,285	4,784	6,532	4,014	10,966	12,642	44,223	31,785
Locally Funded Project	4,900	-	-	-	1,500	1,500	900	1,000	4,900	-
Total	98,322	17,414	5,285	4,784	8,032	5,514	11,866	13,642	49,123	31,785
Other Locally Funded Project	70,650	-	7,232	7,380	17,342	12,132	8,892	8,640	61,618	9,032
Grand Total	665,265	71,143	38,720	47,719	62,662	74,306	85,453	98,272	407,132	

Note: () as shown in MTPIP*

The river basins listed with requests for foreign-assisted projects in the DPWH Medium-Term Investment Program are as shown in Table 2.8, together with the local fund projects.

3.3 National Flood Mitigation Framework Plan (Draft: June 2006)

3.3.1 Current Situation and Needs

Backgrounds

Flood and other water-induced disasters are becoming regular occurrences in the country. These recent occurrences have shown a rising trend of disasters nationwide, coupled with the seemingly reactive postures of both government and the populace. Acknowledging the need to immediately address flood and flood/sediment related disasters which hamper the socio-economic development of the country, President Gloria Macapagal-Arroyo had directed the formulation of a National Flood Mitigation Framework Plan to facilitate the harmonious and coordinated efforts of the various government agencies and other stakeholders in mitigating flood and other water-induced disasters, at the same time rationalizing investments of other sectors.

(a) Disaster Mitigation Framework

Disaster Coordinating Councils (DCCs) at different levels have been created under PD1566, which provides the nation's principles in disaster mitigation. Issues and concerns hampering the effective disaster mitigation in the country were enumerated (e.g., the local calamity fund is not available for pre-disaster activities).

(b) Flood Mitigation Constraints

The existing constraints on flood mitigation have been identified, as follows:

- Limited budget; and
- Limited human resources/expertise and equipment

3.3.2 Goals and Objectives

(a) Goals

The goal set in this National Flood Mitigation Framework Plan (NFMFP) is the protection of communities and environment, and the enhancement of their coping capacities from/against flood and other water induced hazards (includes sediment hazards) through nonstructural and structural measures.

(b) Objectives

Specific objectives of the Framework Plan are as follows:

- To reduce the impacts of flood and other water induced hazards by integrating and harmonizing measures in the following areas: a)Major river basins; b)High-risk principal/small rivers; c)Areas within fault lines; d)Volcanic areas; and e) High risk coastal areas; and
- To develop hazard mitigating measures, such as: a) Structural Measures; b) Nonstructural Measures; and c) Response, Recovery and Development.
- Policies

In the implementation of the NFMFP, the following policies are to be pursued:

- Composition of the framework on flood mitigation by the following approaches:
 - Structural Measures (Reducing Hazard Magnitude);
 - Nonstructural Measures (Reducing Vulnerability);
 - Response, Recovery and Development (Mitigating Impacts);
 - Use of Integrated Water Resources Management (IWRM) principles in guiding the development of approaches;
 - Rational and equitable implementation of mitigation measures, i.e., based on river basin master plans; and
 - Establishment by LGUs of community-based rainfall and water level monitoring, in coordination with PAGASA and BRS-DPWH, respectively.

3.3.3. Strategies

In line with the goals, objectives and policies, the following strategies have been recommended:

- The concerned agencies shall cooperate and coordinate their responsibilities, consistent with the framework of flood mitigation and in accordance with the Responsibility Matrix;
- A river basin management plan shall be formulated for each prioritized river basin, focusing on flood mitigation; and
- Countermeasures shall be suited to local conditions, culture and resources

3.3.4. Framework of Flood Mitigation

Various activities under the structural (reducing vulnerability), nonstructural (reducing hazard magnitude) and response, recovery and development (mitigating impacts) approaches are to be listed including those for institutional strengthening.

3.3.5 Implementation Plan

Government agencies, LGUs and other stakeholders are to implement the mitigation programs and measures discussed above. This will require the commitment of government to support the programs, and the understanding and support of the LGUs and beneficiaries.

The following nonstructural and structural measures are to be implemented:

a) Nonstructural Measures

- NAMRIA Base Map Updating
- Harmonization of Hazard Maps
- Hydrological Information Dissemination
- Watershed Management
- Coastal Resources Management
- Community Disaster Management

b) Structural Measures

- Ongoing Foreign-Assisted Flood Control Projects
- River Basins Scheduled for Implementation until 2010
- Feasibility/Detailed Engineering and Implementation of Priority Projects identified in the High Risk Flood and Sediment Disaster Prone Areas (DPWH)
- Feasibility/Detailed Engineering and Implementation of Sabo Projects in identified Sabo Sites (DPWH)
- Master Plan for the Remaining seven (7) Major River Basins (No existing MP)
- Update of Completed Master Plans of four (4) Major River Basins (DPWH)
- SWIM/SWIP Projects (NIA/BSWM, DA/DPWH)

- River Improvement Projects and Drainage Projects under the District Engineering Offices of the DPWH Regular Funds
- River Improvement Projects and Drainage Projects under the Local Government Units
- Provision of Structural Complement (i.e., check dams) for Erosion Control and Reforestation

4. Japanese Policy on the Sector

4.1 Policy on the Sector

The Government of Japan (GOJ) provides assistance to the Philippines to contribute to political stability and promote economic prosperity, taking into account the following factors: 1) The Philippines is a neighboring country, and has for many years maintained favorable relations with Japan; 2) Japan and the Philippines have a close relationship of interdependence in trade and investment.

In this connection, the GOJ has given priority assistance in Disaster Risk Management focused on the most susceptible areas as one of Priority Areas/Sectors and Policies considering aggravated environmental issues. In the disaster risk management sector, these are inclusive of measures against floods, earthquakes and volcanic activities.

4.2 Previously Assisted Projects in the Sector

The GOJ, recognizing the significance of coping with the sector problems, has been assisting the Government of Philippines (GOP) in the implementation of flood control projects since early 1970's. The projects under GOJ assistance can be classified into: 1) GOJ grant-aid projects; 2) JICA studies; and 3) OECF/JBIC projects, as shown in **Table 7, 8 and 9**, respectively. As shown in these tables, during the last 33 years from 1971 to 2003, 53 projects and studies amounting to 138,173 million yen (excluding costs of JICA studies) have been implemented. The salient features of these projects by category are as described below.

(1) Grant-Aid Projects of GOJ

Nine (9) grant-aid projects with the total cost of 9,198 million yen have been implemented during the last 33 years (**Table 7**). The implementation agencies were PAGASA, University of the Philippines (UP) and DPWH.

PAGASA implemented two projects with the total cost of 101 million yen (1% of the total amount) relating to the flood forecasting and warning systems in the Pampanga River Basin. UP implemented one project relating to the National Hydraulic Research Center. On the other hand, the DPWH implemented six projects with the total cost of 9,037 million yen (98%) relating to:

- Retrieval of flood prone areas in Metro Manila;
- Equipment procurement for Mt. Pinatubo;
- Flood mitigation works in Ormoc City;
- Rehabilitation of the flood control and warning system in Metro Manila; and
- Construction of Hydraulic Laboratory.

In Ormoc City, the first phase of the JICA-assisted Flood Mitigation Project has been completed. This involved the construction of three (3) slit dams and the reconstruction of five (5) bridges.

(2) JICA Studies

Seventeen (17) studies have been implemented during the last 33 years and two (2) studies are on-going (**Table8**). The implementation agencies were PAGASA and DPWH.

PAGASA implemented one study on flood forecasting system (6% of the total number of studies). On the other hand, DPWH implemented 18 studies (94%), which are classified into:

- Flood Control and Sabo: Six (6) studies around Mt. Mayon, Mt. Pinatubo and Laoag;
- Flood Control: Five (5) studies in major river basins (Pampanga, Panay, Agno, Ilog Hilabangan and Lower Cagayan);
- Flood Control and Drainage, or Drainage alone: Three (3) studies in Metro Manila; and
- Others (disaster prevention): Two (2) studies around Mt. Mayon and in Camiguin Island; one (1) nationwide study (The Nationwide Flood Risk Assessment and the Flood Mitigation Plan for the Selected Areas in the Republic of the Philippines); and one (1) study for a principal river basin (Comprehensive Flood Mitigation for Cavite Lowland Area in the Republic of the Philippines).

Based on these, it is evident that JICA studies have been implemented in Metro Manila, major river basins (Pampanga, Panay, Agno, Ilog-Hilabangan and Lower Cagayan), principal river basins (Laoag and Cavite), Mt. Mayon, Mt. Pinatubo and Camiguin Island.

(3) JICA Loan Projects (by Previous OECF/JBIC)

Twenty-seven (27) JICA (i.e., the previous OECF/JBIC) projects (L/A based) with the total cost of 128,975 million yen have been implemented during the last 33 years (**Table9**). The implementation agencies were PAGASA and DPWH.

PAGASA implemented four (4) projects with the total cost of 12,390 million yen (10% of the total amount) relating to the flood forecasting and warning systems for dam operations, etc. On the other hand, DPWH implemented 23 projects with the total cost of 116,585 million yen (90%), which are classified into:

- a. Flood Control: 15 projects in Pampanga, Pasig-Marikina, Agusan, Agno and Allied rivers, Iloilo City and Metro Manila
- b. Flood Control and Drainage, or Drainage alone: 3 projects in Metro Manila
- c. Flood Control and Sabo: 1 project in Laoag
- d. Others (volcano hazard mitigation, telemetering and small dams): 4 projects at Mt. Pinatubo and nationwide.

Based on these, it can be understood that JICA (OECF/JBIC) projects have been implemented mainly in Metro Manila, major river basins (Pampanga, Pasig-Marikina, Agusan and Agno), selected urban centers (Laoag and Iloilo), and Mt. Pinatubo.

5. Policy of the Other Donor Agencies

5.1. World Bank (WB)

a) General Policy on Disaster Risk Management²

The World Bank's Disaster Risk Management aims to reduce human suffering and economic losses caused by natural and technological disasters. The World Bank tries to provide a more strategic and rapid response to disasters, promoting the integration of disaster prevention and mitigation efforts into the range of development activities.

Since 1980, the World Bank had approved more than 500 operations related to disaster management, amounting to more than US\$40 billion. These include post-disaster reconstruction projects, as well as projects with components aimed at preventing and mitigating disaster impacts. For reconstruction projects, much of the Bank's investment focuses on the reconstruction itself of physical infrastructure and damaged structures. Rebuilding in urban areas often focuses upon health facilities, such as hospitals that are themselves important in post disaster reconstruction. Economic recovery also features as a key component in some reconstruction projects, where it usually involved financing urgently needed imports.

Common areas of focus for prevention and mitigation projects include forest fire prevention measures, such as early warning measures and educational campaigns to discourage farmers from slash-and-burn agriculture that ignites forest fires; and flood prevention mechanisms, ranging from shore protection and terracing in rural areas to adaptation of production.

b.) Program to Strengthen Disaster Risk Reduction and Disaster Management

² The Policy of WB on Disaster Risk Management is cited from the website:

<http://web.worldbank.org>

in Southeast Asia

The Association of Southeast Asian Nations (ASEAN) Secretariat, the United Nations International Strategy for Disaster Reduction (UNISDR) and the World Bank announced a cooperation program to strengthen disaster risk reduction and disaster management in Southeast Asia in May 2009. This program aims to help ASEAN reduce its vulnerability to natural hazards, thus protecting its citizens from the impact of extreme weather events in the future. The program is the focus of the Memorandum of Cooperation (MoC) on Disaster Risk Reduction, a tripartite agreement between the ASEAN Secretariat, the UNISDR and the World Bank. The program lays a framework for technical support from the UN and the World Bank to help ASEAN formulate and implement strategies and action plans for disaster risk reduction and management. The objectives of this program include (i) building ASEAN's capacity in the areas of disaster risk reduction and climate change adaptation; (ii) mobilizing resources for the implementation of disaster risk reduction initiatives in ASEAN; and (iii) helping ASEAN policy-makers gain knowledge on effective and practical ways to reduce disaster risks.

5.2 Asian Development Bank (ADB)

ADB has a comprehensive disaster and emergency assistance policy that provides rehabilitation and reconstruction assistance and assists developing member countries with prevention, preparation, and mitigation of the impact of future disasters. This policy has been approved on 01 June 2004. Named as “The 2004 Disaster and Emergency Assistance Policy of the Asian Development Bank (DEAP of ADB),” the policy is consistent with Strategy 2020: The Long-Term Strategic Framework of the Asian Development Bank 2008–2020, which calls for mainstreaming disaster risk management (DRM) and providing early and medium-term disaster response and assistance in partnership with selected aid agencies.

The basic principles of this policy contain the following items:

- Adopting a systematic approach to disaster management, including natural disasters and post-conflict.
- Mainstreaming disaster risk management as an integral part of the development process.
- Strengthening partnerships among development and specialized organizations to enhance the effectiveness of emergency aid, since no single agency can provide all the resources needed to cope with disasters and the resulting emergencies.
- Using resources more efficiently and effectively to better support pre- and post-disaster activities.
- Improving organizational arrangements within ADB for planning, implementing, and communicating effectively on disaster and emergency-related assistance

- Based on the above principles for disaster risk management, ADB has created the following plan and position papers:
- Action Plan for Implementing ADB's Disaster and Emergency Assistance Policy (April 2008)
- Positioning ADB's Disaster and Emergency Assistance Policy in a Changing Regional Environment

Furthermore, the ADB will establish a new fund that will enable it to immediately provide financial aid to developing member countries (DMCs) hit by natural disasters. The ADB Board of Directors approved the establishment of the Asia Pacific Disaster Response Fund (APDRF), which will provide grants of up to US\$3 million to help DMC's meet the immediate costs of restoring life-saving services following a declared disaster. This financial assistance will bridge the gap between existing ADB emergency loans and grants. Hence, the ADB has two emergency funds and one of them is the existing emergency assistance loan that is designed for longer term reconstruction and rehabilitation. While this mechanism of APDRF allows for quick fund disbursement, it still takes at least 12 weeks before funds can be made available to affected DMCs. The new APDRF will complement ADB's existing mechanisms and allow for the disbursement of additional funds almost immediately. APDRF assistance will be extended after three conditions are met – a natural disaster has occurred; a statement of national emergency has been officially declared by the affected DMC; and the United Nations humanitarian/resident coordinator has confirmed the scale and implications of the disaster and indicated a general amount of funding needed. The size of the grant extended by APDRF will depend on the extent of the disaster. The Regional and Sustainable Development Department of ADB (RSDD) will manage the fund in consultation with the ADB regional departments and resident missions, and coordination with various ADB departments in implementing activities financed by the APDRF. An initial US\$40 million will be transferred from the Asian Tsunami Fund to establish the APDRF. The tsunami fund was set up by ADB in February 2005 in response to the pressing needs of DMCs adversely affected by the December 2004 tsunami. The Asian Tsunami Fund contributors have approved the transfer to the new fund. ADB will also accept a minimum US\$500,000 contribution for the APDRF from bilateral, multilateral, and individual sources.

(<http://www.adb.org/Media/Articles/2009/12853-asian-disasters-funds/>)

5.3 German ----- (GTZ)

The GTZ is an international cooperation enterprise for sustainable development with worldwide operations. GTZ has the corporate form of a “GmbH” (closed limited company) in the private sector. It is owned by the German Federal Government. GTZ has been active in the Philippines since 1971 on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ). GTZ currently focuses on economic reform, environment, health and HIV/AIDS, and water and wastewater in the priority regions of the Visayan Islands and Mindanao.

Reference:

1. The Preparatory Study for Sector Loan Disaster Management in The Republic of the Philippines, JICA (2009)
2. The Study on Program Formulation in Disaster Mitigation Sector in the Philippines, JICA (Dec. 2004)
3. JICA Library: <http://lvzopac.jica.go.jp/library/indexeng.html>
4. NDCC home page: <http://ndcc.gov.ph/home/>

Table 3**List of Water Resources Regions**

Code	Name	Major River Basin	No. of Principal Rivers
WRR I	Ilocos Region	Abra River	14
WRR II	Cagayan Valley	Cagayan River	39
WRR III	Central Luzon	Pampanga and Agno Rivers	24
WRR IV	Southern Tagalog	Pasig-Laguna de Bay Rivers	97
WRR V	Bicol Region	Bicol River	30
WRR VI	Western Visayas	Panay, Jalaur and Ilog-Hilabangan Rivers	37
WRR VII	Central Visayas	-	19
WRR VIII	Eastern Visayas	-	34
WRR IX	Southwestern Mindanao	-	34
WRR X	Northern Mindanao	Agusan, Cagayan de Oro and Tagoloan Rivers	29
WRR XI	Southeastern Mindanao	Davao, Tagum-Libuganon, Buayan Rivers	35
WRR XII	Southern Mindanao	Agus and Mindanao Rivers	30

Source: "Principal River Basin of the Philippines" published by NWRC in October 1976

Table 4**Eighteen Major River Basins**

Code No.	Rank	River Basin	Water Resources Region	Catchment Area (km ²)
02001	1	Cagayan	Region II	25,469
12342	2	Mindanao	Region XI and XII	23,169
10315	3	Agusan	Region XIII	10,921
03059	4	Pampanga	Region III	9,759
03070	5	Agno	Region III	5,952
01036	6	Abra	Region I	5,125
04076	7	Pasig-Laguna Bay	NCR and Region IVA	4,678
05114	8	Bicol	Region V	3,771
02028	9	Abulug	Region II	3,372
11303	10	Tagum-Libuganon	Region XI	3,064
06235	11	Ilog-Hilabangan	Region VI and VII	1,945
06197	12	Panay	Region VI	1,843
10331	13	Tagoloan	Region X	1,704
12336	14	Agus	Region XII and ARMM	1,645
11307	15	Davao	Region XI	1,623
10332	16	Cagayan	Region X	1,521
06205	17	Jalaur	Region VI	1,503
11364	18	Buayan-Malungun	Region XI	1,434

Source: "Principal River Basins of the Philippines" published by NWRC in October 1976

Table 5

Recorded Annual Flood Damages, Philippines, (1980-2008)

Year	Population Affected		Causalities			House Damaged		Damage Value* (mil. Peso)
	Families	Persons	Dead	Missing	Injured	Totally	Partially	
1980	248,164	1,666,498	36	4	55	16,510	51,101	1,472
1981	250,325	1,472,417	484	264	1,922	44,994	159,251	1,273
1982	266,476	1,569,017	337	223	347	84,027	97,485	1,754
1983	140,604	747,155	126	168	28	29,892	85,072	523
1984	741,510	4,048,805	1,979	4,426	732	310,646	313,391	416
1985	318,106	1,643,142	211	300	17	8,204	211,151	3
1986	287,240	1,524,301	171	43	155	3,162	14,595	1,838
1987	464,162	2,591,914	1,020	213	1,455	180,550	344,416	8,763
1988	1,173,994	6,081,572	429	195	468	134,344	585,732	8,675
1989	501,682	2,582,822	382	89	1,088	56,473	184,584	4,494
1990	1,265,652	6,661,474	676	262	1,392	223,535	636,742	11,713
1991	150,894	759,335	5,201	4,278	357	15,458	83,664	74
1992	418,964	2,097,693	145	95	51	3,472	8,342	7,359
1993	1,523,250	8,202,118	814	214	1,637	166,004	456,773	25,038
1994	670,078	3,306,783	266	54	260	58,869	226,291	3,401
1995	1,710,619	8,567,666	1,255	669	3,027	294,654	720,502	57,781
1996	260,581	1,254,989	124	49	97	2,690	17,557	10,109
1997	777,997	3,954,175	199	28	66	13,225	53,980	4,842
1998	1,590,905	7,197,953	498	116	873	137,020	406,438	17,823
1999	270,424	1,281,194	56	3	25	144	687	1,555
2000	1,426,965	6,852,826	338	59	370	24,573	195,536	7,217
2001	756,938	3,629,295	431	134	418	14,899	54,422	6,924
2002	538,600	3,546,469	169	33	71	2,980	15,947	829
2003	702,223	3,362,991	139	28	182	12,306	51,579	4,567
2004**	-	-	1,046	437	836	-	-	7,679
2005**	-	-	62	36	51	-	-	2,487
2006	724,405	3,625,839	440	219	744	4,486	853	21,106
2007	891,694	4,287,783	871	94	1,457	9460	22,853	4,592
2008	1,997,547	9,935,009	1,704	818	2,091	139,837	569,512	23,513
Total	20,069,999	84,602,604	19,609	13,551	20,272	1,992,414	5,568,456	247,820

*) Total damages in infrastructure, agriculture and private properties.

**) Source: DSWD for Casualties.

-) Not available here.

Table 6**Destructive Tropical Disturbance and Corresponding Casualties, Philippines**

Tropical Disturbance	Date of Occurrence	Casualties			Damages
		Dead	Missing	Injured	Php million
T Ruping	Nov 10-14, 1990	508	246		
TS Uring	Nov 2-6, 1991	5,101	1,256	292	
TD Ditang	July 17-21, 1992	36	77		
T Kadiang	Sep 30-Oct 7, 1993	126	26	37	
T Monang	Dec 3-4, 1993	273	90	607	
T Puring	Dec 24-29, 1993	187	52	280	
TS Mameng	Sep 27 - Oct 1, 1995	116	126	49	
TS Pepang	Oct 26 -30, 1995	265	67	323	
T Rosing	Oct 31 - Nov 3, 1995	936	316	4,152	
T Emang & TS Gading	Sept 16-21, 1998	108	20		
Loleng	Oct 15-23, 1998	303	29	751	
Reming	Oct 26-Nov 1, 2000	114	10		
T Feria	July 2-6, 2001	188	44	241	
T Nanang	Nov 6-10, 2001	236	88	169	
Hambalos, Inday	June 28-July 14, 2002	85	4	45	
T Harurut	July 19-21, 2003	64	2	154	
T Igme	June 25-July 2, 2004	57	20	39	
T Unding	Nov 14-21, 2004	56	79	25	
TD Winnie	Nov 28-30, 2004	821	417	400	
T.Myrenyo	Sep. 17, 2006	184	47	536	
T.Remin	Nov. 28-Dec.1, 2006	734	762	2,360	
T.Frank	June 21-, 2008	557	87	826	
T Ondoy	Sep. 26, 2009	420	37	540	11,162
T Pepeng	Nov. 7-9, 2009	489	184	49	16,553

T: Typhoon, TS: Tropical Storm, TD: Tropical Depression

Source: Office of Civil Defense

Table 7
GOJ Grant Aid Projects (1972-2009)

Year	Agency	Project	Amount (million Yen)	Status
1972	PAGASA	Flood Forecasting and Warning System in Pampanga River Basin	80	Completed
1977	UP	Strengthening of National Hydraulic Research Center	60	Completed
1980	PAGASA	Rehabilitation of Flood Forecasting and Warning System in Pampanga River Basin	21	Completed
1981	PAGASA	The Project for Improvement of Flood Forecasting and Warning System in the Pampanga River Basins		Completed
1989	DPWH	Retrieval of Flood Prone Areas in Metro Manila	1,231	Completed
1991	DPWH	Equipment for Mt. Pinatubo Hazard Urgent Mitigation	1,455	Completed
1992	DPWH	Retrieval of Flood Prone Areas in Metro Manila (II)	1,254	Completed
2000	PAGASA, DPWH	The Project for Improvement of Flood Control and Warning system in Metro Manila		Completed
1997-2001	DPWH	Flood Mitigation in Ormoc City (I) & (II)	3,255	Completed
2000	DPWH	Rehabilitation of Flood Control Operation and Warning System in Metro Manila	1,048	Completed
2002	DPWH	Construction of Hydraulic Laboratory Building	794	Completed
2002-2010	DPWH	The Project for Strengthening of Flood Management Function of DPWH http://www.jica.go.jp/project/philippines/0600933/english/		On-going
2007-2009	PAGASA	The Project for Improvement of Flood Forecasting and Warning System in the Pampanga and Agno River Basins: Phase I		Completed
2009-	DPWH	Camigine Disaster prevention project		On-going
Total		13 Projects	(9,198)	

Source: "Water & Floods", DPWH, March 2004, Inception Report for Strengthening of Flood Forecasting and Warning System for Dam Operation Nov. 2009

Table 8
JICA Studies (1971-2009)

Year	Agency	Project	Status
1976-1978	DPWH	Planning Report on the Pasig-Potrero River Flood Control and Sabo Project	Completed
1976-1977	PAGASA	Survey for the Flood Forecasting System Project	Completed
1978-1981	DPWH	Master Plan for Mayon Volcano Sabo and Flood Control Project	Completed
1979-1982	DPWH	Pampanga Delta Development Project	Completed
1982-1983	DPWH	Re-study of Mayon Volcano Sabo and Flood Control Project	Completed
1983-1986	DPWH	Panay River Basinwide Flood Control Study	Completed
1985-1987	DPWH	M/P Study on the Cagayan River Basin Water Resources Development	Completed**
1987-1990	DPWH	Study on Flood Control and Drainage Project in Metro Manila	Completed
1988-1991	DPWH	Study of Agno River Basin Flood Control Project	Completed
1989-1991	DPWH	Study on Ilog-Hilabangan River Basin Flood Control Project	Completed
1992-1995	DPWH	The Study on Flood Control and Mudflow Control for Sacobia-Bamban/ Abacan River Basin Draining from Mt. Pinatubo	Completed
1996-1997	DPWH	The Study on Sabo and Flood Control in the Laoag River Basin	Completed
1997-1998	DPWH	Master Plan Study on Water Resources Management in the Philippines	Completed**
2000	DPWH	The Study on Comprehensive Disaster Prevention Around Mayon Volcano	Completed
2000	DPWH	The Study on Existing Drainage Laterals in Metro Manila (LDSP)	Completed
2000	DPWH	The Feasibility Study on Lower Cagayan River Flood Control Project	Completed
2002-2003	DPWH	The Study in Sabo and Flood Control for Western River Basins of Mount Pinatubo	Completed
2002-2004	DPWH	The Study on Water Resources Development in Metro Manila	Completed**
2003	DPWH	Basic Study on Disaster Prevention & Reconstruction Project for Camiguin Island, Mindanao (LDSP)	Completed
2003	DPWH	Study on Drainage Improvement in Core Area of Metropolitan Manila	Completed
2006-2008	DPWH	The Study on the Nationwide Flood Risk Assessment and the Flood Mitigation Plan for the Selected Areas	Completed
2007-2008	DPWH Cavite P	The Study on Comprehensive Flood Mitigation for Cavite Lowland Area	Completed
2007-2008	DPWH	Master Plan Study on Risk Management for Sediment Related Disaster for National Highways	Completed**

2007-2010	DPWH	Improvement of Quality Management for Highway and Bridge Construction and Maintenance	On going for bridges
2008-2009	DPWH	Basic Design Study on the Project for Flood Disaster Mitigation for Camiguin Island	Completed**
2009	DPWH	Preparatory Study for Sector Loan on Disaster Risk Management in the Phils.	On-going**
Total		26 Studies	

Source: "Water & Floods", DPWH, March 2004.and Others

* : Added by the Preparatory Study Team

** Added data Oct. 16, 2009

Table 9**OECF/JBIC Projects (1973-2007)**

L/A Date	Agency	Project	L/A Amount (million Yen)	Status
03/23/1973	PAGASA	Flood Forecasting and Warning System in Pampanga River Basin	3,028	Completed
08/01/1974	DPWH	Flood Control Dredging Project in the Pampanga, Bicol & CoTabato River Basins	3,187	Completed
09/09/1975	DPWH	Pasig River Flood Control Project	5,112	Completed
01/04/1978	PAGASA	The Flood Forecasting Systems Project	1,774	Completed
11/09/1978	DPWH	River Dredging Project (II)	2,429	Completed
05/31/1982	DPWH	Lower Agusan Development Project (ES)	330	Completed
05/31/1982	PAGASA	Flood Forecasting and Warning System for Dam Operation Project	3,600	Completed
09/09/1983	DPWH	Nationwide Flood Control Dredging Project (Telemetering)	1,140	Completed
05/07/1984	DPWH	Metro Manila Drainage System Rehabilitation Project	3,012	Completed
05/30/1986	DPWH	Pampanga Delta Development Project (ES)	705	Completed
05/30/1986	PAGASA	Flood Forecasting and Warning System for Dam Operation Project (II)	3,988	Completed
01/27/1988	DPWH	Metro Manila Flood Control Project (II)	10,818	Completed
01/27/1988	DPWH	Small Water Impounding Management Project	3,193	Completed
01/27/1988	DPWH	Lower Agusan Development Project, Stage I, Phase I	3,372	Completed
02/09/1990	DPWH	Pampanga Delta Development Project, Flood Control Component (I)	8,637	Completed
02/09/1990	DPWH	North Laguna Lakeshore Urgent Flood Control & Drainage Project (ES)	454	Completed
08/30/1995	DPWH	Agno and Allied Rivers Urgent Rehabilitation Project	8,312	Completed
03/29/1996	DPWH	Mt. Pinatubo Hazard Urgent Mitigation Project	6,911	Completed
03/18/1997	DPWH	The Metro Manila Flood Control Project West of Mangahan Floodway	9,411	Completed
03/18/1997	DPWH	Lower Agusan Development Project (Flood Control Component - Phase II)	7,979	Completed
09/10/1998	DPWH	Agno River Flood Control Project (II-A)	6,734	Completed
12/28/1999	DPWH	Pasig-Marikina River Channel Improvement Project (ES)		Completed
12/28/1999	DPWH	Mt. Pinatubo Hazard Urgent Mitigation Project (II)	9,013	Completed
04/07/2000	DPWH	KAMANAVA Flood Control and Drainage System Improvement Project	8,929	On-Going
05/30/2001	DPWH	Laoag River Basin Flood Control and Sabo Project	6,309	On-Going
05/30/2001	DPWH	Agno River Flood Control Project (Phase II-B)	2,789	On-Going
03/28/2002	DPWH	Iloilo Flood Control Project (Stage I)	6,790	On-Going
02/27/2007	DPWH	Pasig-Marikina Phase II (Pasig River Improvement)	8,529	On-Going*
Total		28 Projects	137,504	

Source: "Water & Floods", DPWH, March 2004, and Added by the Preparatory Study Team

* : Added by the Preparatory Study Team