

## Ex-ante Evaluation

### **1. Name of the Project**

Country: The Republic of the Philippines

Project: Pinatubo Hazard Urgent Mitigation Project (Phase III)

(Loan Agreement: December 18, 2007; Loan Amount: 7,604 million yen; Borrower: The Government of the Republic of the Philippines)

### **2. Necessity and Relevance of JBIC's Assistance**

The Philippines is situated in an environment prone to natural disasters because of its geographical and climatic conditions. Particularly, there seems to be no end to flood damage caused by typhoons. In addition, the upper river basins are beset with outflow of sediments triggered by unplanned deforestation, and on the other hand, the urban areas are suffering from accumulation of waste due to illegal dumping of garbage. Sediments and waste reduce the discharge capacity of rivers, so that even a small amount of rain will cause flooding. Until now, the Government of the Philippines has been implementing flood control and sabo projects. In its Medium Term Philippines Development Plan (2004–2010), it has placed emphasis on identifying disaster prone areas across the country and on implementing disaster prevention measures in those areas. Moreover, in recent years, there have been efforts to establish national guidelines for integrated watershed management of rivers including flood control measures.

Mt. Pinatubo, located in Central Luzon, erupted in June 1991. Since this one of the largest volcanic eruptions in the 20th century, the surrounding areas of Mt. Pinatubo have been hit every year by outflow of pyroclastic flow (downstream, by lahar) caused by typhoons. Massive mudslide disasters have occurred in places like Sacobia-Bamban and Pasig-Potrero rivers in the east of Mt. Pinatubo. It was under these circumstances that Phase I (loan agreement: March 1996; loan amount: 6,911 million yen) and Phase II (loan agreement: September 1999; loan amount: 9,013 million yen) were implemented. During the two phases, rivers and roads were improved in the Sacobia-Bamban and Pasig-Potrero River Basins. However, elevation of riverbed and clogging of riverway still remain unsolved in the downstream of Pasig-Potrero River and its confluent Porac-Gumain River and so, the urban area and arterial roads continue to be damaged by flooding during typhoon and rainy seasons. Social and economic activities are thus adversely affected such as, traffic and distribution routes cutoff and obstruction of commercial activities and hygienic environment is worsened. As this project is a part of the development of the Subic Clark area, which the Government of the Philippines is investing in as a cornerstone of its policy for developing the country's economy, an early implementation of flood control measures in the project site .

In its Medium-Term Strategy for Overseas Economic Cooperation Operations (April 2005), JBIC advocates "support for global issues" as a priority area, and in the Assistance Strategy for the Philippines (December 2006), it advocates "support for environmental protection measures including disaster prevention" as a priority area. Thus providing support for this project is consistent with JBIC's assistance policy, and it is highly necessary and relevant that JBIC should support the project with ODA loans.

### **3. Project Objectives**

The objective of this project is to mitigate flood damage in Central Luzon of the Philippines through improvements of drainage channels, rivers, roads and construction of diversion channel, thereby securing physical distribution, improving hygienic environment and contribute to the region's sustainable development as part of the development of Subic Clark promoted by the Government of the Philippines.

### **4. Project Description**

#### (1) Target Area

Municipalities of Guagua, Lubao, Sasmuan, Mexico, Sto. Tomas, San Simon and City of San Fernando (Pampanga Province, Luzon Island)

#### (2) Project Outline

- (a) Dredging/excavation and construction of drainage channels
- (b) Construction of diversion channel in Lower Porac-Gumain River
- (c) Widening and excavation of rivers and drainage channels in the vicinity of City of San Fernando
- (d) Dredging of major rivers in the vicinity
- (e) Raising of roads/bridges and construction of bridges
- (f) Consulting services (detailed design, bidding assistance, construction management, support for formulation of watershed management plan and disaster prevention and evacuation plan, etc.)

#### (3) Total Project Cost / Loan Amount

10,854 million yen (Yen Loan Amount: 7,604 million yen)

#### (4) Schedule

November 2007–July 2013 (69 months). The project completion is defined as when the one-year defect liability period expires after all facilities are transferred to the main constituent of operation and maintenance.

#### (5) Implementation Structure

- (a) Borrower: The Government of the Republic of the Philippines
- (b) Executing Agency: Department of the Public Works and Highways (DPWH)
- (c) Operation and Maintenance System: Regional office of DPWH

#### (6) Environmental and Social Consideration

- (a) Environmental Effects / Land Acquisition and Resident Relocation

(i) Category: A

(ii) Reason for Categorization

The project characteristics are not likely to exert impact under the “Japan Bank for International Cooperation Guidelines for Confirmation of Environmental and Social Considerations” (established in April 2002). Thus this project is classified as Category A.

(iii) Environmental Permit

The Environmental Impact Assessment (EIA) report related to the project was approved by the Department of Environment and Natural Resources in November 2003.

(iv) Anti-Pollution Measures

Some 6.2 million m<sup>3</sup> of waste soil will be produced when the rivers are dredged, excavated or widened. The excavated/dredged materials are expected to be either disposed of in existing spoil sites or reused for embankment reinforcement. In addition, appropriate measures, including installing silt fences and wetting of spoil banks, will be taken to prevent water contamination, noise, vibration, dust, etc.

(v) Natural Environment

The project site is not located in or around sensitive areas, such as national parks, and so adverse impact on the natural environment is assumed to be minimal.

(vi) Social Environment

The project involves land acquisition of 231 ha and resettlement of 552 households of informal settlers. The land acquisition and resettlement will be implemented by the Executing Agency and Local Government Units (LGUs) concerned in accordance with the Philippine laws. The National Housing Authority (NHA) has already developed a resettlement sites with basic infrastructure, and the Executing Agency will provide houses plus land without charge. The Technical Education and Skills Development Authority (TESDA) and LGUs concerned will provide livelihood restoration program to the affected informal settlers.

The public consultation meetings on the land acquisition and resettlement were conducted by the Executing Agency together with the public consultation meetings regarding the EIA. The affected people generally agreed with the land acquisition and resettlement plan.

(vii) Other/Monitoring

In this project, the Executing Agency will monitor the excavated/dredged materials, water quality of rivers, etc.

(b) Promotion of Poverty Reduction

None

(c) Promotion of Social Development (e.g. Gender Perspective, Measure for Infectious Diseases including AIDS, Participatory Development, Consideration for the Handicapped, etc.)

In order to maintain the sustainability of the project's effects after its completion, an information and education campaign related to the prohibition of illegal dumping of wasted to the rivers and the flood management as well as formulation of a watershed and land management plan and a disaster prevention and evacuation plan will be implemented with the participation of local communities/people.

(7) Other Important Issues

Since all three components of the project – Phase I to Phase III – are to be completed with this ODA loan, the following will be implemented in Phase III to ensure the sustainable and comprehensive effects of these components:

- Support for formulating a watershed and land management plan
- Support for formulating a disaster prevention and evacuation plan through improvement of a

community-based flood warning system

- Support for planning and implementing an effective utilization of siltation materials that have been excavated

## 5. Outcome Targets

### (1) Evaluation Indicators (Operation and Effect Indicator)

#### (a) Municipalities of Guagua, Lubao and Sasmuan

Indicator	Original (2002 actual)	Target (2015, 2 years after completion)
Inundation depth and duration (2 years return period)	0.3–0.4 m/9 days	0.1–0.2 m/2 days
(20 years return period)	1.5–1.8 m/45 days	0.6–0.9 m/10 days
Affected population and affected period (2 years return period)	129,570/9 days	65,021/2 days
(20 years return period)	143,676/45 days	108,053/10 days
Amount of flood damage (agricultural products, public resources such as roads and bridges)		
(2 years return period)	3,598 million pesos	850 million pesos
(20 years return period)	6,534 million pesos	2,049 million pesos
Annual maximum number of inundated houses and inundated period		
(2 years return period)	24,214 houses/9 days	12,418 houses/2 days
(20 years return period)	26,835 houses/45 days	20,293 houses/10 days

(Reference indicator) Incident rate of waterborne disease (number of affected patients per 100,000)

#### (b) City of San Fernando, Municipalities of Mexico, Sto. Tomas and San Simon

Indicator	Baseline (2005 actual)	Target (2015, 2 years after completion)
Inundation depth and duration (2 years return period)	0.1–0.4 m/5 days	0–0.2 m/1 day
(20 years return period)	0.6–1.6 m/22 days	0.24–0.8 m/1 day
Affected population and affected period (2 years return period)	180,590/5 days	90,624/1 day
(20 years return period)	200,251/22 days	150,600/1 day
Amount of flood damage (agricultural products, public resources such as roads and bridges)		
(2 years return period)	1,730 million pesos	410 million pesos
(20 years return period)	3,143 million pesos	986 million pesos

Annual maximum number of inundated houses and inundated period (2 years return period) (20 years return period)	30,233 houses/5 days 33,505 houses/22 days	15,168 houses/1 day 25,337 houses/1 day
(Reference indicator) Incident rate of waterborne disease (number of affected patients per 100,000)		
(2) Number of Beneficiaries Around 750,000 (total population of the project site)		
(3) Internal Rate of Return Based on the following conditions, the project's economic internal rate of return (EIRR) is 25.1%.		
<ul style="list-style-type: none"> <li>• Cost: Project cost (excluding tax), operation and maintenance expenses</li> <li>• Benefit: Mitigation of flood damage in the project site (houses, agricultural products, infrastructure, commercial activities)</li> <li>• Project Life: 35 years</li> </ul>		
<b>6. External Risk Factors</b>		
Risk of delays in schedule due to bad weather.		
<b>7. Lessons Learned from Findings of Similar Projects Undertaken in the Past</b>		
A lesson learned in the past projects for disaster prevention is that, in order to make infrastructure measures effective and efficient, it is important to provide technical assistance (such as technology transfer, information and education campaign, etc.). Based on this lesson, in addition to implementing civil works, technical assistance including support for formulating a disaster prevention and evacuation plan will be provided through the consulting services, even more intensively than it has been in the past.		
<b>8. Plans for Future Evaluation</b>		
(1) Indicators for Future Evaluation <ul style="list-style-type: none"> <li>(a) Inundation depth and duration (m/day) (2 years return period, 20 years return period)</li> <li>(b) Affected population and affected period (persons/day) (2 years return period, 20 years return period)</li> <li>(c) Amount of flood damage (million pesos) (2 years return period, 20 years return period)</li> <li>(d) Annual maximum number of inundated houses and inundated period (houses/day) (2 years return period, 20 years return period)</li> <li>(e) Economic internal rate of return (%)</li> </ul>		
(2) Timing of Next Evaluation Two years after project completion		