

Disaster Relief Operation and Rehabilitation after Mt. Pinatubo Eruption

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INTRODUCTION

Perhaps arguably the largest eruption of the recent past century, the Mt. Pinatubo eruption on June 15, 1991, after about 500 years of dormancy, inflicted tremendous damages on infrastructures, institutional buildings, private properties, environment and caused loss of lives. Pyroclastic flows ravaged the forest and agricultural lands while ash fall caused the collapse of several bridges and submerged low-lying areas in the provinces of Pampanga, Tarlac and Zambales in central Luzon. About 6.7 billion cubic meters of pyroclastic material deposited around the mountain slopes, had, in the ensuing years, caused repeated lahar flows into farmlands and urban centers, thereby continuing the damages and bewildered the government in mitigating hazard of such magnitude. In 1992, the Mt. Pinatubo Commission was established directly under the Office of the President for the resettlement, restoration and livelihood for the victims; reconstruction and reconstruction of social infrastructure facilities; and the improvement of living environments for ethnic groups such as the Aeta.

Appealing for support through the United Nations, the Philippine government received assistance from the United States, Japan, Switzerland and other countries. Initial relief and recovery assistance included goods, equipment, and dispatch of experts. The Japanese government has contributed significantly to the rehabilitation of the damaged areas with its support on various surveys and studies which then became the blueprint of mitigation measures.

HAZARD MITIGATION MEASURES AND NON-STRUCTURAL MEASURES

Infrastructure scheme and master plan was formulated by the Department of Public Works and Highways (DPWH) in collaboration with the Mt. Pinatubo Commission, Philippine Institute of Volcanology and Seismology (PHIVOLCS) and other concerned agencies and local government units with the expert assistance and support of Japan International Cooperation Agency (JICA), the United States Agency for International Development (USAID), the US Army Corps of Engineers and the Swiss government, among others. This scheme has evolved over the years into more detailed master plans for the affected area and its component river basins. Moreover, Japan, through JICA's technical cooperation project spearheaded the the engineering support for lahar control.

Immediate mitigating measures undertaken were strengthening and raising the dikes, spur dikes to prevent erosion of river banks, groundfills to stabilize the riverbed, deepening and widening rivers to increase their conveyance capacity and sabo dams to trap volcanic debris in upstream sections of critical rivers. Simultaneously, the rehabilitation or reconstruction of damaged infrastructures was pursued, i.e., replacement of bridges, rehabilitation of damaged sections of roads, and repair/replacement of school buildings, health centers, water systems, markets and other social infrastructures. A communications network to monitor the lahar situation and emergency works, including two-way radios assigned to barangay (smallest political unit) offices and churches which were connected to the DWH central and field office was also established.

The megadike built on the Pasig-Potrero River, a U-shaped dike 23 kilometer long and 12 meter high completed in June 1996 trapped substantial volume of lahar which otherwise would have buried or devastated many parts of the municipalities of Bacolor, Sta. Rita and Guagua in Pampanga.

Among the many assistances extended by JICA were the Study on East Pinatubo River Basin Flood/Mudflow Control Project and the Study West Pinatubo River Basin Flood/Mudflow Project. DPWH then implemented the Pinatubo Hazard Urgent Mitigation Project (PHUMP) with financial assistance from the then Japan Bank for International Cooperation, now JICA, in 1996-2001. Succeeding phases of the PHUMP, based on the recommended priority measures from the masterplan and study, were implemented with financial assistance from JICA. Phase I included the construction of consolidation dam to trap sediments, river training works, dikes and a Nielsen or basket-type steel design. The Phase II, Phase III, and Phase IV of the PHUMP Projects, involving dredging, construction of dikes, river diversion roads, and bridges. Government funds likewise were expended for numerous projects to support the development of the areas, including the development of resettlement areas. Non-structural measures, aside from the various studies provided by JICA, included the development of an earthquake/volcano observation network, watershed management plan, disaster preparedness and flood management plan, land use plan and institutional capacity building. The dispatch of sabo experts and capacity building programs has greatly contributed to the knowledge of the government engineers on sabo works and appreciating their functions in addressing sediment movement disasters.

CURRENT SITUATION AND IMPACTS OF MEASURES

The implementation of the comprehensive measures under several phases of the PHUMP has greatly contributed to the recovery and rehabilitation of the affected areas, and normalizing the social and economic activities. Flood damages are mitigated and flood duration in the delta area is reduced. The people and the areas are protected and agricultural land is secured. The much improved road transport enabled the easy and quick transport of people and goods as well as the connectivity of various municipalities and provinces.

Measures addressing the mobilization of volcanic deposits on the western slopes of Mt. Pinatubo to protect Zambales province are also being implemented, albeit using local funds, but comprehensive measures are also being proposed for foreign financing.

The large scale comprehensive projects implemented initially in the Pampanga province, along with numerous mitigating measures in other provinces in central Luzon area region has enhanced the region's development. Over the recent years the region has its regional gross domestic product increase at an average of about 4 %. The population has increased and economic activities abound.

CONCLUSIONS

The relief and rehabilitation after a large scale disaster such as Mt. Pinatubo eruption can be effectively attained with comprehensive plans and with technical cooperation of foreign donor countries. Japan's technical assistance is critical in addressing sediment movement control. Then plans should be continuously implemented and holistically. After several years of receiving comprehensive structural measures and non-structural measures for mitigation, central Luzon region now enjoys an increasing regional gross domestic product, coming from agriculture, industry and services.