

Annex 8

Project Summary on Community Based Approach in Reforestation

Annex 8 Sustainable Development of Laguna de Bay Environment (SDLBE) Project

As delineated through LLDA's Netherlands-funded Sustainable Development of Laguna de Bay Environment (SDLBE) project, twenty-four (24) sub-basins (micro-watersheds) comprise the Laguna de Bay Basin. These sub-basins were used as the basic unit for planning and implementation of the following river rehabilitation strategies:

1. Lakbay Ilog

Undertaken with representatives from concerned Local Government Unit and other stakeholders, the length of a river is trekked, on foot, from where it opens out into the lake up to its headwaters. The physical survey leads to the identification of pollution sources, land-uses, and bio-physical attributes of the sub-basins, which are then used in the preparation of rehabilitation plans. The exercise serves as the first step towards team building and a prelude to the development of a common vision and mission to rehabilitate the river system.

2. Information, Education and Communication (IEC)

Working under the premise that a stakeholder's level of interest to initiate action arises in proportion to the amount of information that he is given regarding in the state of the river within his area of concern, and its significance to his interest and livelihood, IEC campaigns are conducted to mobilize of river protection and rehabilitation.

3. River Rehabilitation and Protection Councils/Foundations

To ensure multi-sectoral participation in the river rehabilitation effort, River Councils, whose members act as environmental stewards in their own concerns of the Laguna de Bay region, are organized. The formation of the River Rehabilitation and Protection Councils/Foundations for Laguna de Bay's sub-basins was institutionalized in 1999 through **LLDA Board Resolution No. 114**. In 2001, these River Councils/Foundations were federated and legitimized through the passage of **LLDA Board Resolution No. 167**. The umbrella organization, the Federation of River Councils/ Foundations, provides overall leadership, guidance and direction to the activities of its member councils. It also serves as a convergence point for the review of sectoral policies and program that impact on the region's resources.

4. Formulation of River Rehabilitation Plans

Participatory planning is undertaken by bringing together representatives from the various sectors (LGU, NGOs, POs, youth and civic organizations, etc.) to formulate realistic strategies to protect and rehabilitate the river. The output is a rehabilitation plan containing the vision, mission, objectives, key result areas and corresponding indicators to be applied for the sub-basin.

5. Environmental Army

The Environmental Army (*Hukbong Pangkapaligiran*) was organized to undertake the physical clean-up of the River Rehabilitation Program. This army, armed with shovels and pitchforks, is composed mainly of farmers and fisherfolks who are already affected by continuous degradation of the lake. They lead in the clearing of solid wastes, garbage and other debris that obstruct the natural flow of waterways. The group plays a vital role in raising awareness and heightening motivation among various sectors.

6. Water Quality Monitoring

Regular monitoring of the rivers that drain into Laguna de Bay is conducted in coordination with the Monitoring Section of LLDA's **Pollution Control Division (PCD)**. It is a vital component of the River Rehabilitation Program, the result of which are used to determine how effectively the program is being implemented in correlation to improving the lakes water quality.

7. Sustainable Development of the Laguna de Ba'i Environment (SDLBE)

In view of the competing and conflicting uses, the Laguna Lake Development Authority is more than ever faced with a need for comprehensive Water Resources Management and Development of Laguna de Bay.

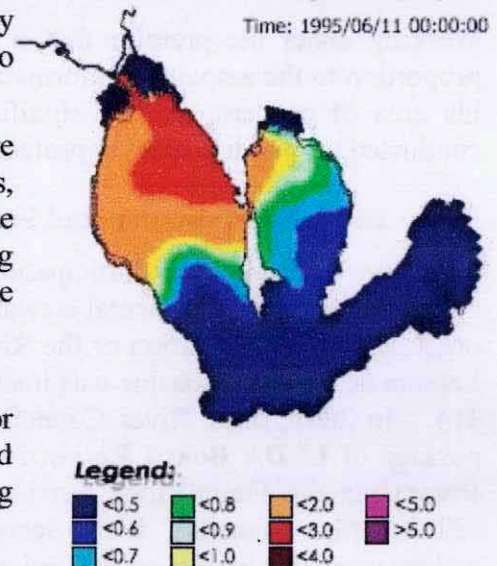
The lack of understanding of the system functioning, the water resources demand and supply, and the inadequacy of information needed to have a coherent understanding of water resources management and development threaten not only the sustainability of the lake uses, but also the ecological functioning within the Laguna de Bay.

Thus, to address these concerns, strategic intervention was initiated through a project: Sustainable Development of the Laguna de Bay Environment (SDLBE). The project, with a term of two years, was funded by the Kingdom of the Netherlands.

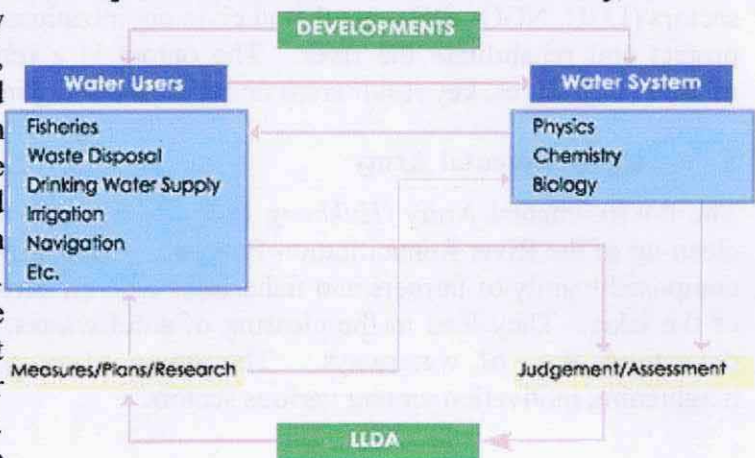
The objective of the project was to ensure future sustainable development of Laguna de Bay resources, based upon a sound knowledge of the functioning of the system, its users and the institutional setting (i.e. supporting Integrated Water Resources Management (IWRM)). The project was therefore especially directed at:

- Capacity building
- Developing practical and realistic solutions for current problems and issues regarding the lake and focusing on drinking water supply, need for dredging and infrastructure works..

With a total surface area of approximately 900 km² Laguna de Bay is one of the largest inland bodies of water in Southeast Asia. Some 100 streams drain into the lake out of six different provinces and a total of more than 50 municipalities. The total area of the watershed is around 3820 km² and has been significantly modified by land use (deforestation, quarry activities, urban expansion and the operation of the Mangahan floodway). As a result of these changes some 4 MT of suspended solids enter the Lake, leading to an average net accretion of 0.5 cm/yr. At present the average depth of the Lake is 2.5 m. The Lake's only outlet controls the flow to the Pasig River that discharges into Manila Bay. Over the last decade population expansion, land conversion, urbanization, industrialization, and intense fisheries have led to



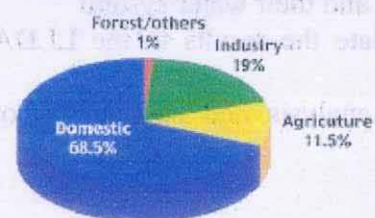
Integrated Water Resource Management



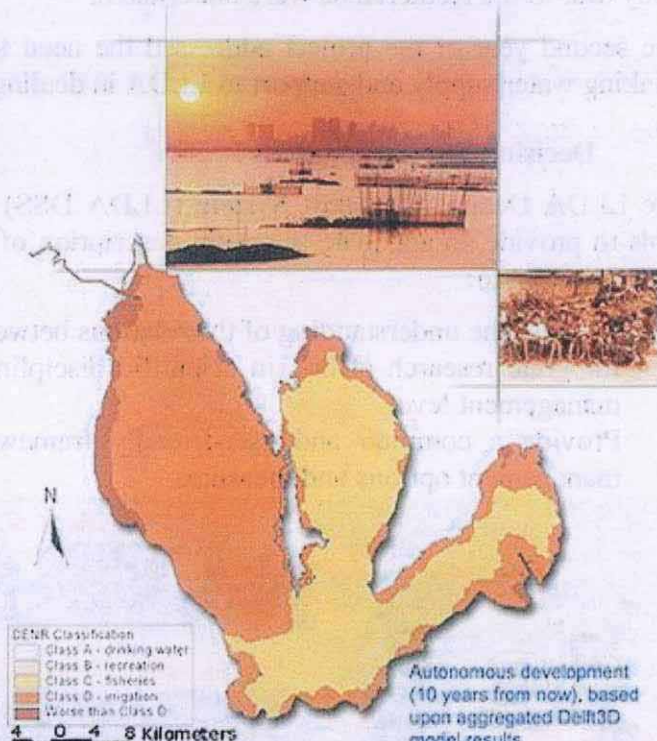
massive changes in the Laguna de Bay catchment. Nowadays households contribute for almost 70% to the total BOD₅ load into the Laguna de Bay, illegal garbage dumping seems common practice and high loads of bacteria, nutrients and toxics enter the water system untreated. Examples of other changes are: rapid siltation in the Lake, the occurrence of eutrophication phenomena and bacterial pollution, significant loss of biodiversity, flooding problems and all sorts of secondary impacts on public health, standard of living, loss of recreational attract, etc.

<View Laguna de Bay's Salinity Intrusion>

Over the last decades population expansion, land conversion, urbanization, industrialization and intense fisheries have led to massive changes, in the Laguna de Bay catchment.



Estimated total BOD load entering Laguna de Bay is 74,300 tons per year



Domestic	68.5%
Industry	19%
Agriculture	11.5%
Forest/others	1%

8. Institutional Development

Institutional strengthening of the LLDA has been an integral part of the project work. The project focused on planning and analysis for IWRM with emphasis on development of human and technical capabilities.

Impression on building with nature during the study tour The objectives of the proposed institutional support were:

- To support the set-up and development of an Integrated Water Resource Management (IWRM) unit within LLDA.
- To strengthen the capability of LLDA staff through intense training in the technical aspects of IWRM.
- To extend the knowledge and understanding of the land and water resources issues in Laguna de Bay including possible resource use conflicts through the development and use of a comprehensive state-of-the-art Decision Support System.

It was recognized that a key to sustainable water resource management is the presence of sufficient well-trained and experienced staff in all disciplines needed to support planning, research, management and development processes.

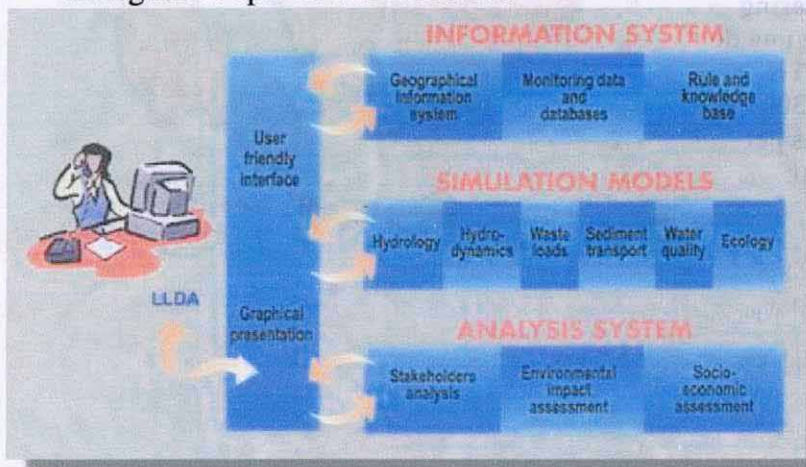
Under the first year of the project, the training was focused to a large extent on the development of technical tools for the IWRM unit. Included was the Joint set-up of a GIS and an advanced and integrated modeling system (referred to as the LLDA Decision Support System). To broaden the view of the staff, many project workshops were organized and a refresher course and study tour to the Netherlands were undertaken.

The second year of the project addressed the need for dredging in the Lake, the possibility of drinking water supply and support to LLDA in dealing with proposed infrastructure works.

9. Decision Support System

The LLDA Decision Support System (LLDA DSS) aims to integrate state-of-the-art software tools to provide an adequate scientific description of the Laguna de Bay. The DSS will be an important tool to:

- Increase the understanding of the relations between lake users and their water system
- Integrate research efforts in scientific disciplines and translate the results to the LLDA management level
- Provide a common and user-friendly framework for the analysis and comparison of management options and measures.

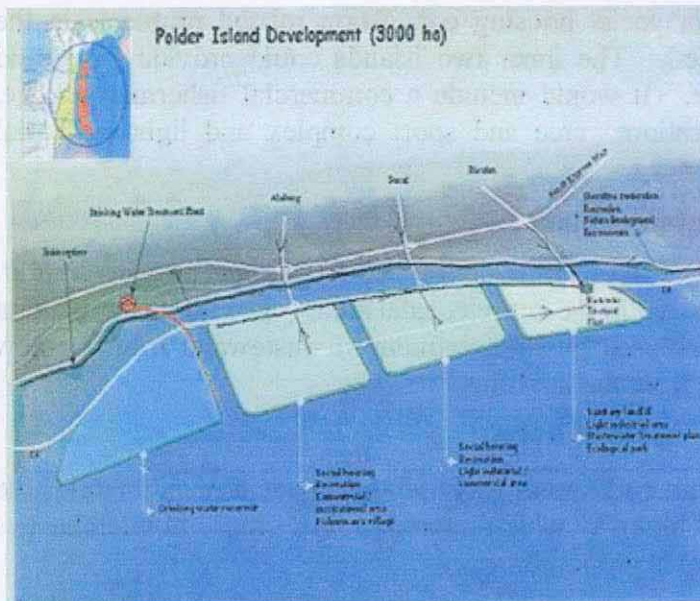


The application of the DSS and accompanying data collection and analysis studies has already led to an impressive update on many facts and figures such as physical characteristics of the Laguna de Bay catchment, total waste loads from the different sectors and areas, water and sediment balances, spatial and temporal compliance with applicable criteria, etc

Other related activities included:

- Set-up of a Laguna de Bay project library
- Encoding and analysis of monitoring data
- Monitoring and analysis of sediments
- Digitizing of all available spatial data
- Study on environmental geo-science

10. Case Study on the Creation of Four Polder Island



Polder Island Development (3000 ha)

In the second year of the project it was proposed to select or create one comprehensive capacity building case. The selected Polder Island Development Project (PIDP) is a technical, economic and environmental pre-feasibility study that aims to present a vision on sustainable development addressing the problems and needs in the most populated, intensely used and polluted part of the Laguna de Bay catchment. It includes the creation of four polder island (3000 ha) and builds on an old study of the Public Estates Authority in 1990-1991.

10.1 Development of a drinking water reservoir

The most southern island is proposed to become a drinking water reservoir to provide a continuous 400 MLD water supply to address the expected inadequate reliable water supply in the year 2006. This could serve as interim for the proposed Agos River Multi-Purpose Water Resource Development project. Afterwards, this polder could be converted into valuable land.

In combination with operation of the Napindan Hydraulic Control Structures (NHCS) the duration and level of increased salinities will be controlled (still allowing for the assumed beneficial effects on primary production and consequently fisheries). The reservoir and associated drinking water treatment plant is relatively easy to realize, overcomes problems related to conflicts of interests and ideally connects to the existing distribution network.

10.2 Sanitary landfill

The north polder island could facilitate a new sanitary landfill for Metro Manila and nearby towns. In combination with improved garbage collection scheme's, segregation and recycling it could solve the solid waste related problems for the next 50 years. The site can also serve as containment area for sludge, polluted sediments, industrial waste and temporal drying fields for dredged clay material and light industrial parks.

Gradually the island will be converted into a recreational area (on top of the landfill). Advantages are related to:

- Thick layer of impermeable clay underneath the site
- Size of the sanitary landfill island (500 ha)
- Accessibility and close distance to Metro Manila
- Controllability of the leachate from the land fill due to the planed wastewater treatment plant
- Its offshore position (and low traffic impact and hinder to the surrounding area) and
- Availability of cover material within the project area (as a result of maintenance dredging)

10.3 Social housing

By dedicating the new land (1700 ha) for social housing congestion related problems in the dense adjacent coastal area can be reduced. The inner two islands could provide space and job-opportunities to some 350,000 people. It would include a commercial fisherman village, institutional and commercial parks, recreational area and sport complex and light industrial zones.

10.4 Interceptors and waste water treatment plant

To improve the water quality and ecology of the Laguna de Bay, collection and treatment of all domestic and industrial wastewater is proposed in the entire coastal area. The treatment plant at the most northern polder island will also be used for the treatment of wastewater from the new polder islands and for treating the leachate from the landfill.

10.5 Construction of the Circumferential Road 6 (C6)

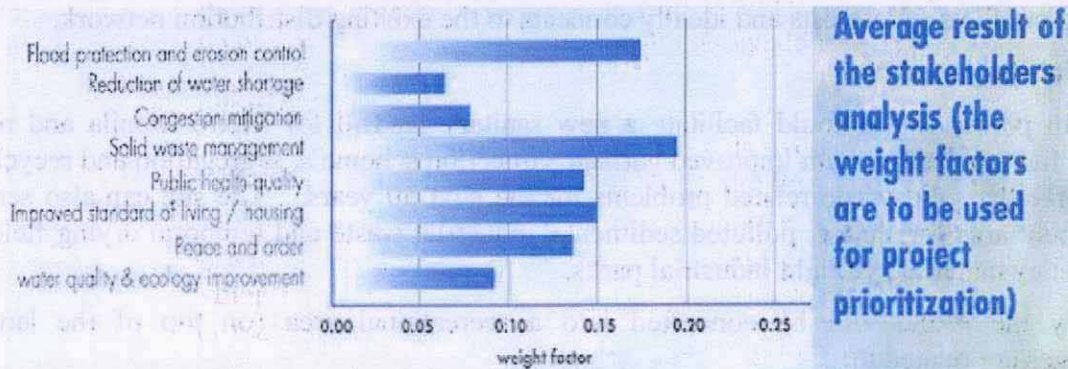
To solve the problem of the congested Southern Express way and the adjacent municipalities the construction of the C6 a four-lane divided highway which intersects four proposed interchanges located at Tagig, Sucat, Alabang and Biñan) is proposed.

10.6 Shoreline restoration

To improve the natural and living conditions along the shoreline, the following aspects are considered: fishponds for endemic species, green buffer zone, recreation activities, nature development/ ecologic embankments, establishment of a Laguna de Bay eco-museum.

10.7 Environmental dredging

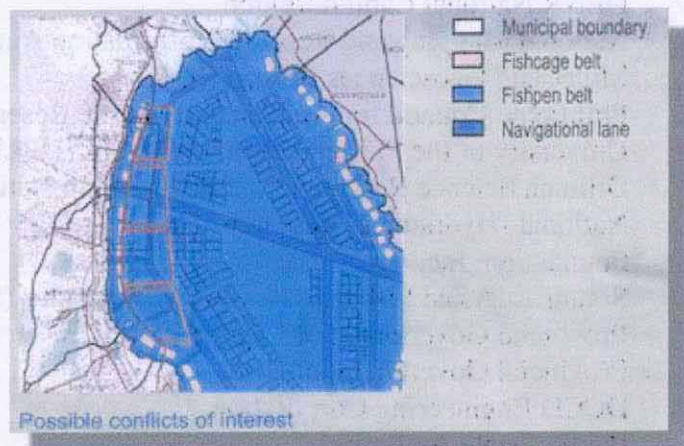
The need for dredging the downstream part of the tributaries is twofold: the dredging of garbage and contaminated material attached to fine particles and dredging for maintaining the river outflow (flood control). The water system around the polder islands will be maintained at a certain depth to improve the water quality and allow for different user activities (fisheries, recreation, nature development, etc.) The dredged clay material can be used for raising the land elevation and as cover material for the landfill.



Summary

The undertaking of the PIDP pre-feasibility study has been:

- Technically and economically very viable, innovative and challenging
- Very effective and stimulating with regard to transfer of tools and technology and increase and increase of credibility of LLDA as knowledge institution on Laguna de Bay
- Well-appreciated by various governmental agencies and the majority of the various stakeholders (LGUs, NGOs, farmers, fishermen and industry)



11. Activities and Partners

The IWRM unit will be responsible within LLDA to support a balanced and sound management and development of the Laguna de Bay using the decision-support systems and expertise developed in the project. This unit will also serve as the focal point for review of the technical and/ or environmental projects by third parties and will coordinate and carry out integrated research projects to increase water system and IWRM related knowledge within LLDA.

Major transfer of knowledge activities included:

- Set-up of GIS and integrated modelling framework
- Review of routine and compliance monitoring
- Study on soil conditions/geo-hazards
- Dredging and civil engineering works
- Water supply and sanitation study
- Set-up of sanitary landfill
- Spatial planning
- Shoreline restoration
- Stakeholders analysis
- Initial environmental examination
- Economic & financial analysis.

Partners

- WL I Delft Hydraulics (leading consultant)
- Royal Haskoning
- Netherlands Institute of Geoscience – TNO
- Van't Holf Consultancy
- Mr. Ronald Waterman

Associated to the international consortium and/ or established through an Memorandum of Understanding with the LLDA, the co-operation with the following local institutions was assured:

- Department of Environment and Natural Resources

- DENR Region IV
- DENR National Capital Region
- National Mapping and Resource Information Authority (NAMRIA)
- Mines and Geosciences Bureau (MGB)
- Philippine Council for Aquatic and Marine Research and Development (PCAMRD)
- University of the Philippines at Los Baños (UPLB)
- Diliman Science Research Foundation (incl. National Institute of Geological Sciences Inc.)
- National Hydraulics Research Center – UP Engineering Research and Development Foundation, Inc.
- Southeast Asian Fisheries Development Center (SEAFDEC)
- Provincial Government of Laguna
- Provincial Government of Rizal
- DCCD Engineering Corporation
- Public Estate Authority
- Additional expert, input

12. Sustainable Development of the Laguna de Ba'i Environment (SDLBE)

12.1 2002 Update

The LLDA through a technical assistance grant from the Kingdom of Netherlands has undertaken the SDLBEP to help ensure future sustainable development of the lake resources, supporting Integrated Water Resource Management (IWRM) that assures coordinated development of water, land and related resources to maximize economic and social welfare without compromising the sustainability of vital environmental systems. The project was therefore directed at capacity building and developing practical and realistic solutions for current problems and issues regarding the lake and the watershed.

Under the SDLBEP, the LLDA set up IWRM unit within the Authority, established state-of-the-art Decision Support System (DSS), assessed the need for lake dredging and the possibility of drinking water supply under the Polder Island Development Plan case study. There were several technical training and study tours to expose LLDA Staff on various aspects of IWRM.

The 2-1/2 year project has been extended to August 2003. For the extension period, the activities initiated under the SDLBEP project will be continued and bridge to follow-up program in institutional strengthening and feasibility on the Polder Island Development Plan (PIDP). These are:

- a.) To steer future Integrated Water Resource Management and Sustainable Development in the Laguna de Bay catchment by undertaking Environmental Action Planning;
- b.) To keep the momentum of the promising PIDP, by initiating institutional arrangements and undertaking social marketing and training related activities; and
- c.) To prepare the LLDA for the proposed follow-up in institutional strengthening program.

This proposal for extension was submitted by Royal Netherlands Embassy for further technical assistance. The Dutch Embassy has approved our request upon endorsement of NEDA and the Department of Foreign Affairs.

12.2 Polder Island Development Plan

The PIDP as a pre-feasibility case study was undertaken as part of SDLBEP to train LLDA staff in dealing with infrastructure development projects and addressing the issue of sustainable development. The case study was fully developed as a pre-feasibility study to address identified problems in the most polluted, densely populated and intensely used part of the Lake - the West Bay.

The PIDP was conceived, among others, to provide raw water for drinking water supply, address wastewater treatment and improvement of water quality and ecology, increase demand for land, natural shoreline restoration and solve environmental problems in the metropolis. Recently, the LLDA Board of Directors has endorsed the Drinking Water Reservoir and Sanitation Polder as a first component of PIDP for sustainable development. It is envisioned to provide raw water source for the drinking water of Metro Manila to bridge the gap starting 2006 when the present sources in the northern end of MWSS service area will be fully used up.

12.3 Water Quality Monitoring

Launching "The Water Mondriaan" Boar for lake monitoring, through the Netherlands-supported "Sustainable Development of Laguna de Bay Environment Project" (SDLBEP), has enhanced the flexibility and accuracy of LLDA's monitoring program and research activities. The LLDA has also operationalized the "Laguna de Bay Water Mondriaan", an on-line lake water quality monitor that can easily and instantly be accessed through the LLDA website, www.lda.gov.ph.

Annex 9

Functions and Roles of NEDA Secretariat in the Central Office

Annex 9 Flood Forecasting and Warning System for Dam Operation (FFWSDO)

1. BACKGROUND

Recognizing the need for operational flood forecasting and warning system to help mitigate losses of life and property brought about by annual occurrences of flooding, the Government piloted a Flood Forecasting and Warning System (FFWS) for the Pampanga River Basin in 1973. The project was established with the financial assistance from the Government of Japan, the warning system proved effective than it led to the establishment of a similar system covering Agno, Bicol and Cagayan River Basins.

In April 1983, the Flood Forecasting and Warning System for Dam Operation (FFWSDO) project was conceived. The project was meant to prevent the occurrence of similar incident (i.e. Angat Dam), which result to the unprecedented flood heights that caused destruction and deaths downstream of the dam.

Implementation of the project was done stages (Phases I and II). Phase I, for Angat and Pantabangan Dams. Was completed in July 1986, was funded under the 10th Yen Loan Package from Japan Overseas Economic Cooperation Fund (OECF).

For Phase II, implementation was started last January 1990 and was fully completed by the on set of the rainy season in 1992. The major components of Phase II are the establishment of the PAGASA Data Information Center, flood forecasting and warning systems, flood forecasting and warning system at dam offices, hydrological stations, warning posts, repeater stations and monitoring stations.

The project was implemented with the National Power Corporation (NPC) and the National Irrigation Administration (NIA) as cooperating agencies and the Philippine, Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) as the lead agency.

2. THE PROJECT

The Flood Forecasting and Warning system for Dam Operation (FFWSDO) aims at the establishment of telemetered flood forecasting warning system that will provide the necessary information for the safe and cost effective operation of the existing five major dams in Luzon and to forewarn the people in the flood plains downstream of these damsites of the impending release of impounded water through spillways during typhoons. Phase I, involves the establishment of a FFWS covering Angat and Pantabangan watershed areas, while Phase II, involves the establishment of a FFWS covering Magat and Binga/Ambuklao watershed areas.

The Agencies directly involved in the implementation of the project such as NPC and NIA are dam authorities who operate and manage the Angat and Binga/Ambuklao Dams and Pantabangan and Magat Dams respectively and the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) through its Flood Forecasting Branch which operates the flood forecasting warning systems. Monitoring agencies are the Department of Public Works and Highways (DPWH), Office of Civil Defense (OCD) and the National Water Resource Board (NWRB).

The complete FFWSDO has the following basic system and components:

- Real-time telemetering system consisting of the optimum number of rainfall and water level gauging stations
- Real-time processing computer system to forecast flood water inflow to the reservoir based on the telemetered rainfall data;
- Flood warning system with warning dissemination facilities and supervisory control stations in dam offices;

Overall supervisory system for the operation of the above system in the respective Central Offices of NPC, NIA, and PAGASA;

Monitoring system which will allow exchange of necessary information among the participating agencies in flood control and other related activities; and

Telecommunication system which provide the means for continuous information flow for the operation of the above system.

3. BENEFITS

The project will result in the effective use of the hydrological data and information for the efficient operations and management of reservoirs and ensure the optimum use of the impounded water for power generation, irrigation, flood control and domestic water supply, the mitigation of flood damages, particularly loss of human lives, by timely and adequate warnings of impending release of impounded water through the spillways.

4. FACILITIES

The Flood Forecasting and Warning System for Dam Operation consists of a network of telemetered gauging stations, warning stations, supervisory control offices of damsites linked with supervisory centers in Central Offices of NPC, NIA and PAGASA. The project's major facilities are as follows;

	FACILITIES	NUMBER
a.	Center at PAGASA	1
b.	Center at NPC and NIA	2
c.	Rainfall gauging station	19
d.	Waterlevel gauging station	7
e.	Fixed warning station	69
f.	Mobile warning station	24
g.	Repeater station	13
h.	Reflector station	2
i.	Monitor station	3

5. SUB-SYSTEM

The Flood forecasting and Warning System for Dam Operation is composed of the following four major sub-system, namely;

NAME OF DAM	AREAS COVERED
PHASE I	
A. ANGAT DAM	NORZAGARAY TO PLARIDEL
B. PANTABANGAN DAM	RIZAL TO CABANATUAN CITY
PHASE II	
A. MAGAT DAM	MARIS DAM TO NAGUILIAN
B. BINGA/AMBUKLAO DAM	SAN ROQUE TO CARMEN

Each of the sub-system are composed of the following components:

(1) **TELEMETERING SYSTEM**

The telemetering system is composed of rain and water level gauge stations (installed in selected places in dam watersheds) and radio telecommunication system for transmission of data.

In each damsite, at least three rain gauge stations are installed in selected locations considered appropriate based on hydrological considerations, radiowave propagation and construction and maintenance accessibility.

(2) **SUPERVISORY AND CONTROL SYSTEM**

The supervisory and control station (FFWS Dam Office) for the sub-system is located in each dam office. It supervises and controls the telemetering system and serves as the supervising control station for the warning systems within its area of coverage. It also performs the following functions:

- Disseminates dam discharge warning;
- Disseminates flood warnings issued by PAGASA;
- Monitors the operating condition of the warning stations;
- Prints out the collected data for compilation and utilization in subsequent analysis;
- Analyses the collected data to forecast the water inflows in the reservoirs and implements the recommended reservoir operation program.

(3) **TELECOMMUNICATION SYSTEM**

The FFWS Dam Office and rainfall/waterlevel gauging stations are linked by radio telecom network.

(4) **WARNING SYSTEM**

The FFWSDO's integrated and warning system includes the following:

- Fixed point warning stations categorized as Type-A and Type-B
- Mobile warning stations (vehicles) equipped with loud-speakers and portable radio telephones.

A **Type-A** warning station is equipped with a speaker and radio telephone. Generally, it is installed in the most densely populated area of each municipality with the area covered by each FFWSDO. The **Type-B** warning station is equipped with speaker only and is installed in barangays located between the coverage of Type-A stations.

In area not reach by both fixed point warning stations, a warning vehicle equipped with a speaker and radio telephone is provided.

Discharge/Flood warning notices are transmitted from the Dam Offices to the municipal halls which serves as the center for the dissemination of warnings. All flood warning operation are undertaken in close coordination with the FFWS Dam Offices, PAGASA and other government agencies.

6. FLOOD FORECASTING AND WARNING OPERATION

Flood forecasting and warning operation includes a number of interrelated activities, each of which forms the following integral part of the operation:

- Collection of hydrometeorological data on real-time basis.
- Assessment of weather conditions affecting or expected to affect the reservoir catchment areas;
- Streamflow simulation and flood forecasting;

Preparation and issuance of DICHARGE WARNINGS or FLOOD BULLETINS and FLOOD INFORMATION as the case may be; and

Dissemination of discharge warnings of flood warnings/information to the local, municipal, and provincial government offices, disaster coordinating councils and the general public through the FFWS Center, FFWS Dam Offices, OCD, DPWH, NWRB and other government agencies as well as the print and broadcast media.

The Warning/Information on flood are divided into two (2) groups, namely; Flood Bulletin and Flood Information.

Flood Bulletin is categorized into four (4) kinds of warning namely: Flood Outlook, Flood Advisory, Flood Warning and Critical Flood Warning. The PAGASA prepares and issues the corresponding Flood Bulletins at the exact time.

In the issuance of Flood Bulletins PAGASA uses three (3) assessment levels as guides, namely:

ALERT W.L. - corresponds to such river discharge which will not cause flooding in the flood warning zone.

ALARM W.L. - corresponds to such river discharge which will not cause substantial flooding in the cultivated land and residential areas.

CRITICAL W.L. - corresponds to such river discharge that causes extensive flooding in cultivated land and residential areas.

Flood Information consists of two (2) types, namely: the Flood Warning Information and Flood Disaster Information.

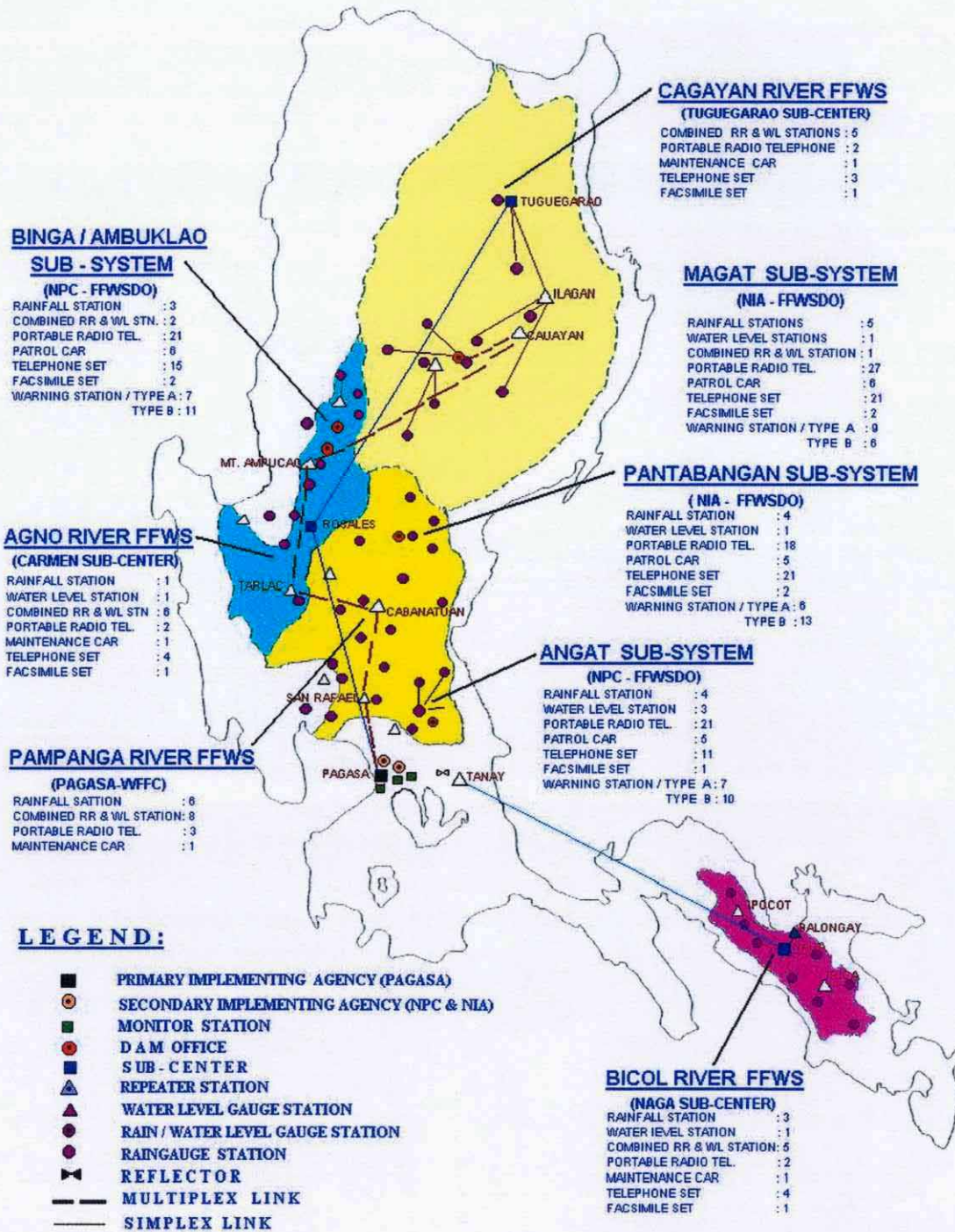
The **Flood Warning Information**, which is issued by PAGASA is the supplemental and periodical information on Flood Warning to the inhabitants in the flood warning zone.

The **Flood Disaster Information** is prepared and issued by the Office of Civil Defense (OCD) when a serious disaster due to flood is taking place in the flood warning zone.

The Flood Bulletins, Flood Warning Information and Flood Disaster Information will be disseminated to the government agencies concerned. Dissemination of all bulletins and information related to flooding in the flood warning zones shall be the joint responsibility of PAGASA and concerned Dam Offices who are equipped with supervisory control of different warning facilities.

LOCATION MAP

OVERALL SYSTEM NETWORK OF FFWSs (FFWSDO / ABC/ PAMPANGA FFWS)



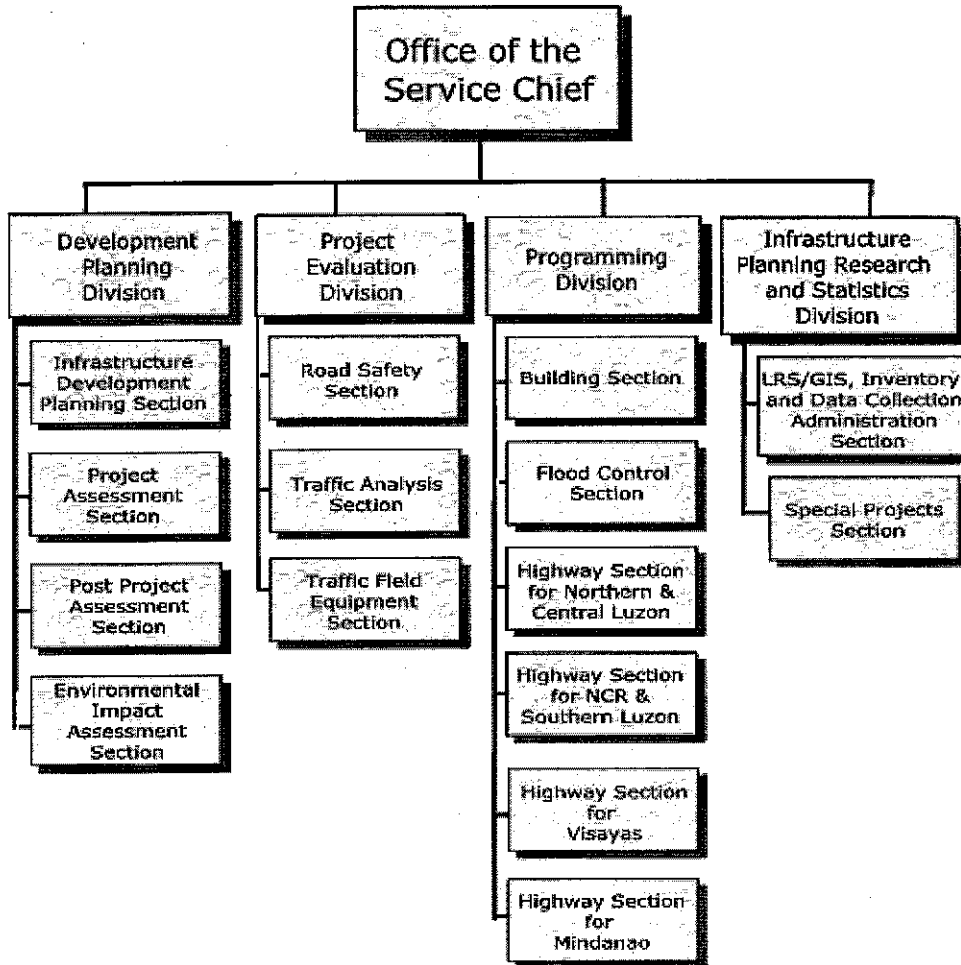
Annex 10

Sustainable Development of Laguna de Bay Environment (SDLBE) Project

Annex 10 Organizational Charts of Bureaus of DPWH

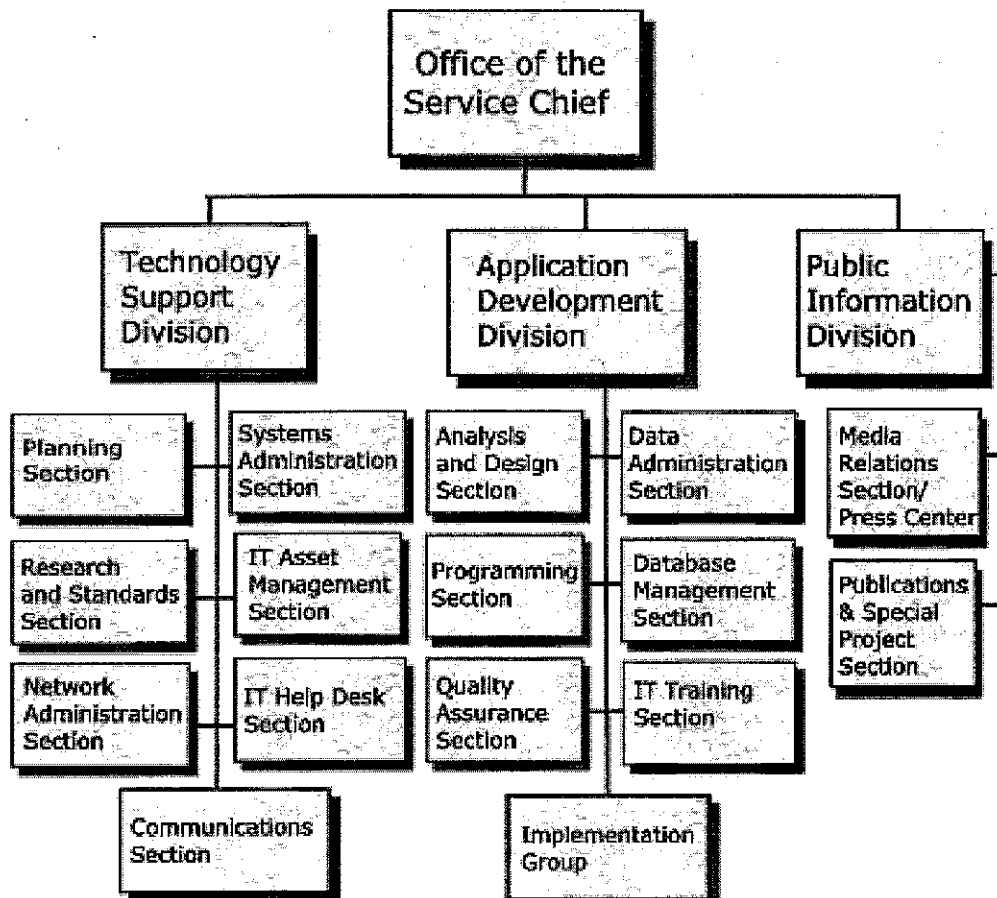
(a) Planning Service

Planning Service is responsible for providing "the capacity to undertake infrastructure development, planning and programming."



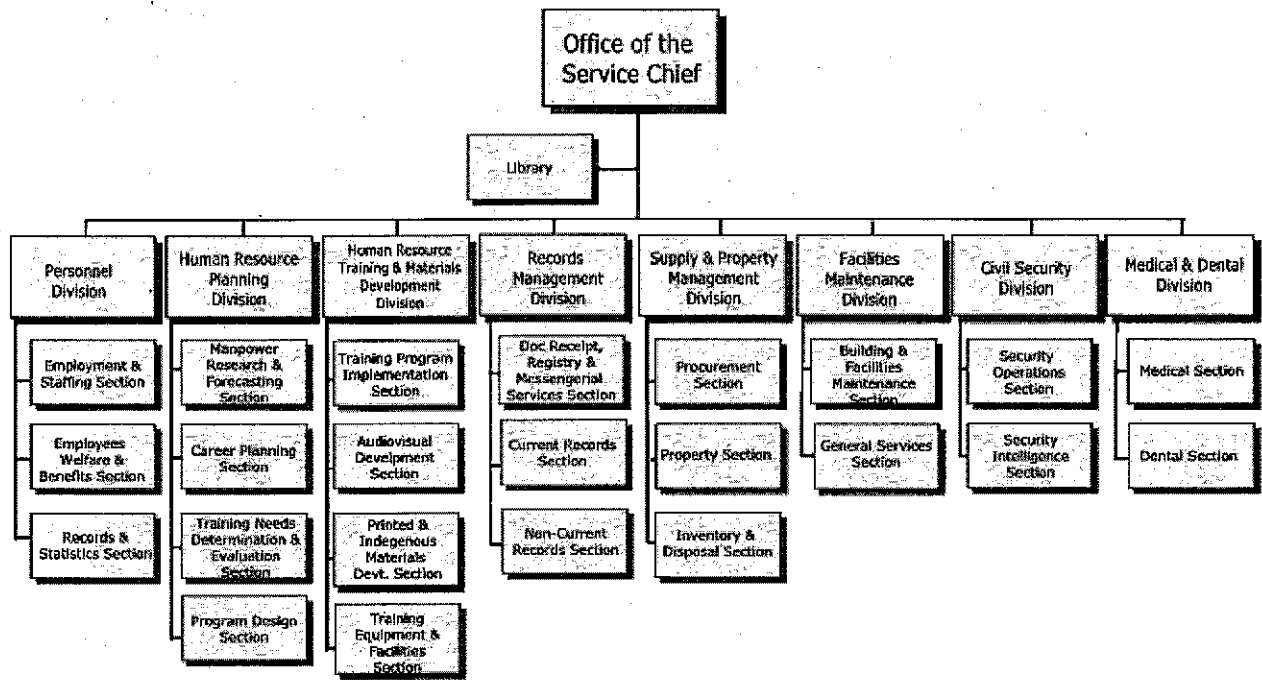
(b) Monitoring and Information Services

Advise the Management on all matters relating to Information Technology (IT)



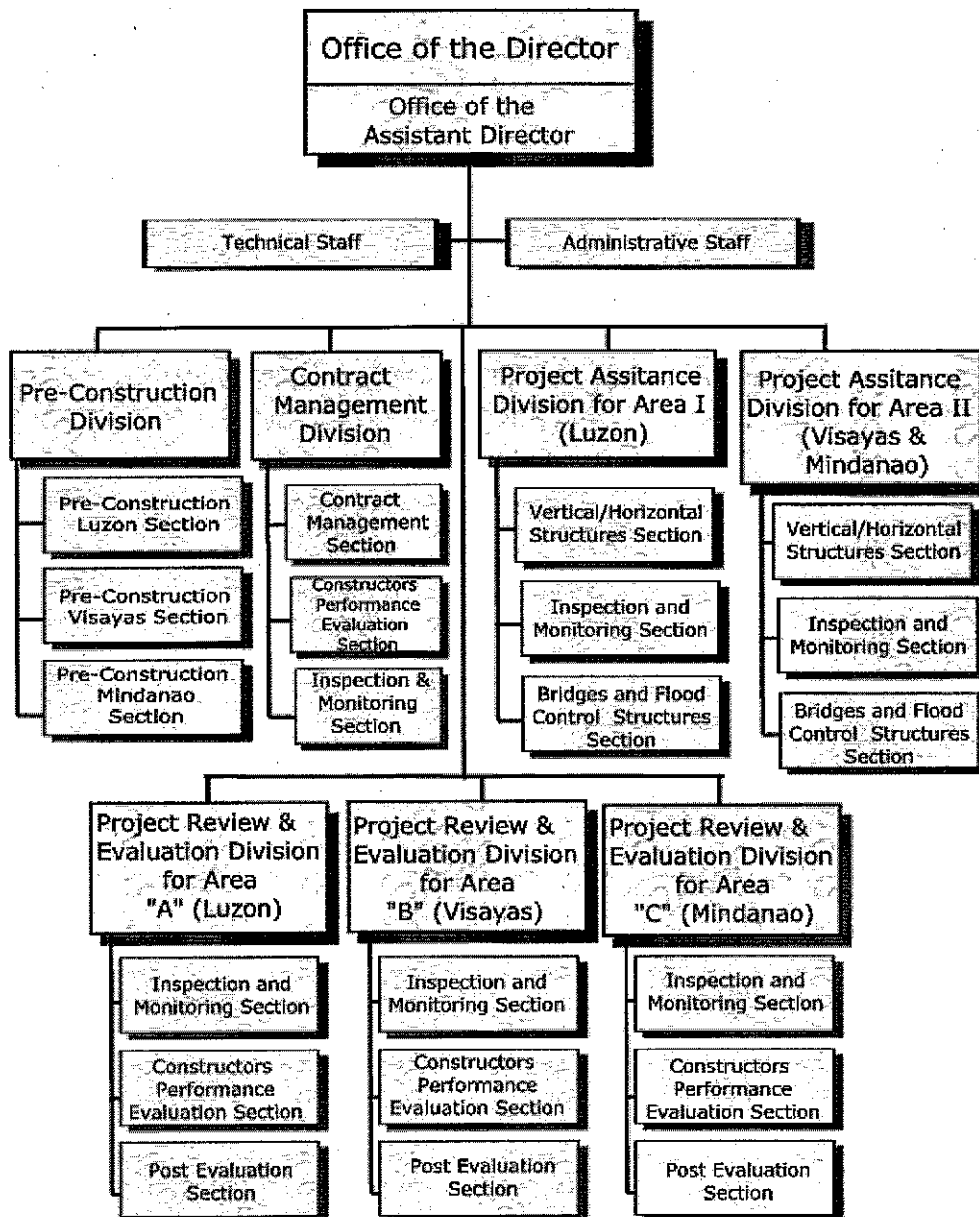
(c) Administrative and Manpower Management Service

Administrative and Manpower Management Service is responsible for providing "the Department with services relating to human resources development, personnel, records, facilities maintenance, medical and dental, security, and property and procurement services".



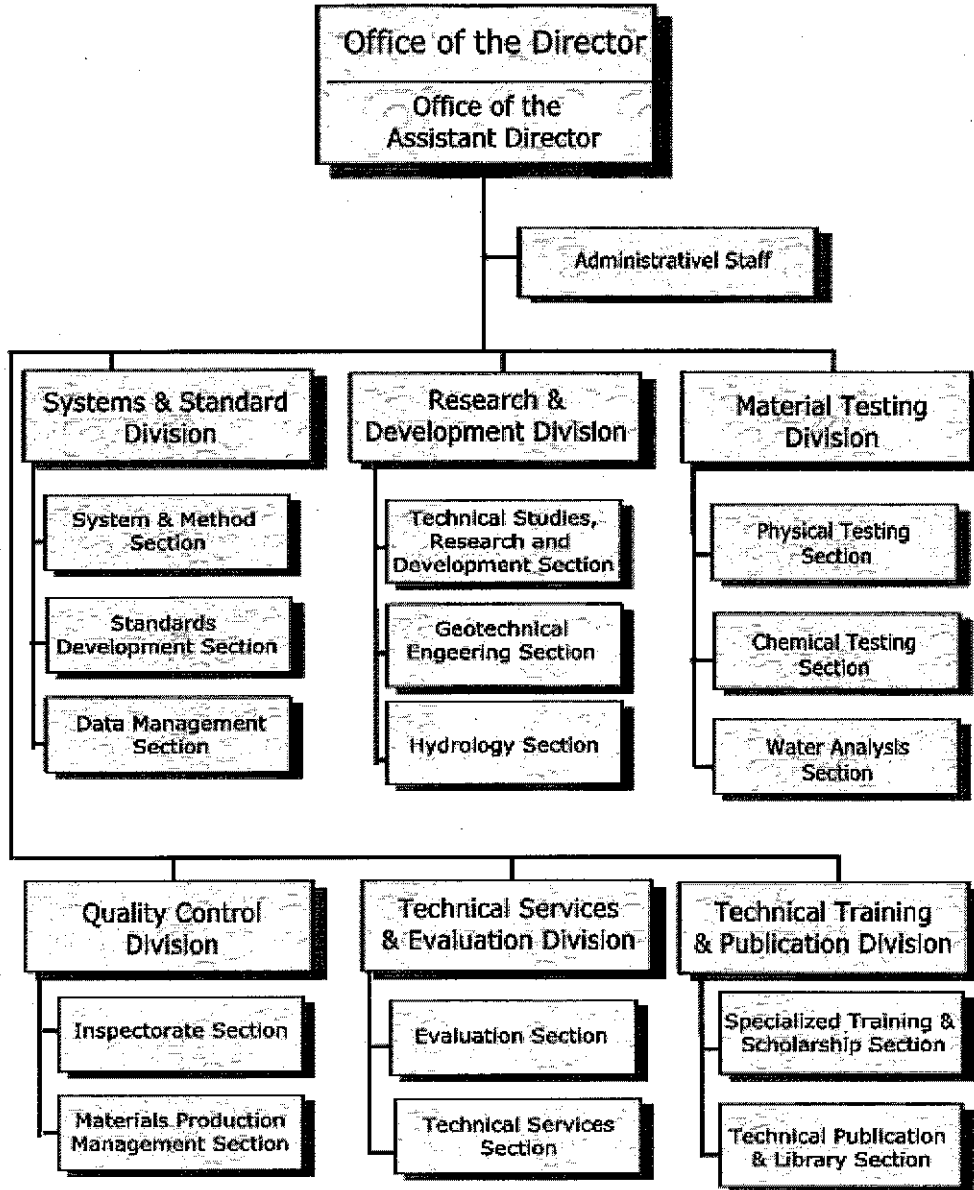
(d) Bureau of Construction

Bureau of Construction is responsible for providing "technical services on construction works for infrastructure projects and facilities"

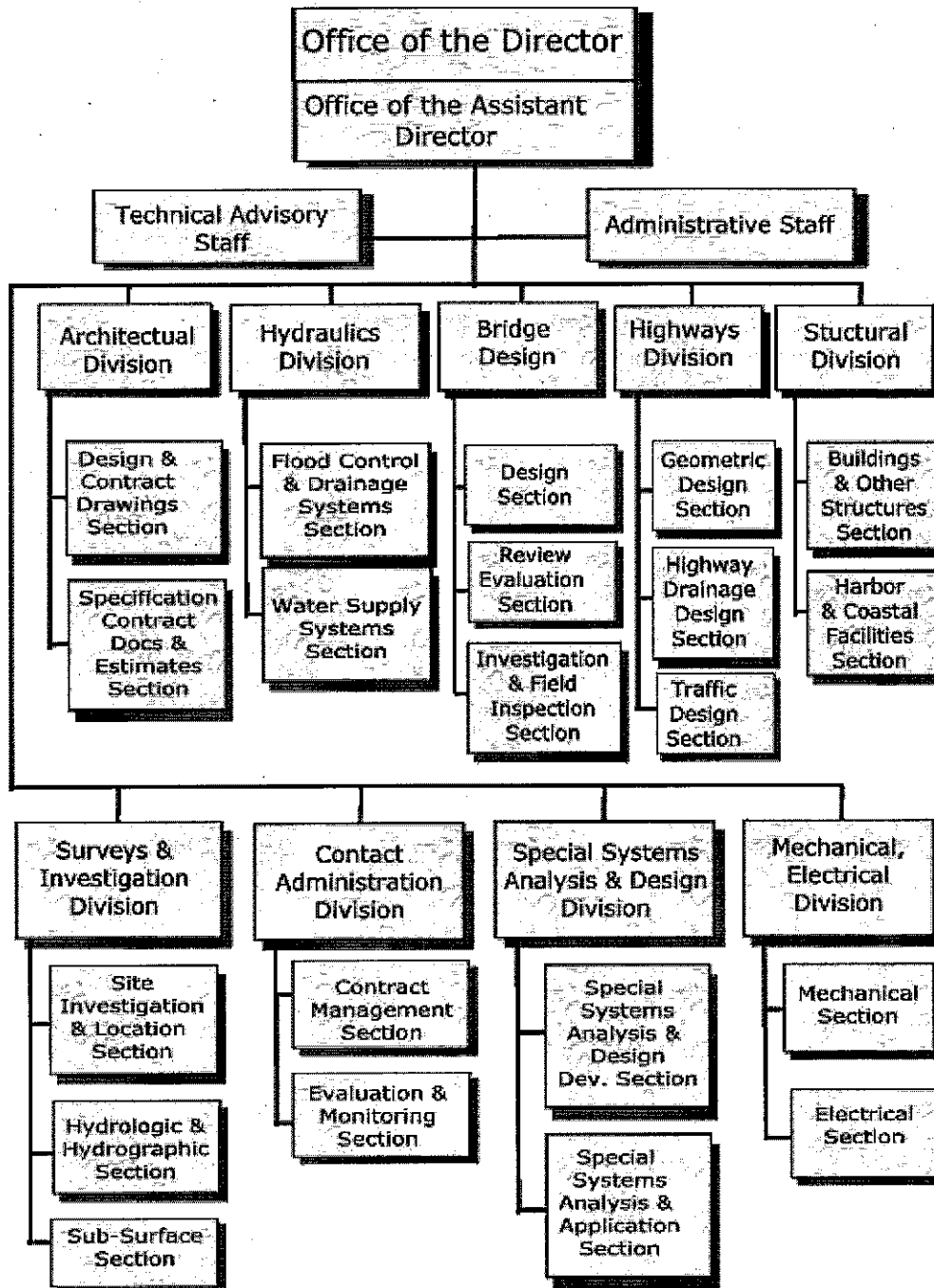


(e) Bureau of Research and Standards

Bureau of Research and Standards is responsible for "developing and setting effective standards and reasonable guidelines to ensure the safety of all infrastructure facilities in the country and to assure efficiency and proper quality in the construction of government public works.

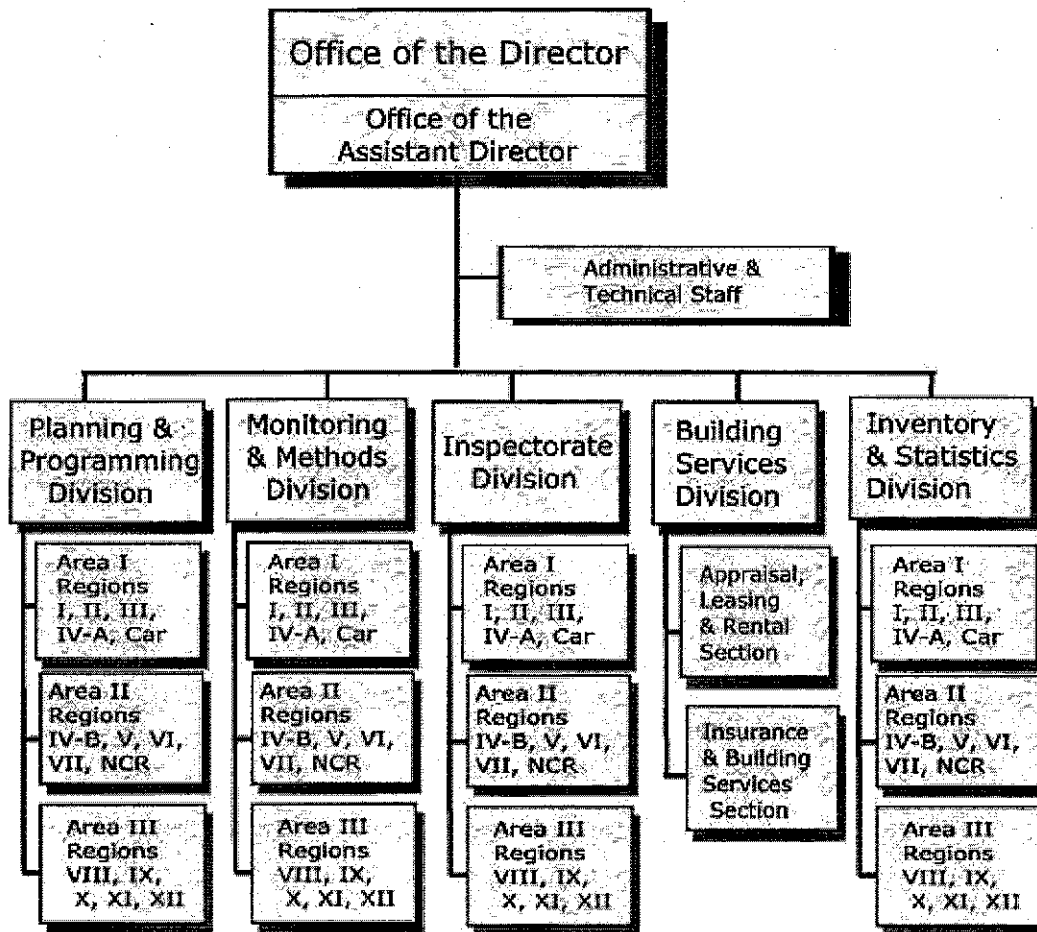


(f) Bureau of Design



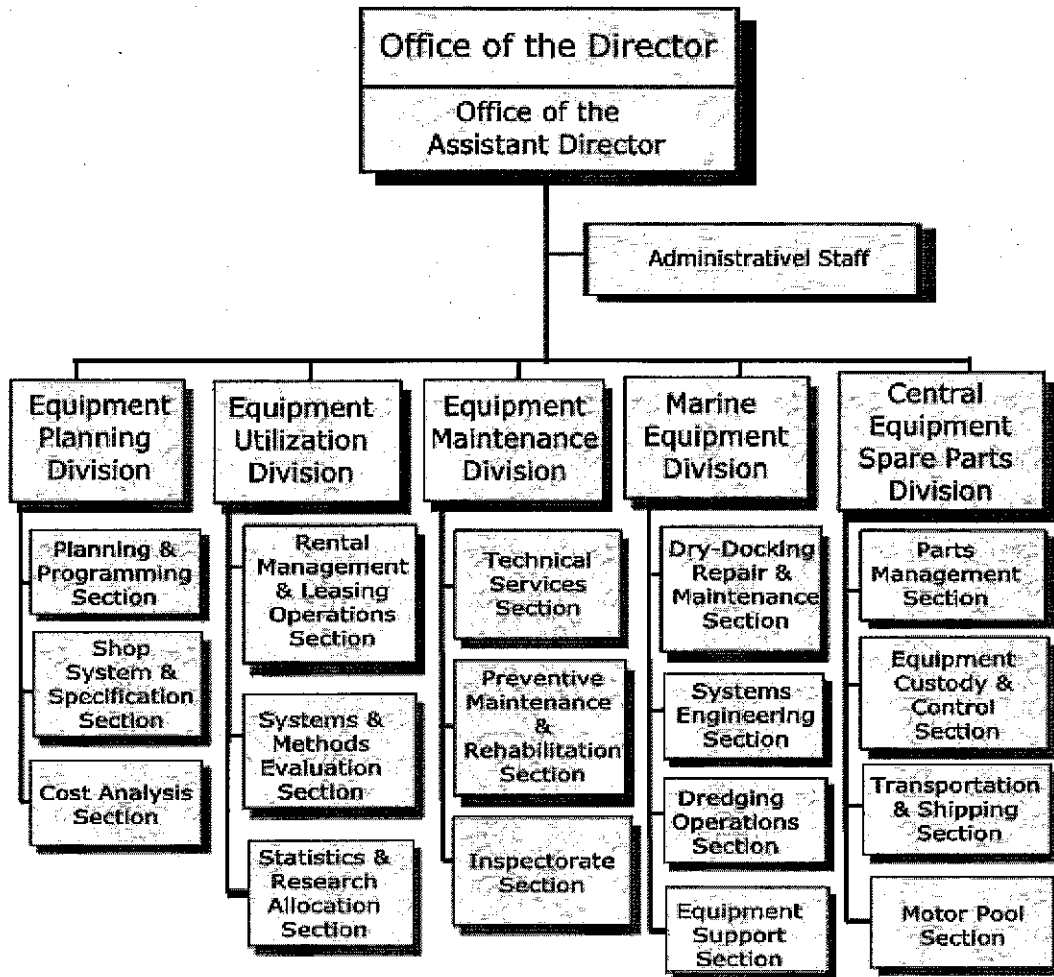
(g) Bureau of Maintenance

Bureau of Maintenance is responsible for providing "technical services on the maintenance and repair of infrastructure projects and facilities.



(h) Bureau of Equipment

Bureau of Equipment is responsible for providing technical services on the management of construction and maintenance equipment and ancillary facilities.



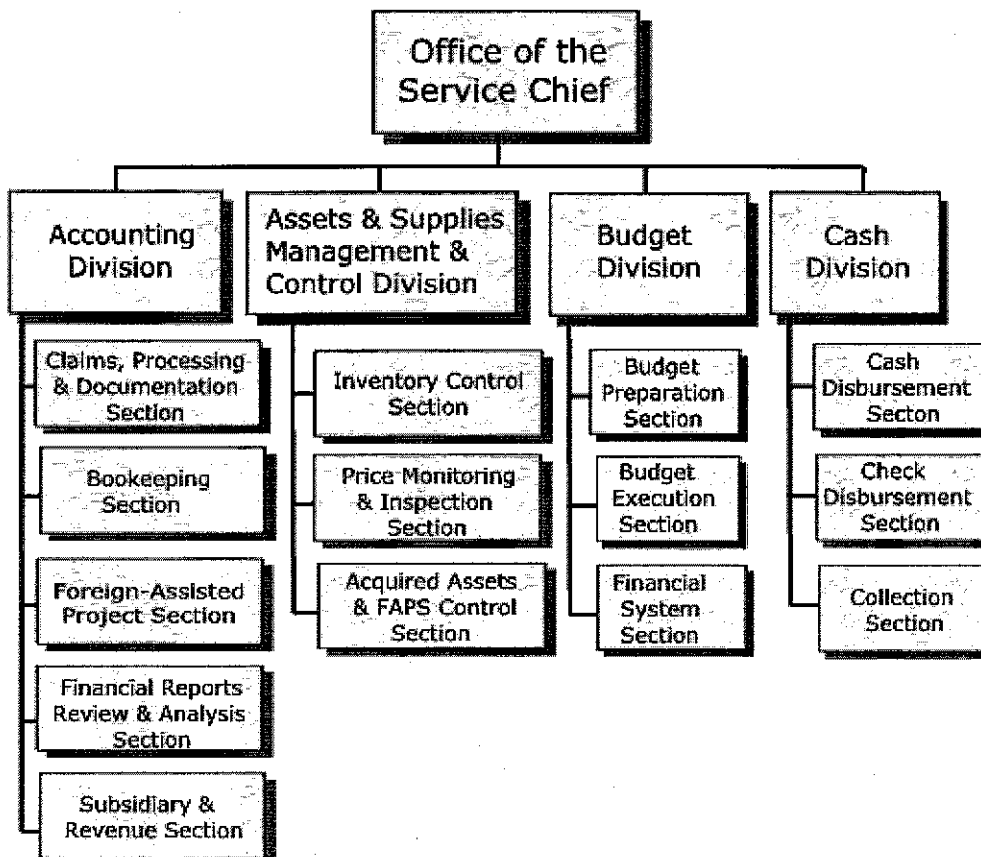
(i) Legal Service

Legal Service is responsible for providing "the Department with services on such legal affairs as contract letting and litigation, legal and legislative research, complaints and investigation, legal counseling and other matters of law"



(j) Comptrollership and Financial Management Service

Comptrollership and Financial Management Service is responsible for providing "the Department with coordinated services relating to financial systems and procedures, budget, cash, accounting, and all financial housekeeping matters"

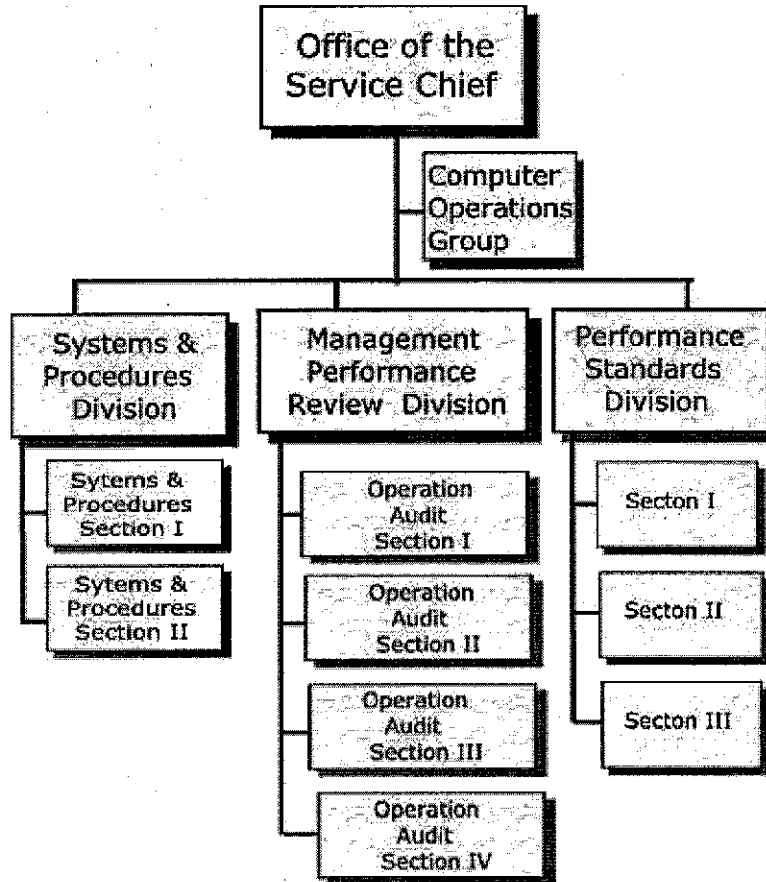


(k) Legislative Liaison Office

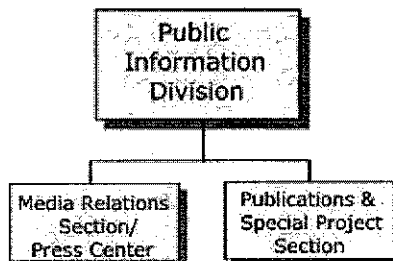
The Legislative Liaison Office is the office responsible to promote and monitor the progress of bills certified and/or endorsed by the President as administration measure which directly concerns the Department; steward the passage of favorable legislative measures high in the department's agenda; keep the department abreast of all the developments in Congress which may affect future decisions/actions; establish and maintain linkages with Members of Congress and key leaders of committees directly involved with the Department's concern and develop cooperative relationship with key legislative personnel and provide relevant and technical information; and, attend to/monitor requests/concerns of Members of Congress pending with the Department.

(l) Internal Audit Service

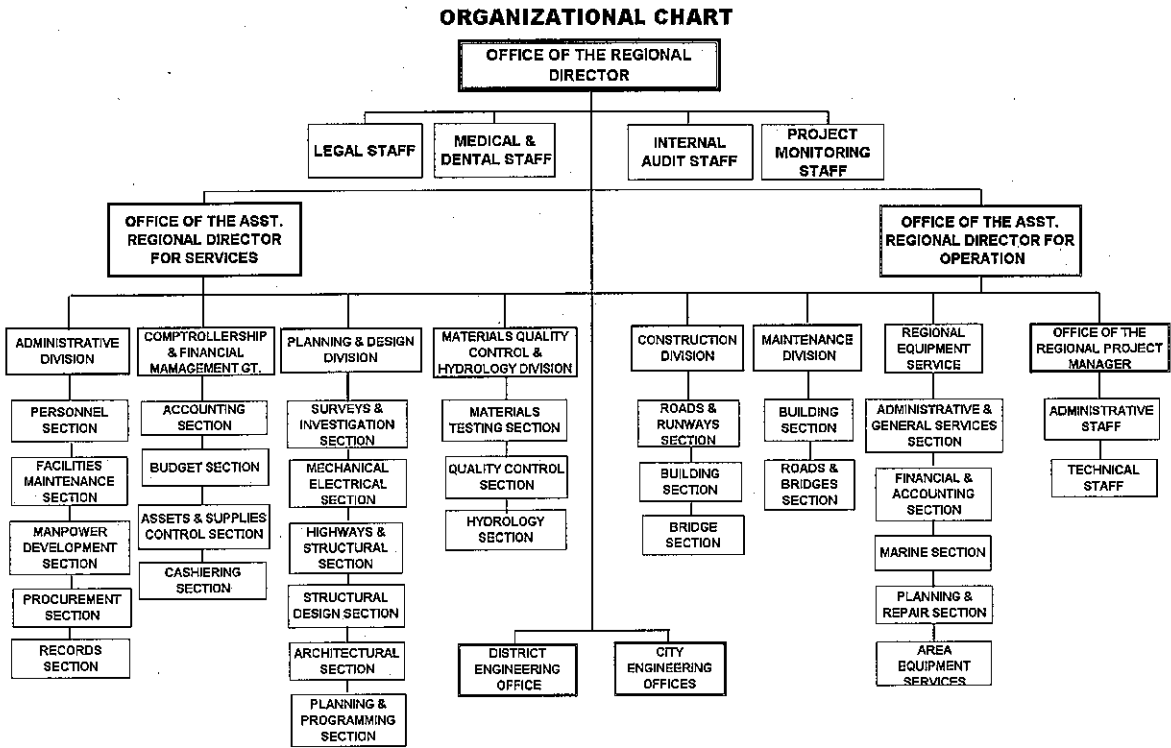
Internal Audit Service is responsible for "conducting comprehensive audit of various Department Activities.



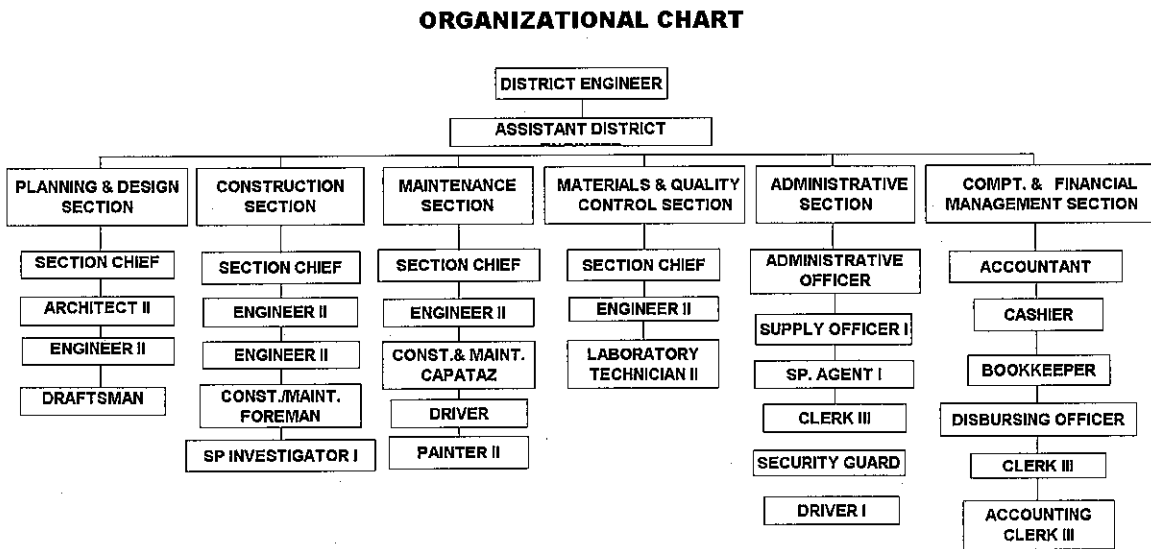
(m) Public Information Division



(n) Regional Office



(o) District Engineering Office



Annex 11

Flood Forecasting and Warning System for Dam Operation

Annex 11 Project Summary on Community-Based Approach in Reforestation¹

(1) Goals/Objectives of the Projects

The Forestry Sector Project is implemented by the National Forestation Development Office (NFDO) adopting the Community-Based Forest Management (CBFM) strategy. The Goals of the projects are the following:

- Reduce poverty by providing communities with alternative livelihood and stable sources of income;
- Enhance the active participation of local communities in the implementation of the Project through sustainable community-based forest management;
- Improve environmental conditions through forest rehabilitation and effective forest law enforcement by multi-sectoral forest protection groups;
- Implement policy and institutional changes in forest management by implementing more socialized forestry program in upland and mangrove areas.

Furthermore, the Project objectives are:

- Re-establish the vegetative cover of currently denuded priority watershed areas;
- Improve the living conditions of inhabitants residing in areas covered by the project;
- Conserve biodiversity; and
- Control soil erosion in order to protect downstream areas from natural calamities.

(2) Principles

The guiding principles of FSP are as follows:

- Promotes and sets a sound people-and-resources interaction. People develop the values to care for and nurture the environment rather than treat it merely as source.
- Requires capacities and readiness both of the people and environment. People need to emotionally and skillfully prepare to do CBFM and accept the responsibility to take care of the environment while making use of it.
- Promotes community-centered and long-term goals. Collective efforts will have to replace the traditional self-centered individualistic system and short-term goals because CBFM promotes cooperation and unified actions.
- Proposed action at the lowest level possible. This is parallel to the bottom-up approach where people are given more autonomy to design plans and act on them.
- Recognized resource management capacity of the community. CBFM believes that communities have innate skills to plan and implement a sound resource management system.
- The ultimate goal of FSP is to empower the greater majority of the upland and mangrove population economically, socially, technically and politically. Once they have reached this stage, the people would have sufficient and stable income to obtain the basic necessities in life such as food, clothing, shelter, education, access to health services and peace and order. To achieve this, the plantation has fruits and crops when managed at a sustainable basis will make the communities more economically sufficient thus, minimizing shifting cultivation, logging and other resource extractive activities that will cause environmental deterioration.

¹ Extracted from 'Forestry Sector Project in the Philippines: A Community-Based Approach in Reforestation', Gualberto T. Tortoza, Project Director, National Forestation Development Office, DENR

(3) Financial Assistance

It is implemented nationwide through a \$75 million financial assistance from the JBIC and the Government of Philippines. Of the total Project Cost, \$50 million was provide by JBIC and \$25 million by the GOP. The loan profile is shown as follows;

Loan No.	:	PH-P135
Loan Amount	:	¥9,294M(\$75M), Revised ¥5,753M(about \$50M)
GOP Counterpart	:	\$25M
Singing Date	:	August 19, 1993
Effectivity Date	:	December 15, 1993
Closing Date	:	Original December 16, 2000
Revised	:	December 16, 2003
Target	:	Original: 80,000 Ha Revised: 68,749 Ha

(4) Project Implementation

The project (FSP) involves several activities and/or process either implemented sequentially or simultaneously. The main activities involve site selection; survey, mapping and planning; site appraisal; community organizing; awarding of CBFMA; comprehensive site development; and monitoring and evaluation.

(a) Site Selection

The DENR, through its regional offices and in coordination with the NFDO, identifies subproject sites based on the Site Selection Criteria consisting of Accessibility, Visibility, Existence of NGOs, Existence of Infrastructure and Areas.

(b) Survey, Mapping and Planning (SMP)

This activity is undertaken by the DENR and contracted to qualified NGOs within the area or nearby localities.

(c) Site Appraisal

Site Appraisal is a feasibility study undertaken to determine the suitability, viability and sustainability of the subproject. This is done by the Regional Appraisal Team. The procedure adopted in subproject site appraisal involves a conduct of a number of activities.

(5) Community Organizing

Community organizing under FSP is aimed at mobilizing communities and developing/strengthening their capabilities to implement subproject activities and become long-term resource managers. Before the subproject is entrusted to the community, they are first organized and trained to equip them with the necessary values and appropriate technical know-how on the proper management, protection and conservation of forest resources. CO is also contracted to the qualified NGOs preferably those operating within the subproject site or nearby localities.

(5) Comprehensive Site Development (CSD)

CSD is one of the major activities/components of the project. It entails all activities related to plantation establishment, like nursery establishment, site preparation, planning and replanting. Under this activity, the PO with technical assistance from the Assisting Organization and the DENR field office, will establish tree plantations within their

subproject area. The POs are given three years to completely develop the subproject area with all the necessary funding from the project. The total amount allocated per subproject was based on costing set by the DENR. The species to be planted will depend on the type identified in the appraisal report taking into consideration the suitability of the species to certain conditions (e.g. soil type, climate, etc.)

(6) Monitoring and Evaluation (M&E)

The forestry Sector Project has two kinds of monitoring, in-house and by contract. The in-house monitoring is done by the DENR through the SUSIMO and DENR personnel while the by contract monitoring is being undertaken by NGOs.

(7) FSP Subproject Billing Process

In the implementation of the various FSP major activities (CO, CSD, M&E), DENR is paying the contractors through progress billing. In this way, the activities are paid in a protracted manner, which is dictated by the amount of work being accomplished in a given period.

In the case of CSD, the PO prepares the necessary documents taking into account the validation report of the VBU. This report also recommends the total amount, which is commensurate to the accomplished activities after the validation was made. The billing documents are then submitted to the CENRO for further review and subsequent endorsement to the PENRO before it is finally endorsed to the Regional Office for Payment. The CENRO is given a maximum of two (2) days to act on said documents, the PENRO also two (2) days and Regional Office six (6) days until the approval of the check by the RED.

(8) Project Benefit

One of the objectives of FSP is the improvement of the living standards of inhabitants residing in the subproject areas. The Project certainly achieved the objective because the subproject participants received payment from DENR through the Pos for their works in plantation establishment, protection and maintenance. Many community members also received payment from the infrastructure contractors for their works as laborers.

The impacts of the short-term cash income increase are easily observed in the subproject areas: increase in the number of children going to school; improvement of the houses; and possession of electric appliances such as TV. In some areas, the POs, using their own fund generated from the subproject activities, were able to finance the construction of mini-hydro electric power plant or purchase generators to provide electricity to their respective communities. Local school buildings were also constructed by some POs.

Aside from the impact of short-term cash income, there is high possibility of long-term income increase. The assistance to the livelihood development could provide the long-term additional income to the participated communities. Some POs have already gained stable income from the on-going livelihood projects. The infrastructure projects of FSP also not only improved the access to market and delivery of public services but also significantly contributed to raise the possibility of enhancing existing or alternative livelihood development in the subproject areas.

(9) Lessons Learned

The implementation of the Project left several important lessons learned. These are categorized into five (5): (a) project management, (b) socio-institutional aspect,

(c) comprehensive site development, (d) livelihood development, and (e) infrastructure development. These lessons learned are itemized as follows;

(a) Project Management

Importance of on-site subproject management offices

- Facilitating administrative process: a key for successful project implementation
- Effective regular meetings among project implementers
- Importance of involvement of LGUs and coordination with other institutions
- Importance of good leadership

(b) Socio-Institutional Aspect

- Need for longer duration of project implementation to ensure full participation of communities
- Importance of the transparency of Pos
- Importance of raising Pos sense of ownership
- Importance to address economic needs of Pos
- Effective cross visits of Pos
- Importance of demonstrating positive support from DENR
- Need to improve the procurement of contracts for CO and PO's
- Capability-building
- Importance of training community leaders for sustainability of the project

(c) Comprehensive Site Development

- Importance of the preparation of accurate maps for planning, implementation and monitoring of site development
- Importance of the planning of CSD with full participation of community and due consideration of site conditions
- Importance of flexible site development plan
- Needs for planning of agro-forestry component with due consideration of the proper maintenance of trees and marketing of products
- Importance of the use of quality seedlings
- Importance of protection and maintenance of plantations
- Coordination with other technical institutions/organizations

(d) Livelihood Development Aspect

- Due consideration in the selection of projects
- Preparation of feasibility studies/business plans
- Importance of the management of livelihood projects
- Importance of the monitoring and supervision of project implementation
- Proper financial management and generation of fund
- Needs for further technical assistance in the implementation of livelihood projects
- Development of agency linkages
- Standardization of livelihood projects

(e) Infrastructure Development Aspect

- Needs for longer time for participatory planning involving PO members as well as LGUs concerned
- Need to secure support and commitment from LGUs for the maintenance of the infrastructure projects prior to its construction

Annex 12

Organizational Charts of Bureaus of DPWH

Annex 12 (a) List of Members

Council of Filipino Consultants, Inc (COFIC)

1. A. Lazaro and Associates
2. ACRE Surveying and Development
3. A.M. Geoconsult and Associates*
4. Asian Technicon Managers and Consultants, Inc. (ATMC)*
5. Cest, Inc.
6. C. L. Almajose and Sons, Inc.
7. Development of Environmental System, Inc. (DOES)
8. Design Science, Inc.
9. E. H. Sison Engineers Co.
10. ESCA, Incorporated
11. Geodata Systems Technology, Inc.
12. GPE Resources Consultants, Inc. (GPERC)
13. Heuristics Technology and Management Consultants, Inc.
14. Integrated Philconsult, Inc. (IPI)
15. JF Cancio and Associates
16. Jose Alling and Associates (JAA)
17. MCSI Konsult, Inc.
18. Multi-Infra Konsult, Inc. (MIKI)
19. P.J. Carballo Consulting Engineers (PJCC)
20. Prime Asia Consultants Corp.
21. Resources, Environmental and Economic Center for Studies, Inc.
22. Sealand Technology and Management Corporation (SLTMC)
23. Stream Development Foundation, Inc.
24. Techphil, Inc.*
25. The A & S Team, Inc.
26. Trans-Asia Consultants Group, Inc.
27. Urban Integrated Consultants, Inc.*
28. Valley Technologies, Inc.
29. Woodfields Consultants, Inc.
30. Advance Technomangement, Inc.

Council of Engineering Consultants of the Philippines (CECOPHIL)

31. Adrian Wilson International Associates, Inc. (AWIAI)
32. Asiatic Consultants Associates
33. Basic Technology and Management Corporation
34. Cedco, Inc.
35. Certeza Development Corporation
36. DCCD EGINEERING CORPORATION
37. DKK Consultants, Inc.
38. Engineering and Development Corporation of the Philippines
39. Filipinas Dravo Corporation
40. Geotecnica Corporation
41. Perconsult International
42. Tetra Consult and Associates, Inc.
43. Philippine Technical Consultants, Inc. (PHILTECH)
44. Philipp's Technical Consultants, Inc.
45. Philkoei International, Inc.
46. Proconsult, Inc.
47. Radian Technology, Inc.
48. Schema Konsult, Inc.
49. SNDI Consultants, Inc.
50. SP Castro and Associates
51. Stetra Philippines, Inc.
52. Techniks Group Corporation
53. Test Consultants
54. Team Asia Philippines, Inc.
55. Tugade Associates, Inc.

Affiliate Members of CECOPHIL

1. Coffey Philippines, Inc.
2. Cowi Philippines, Inc.
3. Katahira and Engineers International
4. Nippon Jogesuido Sekkei Co., Ltd.
5. Pacific Consultants International

Annex 12 (b) Expertise of Surveyed Firms

	Annual Revenue	Flood Control					Sabo Engineering					Urban Drainage					Irrigation					Watershed Management									
		a	b	c	d	e	a	b	c	d	e	a	b	c	d	e	a	b	c	d	e	a	b	c	d	e					
Council of Filipino Consultants, Inc (COFIC)																															
1. Cest, Inc.		1																													
2. Development of Environmental System, Inc. (DOES)	500,000	1	1									1	1	1	1	1						1	1	1	1	1					
3. MCSI Konsult, Inc.		1	1	1	1	1						1	1	1	1	1						1	1	1	1	1					
4. Trans-Asia Consultants Group, Inc.												1	1																		
5. Urban Integrated Consultants, Inc.*		1										1	1	1	1	1						1	1	1	1	1					
6. Woodfields Consultants, Inc.	50,000,000	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Council of Engineering Consultants of the Philippines (CECOPHIL)																															
7. Basic Technology and Management Corporation	11,200,000	1	1	1	1	1						1	1	1	1	1															
8. Certeza Development Corporation	17,910,871	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
9. DCCD Engineering Corporation	164,640,000	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
10. Engineering and Development Corporation of the Philippines	57,929,190	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
11. Filipinas Dravo Corporation	42,040,000																1	1													
12. Philkoei International, Inc.		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
13. Proconsult, Inc.	18,000,000	1	1	1	1	1						1	1	1	1	1						1	1	1	1	1					
14. Schema Konsult, Inc.	10,000,000	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
15. TCGI Engineers	133,781,110	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
16. Test Consultants	7,940,906	1	1	1	1	1						1	1	1	1	1						1	1	1	1	1					
17. MADECOR Environmental Management Systems, Inc.	10,800,000	1										1															1				
18. MGG Consultants	38,900,000	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
19. Science and Vision	3,043,621	1	1	1	1	1						1	1				1	1									1	1			

a: feasibility study; b: design; c: construction supervision
d: topographic survey; e: geotechnical investigation

Annex 12 (c) Personnel of Surveyed Firms

	Total No. of Employees		EC Engineers		Sabo Engineers		Drainage Engineers		Irrigation Engineers		Watershed Management		River Engineers		Hydrologists		Hydraulic Engineers	
	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P
Council of Filipino Consultants, Inc (COFIC)																		
1. Cest, Inc.			2	3			3	3	2	2			3	2	2	2	2	3
2. Development of Environmental System, Inc. (DOES)																		
3. MCSI Konsult, Inc.	34	8	6	8			6	2	2	2		2		2	1	2	2	2
4. Trans-Asia Consultants Group, Inc.	68	30	1	3			1	3								1	3	1
5. Urban Integrated Consultants, Inc.*	117	16			1	1	2	3	1	2	1	1		2	2	2	5	2
6. Woodfields Consultants, Inc.	105	100	5	5	1	1	5	3	2	3			3	5	2	5	4	5
Council of Engineering Consultants of the Philippines (CECOPHIL)																		
7. Basic Technology and Management Corporation	86		6		2		8							3		4		5
8. Certeza Development Corporation	77						3									2		
9. DCCD Engineering Corporation	239		5		2		8		10			5		5		4		5
10. Engineering and Development Corporation of the Philippines	50	69	4	2	4	2	8	3	4	1	3	2	2	4	2	8	3	10
11. Filipinas Dravo Corporation	75	15																
12. Philkoei International, Inc.	134	39	6	2	1	1	4	2	4	3			5	1	2	4	2	4
13. Proconsult, Inc.	110	15	7	3			9	2	3	2			1	2	1	1	2	1
14. Schema Konsult, Inc.	150	15	2	1	1	1	2	1	2	1	2		1	3	1	2	1	2
15. TCGI Engineers	300	50	2	2			4	2	2	2						4	2	4
16. Test Consultants	30	56		9			10			2			4		2		12	2
17. MADECOR Environmental Management Systems, Inc.	304																	
18. MGG Consultants	89						2											
19. Science and Vision	12	8	2	3	1		2	2	1					2	1	2	1	2

Annex 12 (d) Experience of Surveyed Firms

Number of Locally Funded Projects Handled in the Last Ten Years

	Flood Control					Sabo Engineering					Urban Drainage					Irrigation					Watershed Management									
	a	b	c	d	e	a	b	c	d	e	a	b	c	d	e	a	b	c	d	e	a	b	c	d	e					
	Council of Filipino Consultants, Inc (COFIC)																													
1. Cest, Inc.																														
2. Development of Environmental System, Inc. (DOES)	1										3	3	2	2	2	2	2	1	1											
3. MCSI Konsult, Inc.	2	2									3	3	2																	
4. Trans-Asia Consultants Group, Inc.																														
5. Urban Integrated Consultants, Inc.*	2	2	2	2	2	2	3	3			1	5	5	5	1	1	1													
6. Woodfields Consultants, Inc.	2	2	2	2	1	3	3				1	3	1	1	5	4	4													
Council of Engineering Consultants of the Philippines (CECOPHIL)																														
7. Basic Technology and Management Corporation	2	2	1								1	1	1																	
8. Certza Development Corporation											1	1	1			1	1													
9. DCCD Engineering Corporation	28	10	5	20	20	1	1	1	1	1	19	5	2	10	10	3	3	3												
10. Engineering and Development Corporation of the Philippines	2	2	2								5	5				2	2													
11. Filipinas Dravo Corporation	1										1																			
12. Philkoei International, Inc.																														
13. Proconsult, Inc.	2	3	4	3							4	14	3	10	10	1	2	1	1	1										
14. Schema Konsult, Inc.	6	5	5	5	2	2	2				2	2	10	6	4	6	3	3	3	5										
15. TCGI Engineers	2	4	4	4	4						2	4	4	4	4															
16. Test Consultants	1										1					1														
17. MADECOR Environmental Management Systems, Inc.	1										1					1														
18. MGG Consultants											4	3	1	3																
19. Science and Vision																														

a: feasibility study; b: design; c: construction supervision
d: topographic survey; e: geotechnical investigation

Annex 12 (e) Experience of Surveyed Firms

Number of Foreign-Assisted Projects Handled in the Last Ten Years

	Flood Control					Sabo Engineering					Urban Drainage					Irrigation					Watershed Management									
	a	b	c	d	e	a	b	c	d	e	a	b	c	d	e	a	b	c	d	e	a	b	c	d	e					
	Council of Filipino Consultants, Inc (COFIC)																													
1. Cest, Inc.	1	1	1	1	1						2	2	2	2	2											2				
2. Development of Environmental System, Inc. (DOES)											2	5																		
3. MCSI Konsult, Inc.	4	4	4	4	4						4	4	4	4	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
4. Trans-Asia Consultants Group, Inc.																														
5. Urban Integrated Consultants, Inc.*	2	10				3	3	3	3	3	1	7	8	7	7	2										2				
6. Woodfields Consultants, Inc.	9	4	3	3	2	1					3	2	3	2												1				
Council of Engineering Consultants of the Philippines (CECOPHIL)																														
7. Basic Technology and Management Corporation	2	8	7	3	3	1	1	1	1	1	2	2	1	1	1															
8. Certeza Development Corporation	1																													
9. DCCD Engineering Corporation	2			2	2						2					2	2	2	2	2	2	2	2	2	2	3	3	3	3	3
10. Engineering and Development Corporation of the Philippines	2	2	2			1	1				2	3	3	1	1	2	2	2												
11. Filipinas Dravo Corporation											1																			
12. Philkoei International, Inc.	8	10	8	8	8	2	2	2	2	2	9	14	14	15	15	7	8	10	10	10	3	1	1	1	1	1	1	1	1	1
13. Proconsult, Inc.	3			3	3						7	5	7	7																
14. Schema Konsult, Inc.											1	1				2	2	2	2	2	2	2	2	2	2	3	3	3	3	3
15. TCGI Engineers	5	5	5	5	5	2	2	2	2	2	5	5	5	5	5	4	4	4	4	4										
16. Test Consultants	2	1	1	1	1						5	1	1	1	1	1	1	1	1	1						1				
17. MADECOR Environmental Management Systems, Inc.																														
18. MGG Consultants																														
19. Science and Vision	2	2	2			1	1				2	2	2	2												1				

a: feasibility study; b: design; c: construction supervision
d: topographic survey; e: geotechnical investigation

Annex 13

Process and Outline of PCM Workshop

Annex 13 List of Flood Control Related Projects Implemented by the National Government Agencies Surveyed - DENR-FMB (1a/11)

Name of Project	Location	Description of Project	Cost	Source of Fund	Date Started	Date Completed	Remarks
Forest Management Bureau (DENR-FMB) 1. Forestry Sector Project (FSP)	Various sites all over the Philippines (nationwide)	The Project aims to rehabilitate a total of 68,748 ha., covering 578,573 ha. of watershed area and 11,175 ha of mangrove area.	\$ 55 M \$ 25M	JBIC Loan No. PH 135 Local Fund			The loan became effective on Dec.16, 1993 until Dec.16, 2000. However, the 7 year project duration was extended until Dec.31, 2003.
2. Forest Resources Assessment Project (FRA)	Various sites all over the Philippines (nationwide)	The Project is a grant agreement between the Forest Management Bureau (FMB) of the Department of Environment and Natural Resources (DENR) and the Forestry Department of the Food and Agriculture Organization of the United Nations (FAO), in support of the Forest Resources Assessment programme of FAO. The Project aims to enhance the social, economic and environmental functions of the forest and trees resources through their sustainable management on the basis of better understanding of their qualitative and quantitative importance.					
3. Southern Philippines Irrigation Sector Project (SPIISP)	<p>Core Project Sites: Can-asujan Watershed, Carcar Cebu; Calayagon Watershed, Buenavista, Agusan del Norte, and Gibong Watershed Prosperidad, Agusan del Sur</p> <p>Non-Core Project Sites: Magballo Watershed, Kabangkalan, Negros occidental; Davin Watershed, Davin, Negros occidental; Aclan-Amontay Watershed, Nasipit, Agusan del Norte; Cabadbaran Watershed, Cabadbaran, Agusan del Norte; (Canaway) San Roque Watershed, Kitcharao, Agusan del Norte; Logum-Baobo Watershed, veruela, Agusan del Sur and Laak, Compostela Valley; Cantian (Carac-an) Watershed, Madrid, Surigao del Sur, Rungan Watershed, Lumba-Bayabao, Lanao del Sur (ARMM)</p>	A five-year project which primarily aims to maintain or improve the hydrologic integrity of the watershed areas, thus, avoid any depreciation of the downstream benefits of the irrigation systems. Its major activities includes: Survey, Information and Education Campaign, Community organizing, Nursery operation, Watershed rehabilitation and protection, and Monitoring and Evaluation.		ADB			

Annex 13 List of Flood Control Related Projects Implemented by the National Government Agencies Surveyed - DENR-FMB (1b/11)

Name of Project	Location	Description of Project	Cost	Source of Fund	Date Started	Date Completed	Remarks
4. Water Resources Development Project (WRDP- WMIC)	Region IV- Tanay, Rizal and Gen. Rakar, Quezon Region IX- Zamboanga del Sur	A seven-year project which aims to formulate a national watershed management strategy and a long-term program of investments for the sustainable management of watersheds, particularly those considered critical, and recommend appropriate policies, and legislative and institutional measures, to implement the strategy and investment program.	US\$14.84	DANIDA	1997	2002	The seven year project was extended up to June 2004.
5. Regional Forestry Master Plan Development	Various sites all over the Philippines (nationwide)	A one-year project which aims to develop a clear framework plan for review and revision of the Master Plan for Forestry Development (MPFD); Assess the accomplishment of MPFD relative to its six objectives; Ascertain the extent to which achievement of the MPFD's objectives has contributed to the alleviation of poverty and improvement of food security among rural poor, particularly those located in forestlands/upland areas; Re-evaluate, revise and/or update the MPFD as appropriate, taking into consideration the need for strong partnership with relevant and major stakeholders; and Identify and recommend needed remedial measures, including further strengthening of policies and institutions, to hasten the full attainment of MPFD's objectives.		ADB			
6. Development of Criteria and Indicators for Sustainable Forest Management in the Philippines	Various sites all over the Philippines (nationwide)	A one-year project which is designed to promote sustainable management of the tropical resources in the Philippines in accordance with the ITTO year 2000 objective, through the formulation of criteria and indicators for sustainable forest management unit levels, including appropriate monitoring, assessment and reporting systems.	US\$88,646.00	International Tropical Timber Organization (ITTO)	April 2002	April 2003	
7. Development and Implementation of the Pilot Project of the Forestry Statistics Information Systems (FSIS)-Phase 1	Various sites all over the Philippines (nationwide)	A two-year project, funded by International Tropical Timber Organization (ITTO) which aims to provide a facility for the efficient management of forestry data and for an effective statistical system which will provide adequate data support for decision making and policy formulation. It also aims to organize the tremendous amount of forestry data that are being generated by the current system and integrate all data vertically along the government hierarchy and horizontally across the forestry administrative functions to provide a total view of the Philippine forestry section.		ITTO			
8. Timber and Timber Products Trade Flow Study in the Philippines	Various sites all over the Philippines (nationwide)	A two-year project which aims to analyze the flow and market of local and imported timber and timber products in the market by grade, by species grouping, by forest source, and by type of processor and identify problems and solutions affecting such flow.	US\$126,937	ITTO			

Annex 13 List of Flood Control Related Projects Implemented by the National Government Agencies Surveyed - DENR-FMB (1c/11)

Name of Project	Location	Description of Project	Cost	Source of Fund	Date Started	Date Completed	Remarks
9. Community Livelihood Assistance Special Program (CLASP)	Various sites all over the Philippines (nationwide)	The Community Livelihood Assistance Special Program is the response of the Department of Environment and National Resources under the administration of Sec. Hershon T. Alvarez, to Pres. Gloria macapagal Arroyo's call for poverty reduction and wealth creation in the Philippines. CLASP aims to help alleviate poverty and improve the quality of life in resource-dependent communities in various areas in the Philippines through appropriate and environmentally sound technologies, information, and other resources that will lead to sustainable economic, social, and ecological benefits for these communities.					
10. National Clonal Forestation project (NCFP)	Various sites all over the Philippines (nationwide)	The Project is designed to naturally enmesh itself into existing programs of the DENR that require quality clonal seedlings. It aims to support the National Forestation Program for the Philippines through the production of genetically superior clonal seedlings of forest trees and other equally important plant species, and to institutionalize the practice of clonal forestry in gearing up to a higher level the development of forestry sector.					

Annex 13 List of Flood Control Related Projects Implemented by the National Government Agencies Surveyed - DA-BSWM (2/11)

Name of Project	Location	Description of Project	Cost	Source of Fund	Date Started	Date Completed	Remarks
Bureau of Soil and Water Management (DA-BSWM)							
1. Practical & Low-Cost Soil & Water Conservation Technologies for Upland Farmers							
a. Small Water Impounding Project (SWIP)	Various sites all over the Philippines (nationwide)		P1.6 Billion				Summary of completed projects by
b. Small Farm Reservoir (SFR)	Various sites all over the Philippines (nationwide)		P170M				
c. Small Diversion Dams	Various sites all over the Philippines (nationwide)		P1.85 Billion				
2. Environmental and Productivity Management of Marginal Soils in the Philippines	Region III, San Ildefonso, Bulacan; Region IV, Tanay, Rizal; Region X, Malaybalay, Bukidnon	Development of soil & water management technologies for farmers participatory techno-demo farms; Dissemination of soil & water management technologies to various farmer-beneficiaries.		Implemented through the regular budget and Japan Grant	February 2000-2005		
3. Integrated Watershed Management for Sustainable Soil & Water Resources Management of Inabanga Watershed, Bohol Island, Philippines	Region VII, Municipality of Sierra Bullones; Pilar; Dagohoy; Danao; Inabanga, Province of Bohol	The Project aims to examine the current land & water resources of the Inabanga Watershed using Geographical Information Systems & the ongoing natural resources management programs in the watershed; to evaluate the extent of soil erosion from agricultural crop lands, sedimentation in surface waters and water quality problems in the Inabanga Watershed; to understand socio-economic & policy issues & constraints that impact on the agricultural sustainability & surface water quality of the Inabanga Watershed; to evaluate different options and impacts for water resources uses in the Inabanga Watershed; to enhance/strengthen the research capacity/capability of staff in the BSWM & local project collaborators; to transfer research outputs to soil & water stakeholders in the Inabanga Watershed.	Aus\$151,328	Australian Centre for International Agricultural Research (ACIAR)	July 2002-June 2005		
4. Evaluation of the Multifunctionality of Agriculture in Selected Sites in The Philippines	Region III, Talugtog, Nueva Ecija Region IV, Tagaytay City & Amadeo, Cavite Region VI, Guimaras	The Project aims to evaluate the multifunctionality of agriculture. Specifically, it aims to quantitatively analyze the environmental, socio-economic & agritourism functions of agriculture & disseminate the concept of multifunctionality of agriculture & rural areas.	\$36,985.00	ASEAN- Ministry of Agriculture Forestry Fishery (MAFF) of Japan	December 2003-2006		

Annex 13 List of Flood Control Related Projects Implemented by the National Government Agencies Surveyed - DENR-MGB (3/11)

Name of Project	Location	Description of Project	Cost	Source of Fund	Date Started	Date Completed	Remarks
Mines and Geosciences Bureau (DENR-MGB) 1. Application of Integrated Exploration Strategy for Precious & Base Metal Mineralization	North Bicol Area	A two-year project that culminated in 2002, focusing on the conduct of airborne magnetics/radiometric and geochemical surveys.		RP-KOREA	2002		Follow-up Study
2. Capacity Building Project for Environmental Management I Mining		A three-year project that began in 1999 resulting in MGB's strengthened capacity & capability in mine environmental management, & mine environmental laboratory.		RP-JICA	1999		
3. Development of Mitigating Measures against Geohazards	NCR & Eastern Rizal, Naga-Legaspi, Tacloban-Ormoc Cagayan de Oro- Ginoog Coastal Strip, Davao-Tagum & Surigao City-Butuan City	The Project is designed to produce maps of the UNDP, which will have a substantial impact on the country's disaster management program.	P2.24M	UNDP	March 2004		
4. Tailing Facility Phase I. The Mibatás (Mabatás) Interim Tailing Disposal Facility	Three (3) ha of the Mibatás Creek drainage area within public forestland	An earth dam across the valley in the creek's upstream portion is under construction. The upstream of the dam will be used as an impoundment area for tailings coming from the processing of the ores from the Diwalwal mines.					
5. Tailing Facility Phase II. The Mibatás (Mabatás) Final Tailings Disposal Facility		At a later time, the project will be constructed and will cover some 35 has in the same general area. It shall cover the 3 has of the interim facility. The larger dam axis of the final facility will be constructed downstream of the interim tailing dam axis, about 1 km fr. the confluence of the Mibatás Creek & the Naboc River.					

Annex 13 List of Flood Control Related Projects Implemented by the National Government Agencies Surveyed - DOST-PHILVOLCS (4/11)

Name of Project	Location	Description of Project	Cost	Source of Fund	Date Started	Date Completed	Remarks
Philippine Institute of Volcanology and Seismology (DOST-PHIVOLCS)							
1. Operation & Maintenance of Volcanological Observatories							
2. Monitoring of Geochemistry of Volcanic Gases and Fluids							
3. Ground Deformation Network Development							
4. Spot Seismic Monitoring of Unmonitored Active, Potentially Active and Inactive Volcanoes							
5. Ground Water Monitoring as an Additional Method for Eruption Prediction							
6. GPS Monitoring of Active Volcanoes and Active Faults in the Philippines							
7. Volcano Database Development							
8. Seismological Observations and Network Development							
9. Seismic Data Processing and Management							
10. Operation and Maintenance of a Radio-Telemetered Seismic Network in Metro Manila							
11. Crystal Stress and Community Awareness Network (CSCAN)							
12. Operation and Maintenance of a Metro Manila Strong Motion Network (MMSTAR)							
13. Volcanic Hazards Awareness and Disaster Reduction among Residents of Active and Potentially Active Volcanoes in the Philippines							

Annex 13 List of Flood Control Related Projects Implemented by the National Government Agencies Surveyed - DOST-PAGASA (5/11)

Name of Project	Location	Description of Project	Cost	Source of Fund	Date Started	Date Completed	Remarks
Philippine Atmospheric, Geophysical and Astronomical Services Administration (DOST-PAGASA)							
1. Strengthening of Flood Forecasting & Warning Section (FFWS)	Pampanga & Agno Rivers			JICA			Pending
2. Hydrological Study of E.B. Magalona's	Madalag River, Malogo River				April 1999		Joint Partnership
3. Partnership for Sustainable Disaster Prevention, Mitigation & Preparedness					September 1999		
4. Community-Based Flood Forecasting and/or Warning System (CBFFWS)	Sinocalan and Allied River Basins, Iloilo Province				May 2003		
5. Community-Based Flood Forecasting and/or Warning System (CBFFWS)	Municipality of Dumangas, Iloilo Province				June 2003		

Annex 13 List of Flood Control Related Projects Implemented by the National Government Agencies Surveyed - DILG (6/11)

Name of Project	Location	Description of Project	Cost	Source of Fund	Date Started	Date Completed	Remarks
Department of Interior and Local Government (DILG)							
1. Philippines Regional Municipal Development Project (PRMDP)		Drainage works included in respective urban development projects.					
2. Subic Bay Area Municipal Development Project (SBAMDP)		Drainage works included in respective urban development projects.					
3. Clark Area Municipal Development Project (CAMDP)		Drainage works included in respective urban development projects.					
4. Mindanao Basic Urban Sector Services (MBUSS)		Drainage works included in respective urban development projects.					

Annex 13 List of Flood Control Related Projects Implemented by the National Government Agencies Surveyed - DBP (7/11)

Name of Project	Location	Description of Project	Cost	Source of Fund	Date Started	Date Completed	Remarks
Development Bank of the Philippines (DBP)							
1. LGU - Urban Water and Sanitation (LGU-USWP)	Nationwide	A program of encouraging sustainable water & sanitation investments to about 364 local government units, on the basis of beneficiaries demand & private sector participation.	\$283.3M	IBRD/World Bank	1999-2010		Four phases of the Adoptable Program Loan
2. Environmental Management Project (EMP) Phase 3-B		Institutionalize activities and strengthen the capability of stakeholders in adopting the following core values as important project considerations.		SIDA	2000-2002	March 2004	While the funding agreement with SIDA and the consulting agreement with AF International were only signed on March 2002, project activities were already initiated during the first quarter of 2002 in preparation for the actual implementation of the work plan approved by SIDA.

Annex 13 List of Flood Control Related Projects Implemented by the National Government Agencies Surveyed - DOF (8a/11)

Name of Project	Location	Description of Project	Cost	Source of Fund	Date Started	Date Completed	Remarks
Department of Finance (DOF)							
Environment							
a. Kalahe - CIDSS							
b. Laguna de Bay Environment & Watershed Project (LEMP)							
c. Local Government Finance & Development Project (LOGOFIND)							
d. LGU Urban Water and Sanitation Projects 1 & 2 (LGUWSP)							
e. Manila Second Sewerage Project (MSSP)							
f. Mindanao Rural Development Project - Coastal Marine Project (MRDP-CMP)							
g. Water Districts Development Project (WDDP)							
h. ARMM Peace and Social Fund Project							
i. River Basin and Watershed Management Project							
Rural Development							
a. Agrarian Reform Communities Development Project (ARCDP)							
b. Community-Based Resource Management Project (CBRM)							
c. Improving Microfinance Access for Barangay and Town-Based Microenterprise Development							
d. Kalahe - CIDSS							
e. Land Administration Management Project (LAMMP)							
f. Local Government Finance & Development Project (LOGOFIND)							
g. Mindanao Rural Development Project (MRDP)							
h. Rural Finance Project 3 (RF3)							
i. Special Zone for Peace & Development (SZOPAD) Special Fund Project							
j. Water Resources Development Project (WRDP)							
k. ARMM Peace and Social Fund Project							
l. Diversified Farm Income & Market Development Project							
m. River Basin & Watershed Management Project							
n. Second Agrarian Reform Communities Development Project (ARCDP2)							
Urban Development							
a. Kalahe - CIDSS							
b. Local Government Finance & Development Project (LOGOFIND)							
c. LGU Urban Water and Sanitation Projects 1 & 2 (LGUWSP)							

Annex 13 List of Flood Control Related Projects Implemented by the National Government Agencies Surveyed - DOF (8b/11)

Name of Project	Location	Description of Project	Cost	Source of Fund	Date Started	Date Completed	Remarks
d. Manila Second Sewerage Project (MSSP)							
e. Second Subic Bay Free Port Project (SUBIC2)							
f. Water Districts Development Project (WDDP)							
Water Supply and Sanitation							
a. Kalahi - CIDSS							
b. Local Government Finance & Development Project (LOGOFIND)		A project of the DOF which aims to provide long-term financing and technical support to the local government units for the implementation of local developments projects.		World Bank			
c. LGU Urban Water and Sanitation Projects 1 & 2 (LGUWSP)		Financing facilities that support the Philippine Government LGU Urban Water and Sanitation Program that aims to assist LGU in improving and sustaining the provision of water, sanitation, drainage and other environmental services to their urban populations. It also aims to assist in building institutional capacity for the planning and management of water and sanitation services at all levels of government.		World Bank			
d. Manila Second Sewerage Project (MSSP)							
e. Water Districts Development Project (WDDP)							
f. ARMM Peace and Social Fund Project							

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Annex 13 List of Flood Control Related Projects Implemented by the National Government Agencies Surveyed - NIA (9a/11)

Name of Project	Location	Description of Project	Cost	Source of Fund	Date Started	Date Completed	Remarks
National Irrigation Authority (NIA)							
Luzon Area							
1. Casecan MIPP-IC	Region III		5,832.00	JBIC	October 1997	June 2004	
2. Casecan MIPP-BOT	Region III		14,998.30	CE	November 1995	August 2001	
3. Tarlac GISRP	Region III		624	JBIC	July 1997	December 2005	
4. Pampanga Delta DP-IC	Region III		4,440.44	JBIC	January 1992	June 2003	
5. Agno River Integ. Irrigation Project	Region I		8,634.04	GOP	December 1997	March 2008	
6. Apayao-Abulog ISIP	Region II		860	GOP	July 1996	December 2003	
7. Adalaran River IP	Region II		994	GOP	March 1997	December 2005	
8. Balog-Balog MPP	Region III		12,028.37	GOP	January 1999	December 2009	
9. Auto SRIP	Region III		351	GOP	March 1995	December 2004	
10. Tanglad SRIP	Region III		286	GOP	September 1996	December 2004	
11. Banaoang Pump IP	Region III		1,340	CAMC	August 2002	July 2006	
Visayas Area							
1. Bohol IP II	Region VII		2,384.14	JBIC	January 2000	December 2005	
2. Nasig-id SRIP	Region VII		243	GOP	January 1999	December 2004	
3. Second Irrigation SIP	Region VII & VIII		1,883.35	ADP	April 1997	December 2004	
Help for Catubig A.A. Project	Region VIII		1,773.80	JBIC	April 2002	July 2009	
Mindanao Area							
1. Malitubog-Maridagao IP	Bataan		300,000	DPWH.CY 1999			
2. Lower Agusan DP-IC	Region IIX		3,103.35	JBIC	October 1989	December 2004	
	Caraga		2,066.80	JBIC	January 1996	December 2003	
Nationwide							
1. Southern Phils. ISP (10-NIP, 4-CIP, 5-SRIP)	Caraga, 7 & 8		4,169.40	ADB	June 2000	December 2005	
2. Small Reservoir Irrigation Project (SRIP), Nationwide	Nationwide		3,200.00	GOP	January 1990		
3. Water Resources DP-68 Systems, 6-Schemes	Nationwide		1,852.10	IBRD	January 1997	June 2004	
Foreign-Assisted Projects:							
1. Malitubog-Maridagao Irrigation Project	North Cotabato	Construction of dam, main and lateral canals, roads, drainage and on-farm facilities to irrigate an area of 10,840 ha.	4,867 Billion Yen	JBIC	October 1989	December 2004	
2. Pampanga Delta Development Project - IC	Pampanga	Construction of diversion dam, pumping station, irrigation and drainage canals and their related structures, on-farm facilities and project facilities to irrigate 10,540 ha. Studies shown that the project area could be increased to 13,378 ha with farmer's beneficiaries increased to 8,900 farmers.	9,427 Billion Yen	JBIC	January 1992	June 2003	

Annex 13 List of Flood Control Related Projects Implemented by the National Government Agencies Surveyed - NIA (9b/11)

Name of Project	Location	Description of Project	Cost	Source of Fund	Date Started	Date Completed	Remarks
3. Casecanan Multi-Purpose Irrigation & Power Project-Irrigation Component	Nueva Ecija, Bulacan, Pampanga	Construction of irrigation facilities and improvement of drainage system for 26, 920 ha of new area. Establishment of re-use points and intermediate farm ponds for both new and rehab areas. Rehab of selected irrigation and drainage facilities in Upper Pampanga River Integrated Irrigation System totalling 55, 100 ha and pursuit of institutional development in the new areas, including initiatives of pilot areas for diversified.	10,868 Billion Yen	JBIC	October 1997	June 2004	
4. Casecanan Multi-Purpose Irrigation & Power Project-BOT Component	Nueva Viscaya and Quirino	Construction of two (2) diversion dams measuring 20-25 meters high and 100-120 meter long in Casecanan and Taang rivers along Alfonso Castaneda, Nueva Viscaya. Underground tunnel-6.3 meters in diameter and approximately 26 kms. Long from the province of Nueva Viscaya. Underground powerhouse with generating capacity of 140 mega-watts before the tailrace of the tunnel into the Pantabangan reservoir.	19,743.00 million		November 1995	November 2000	Completed
5. Tarlac Groundwater Irrigation System Reactivation Project	Tarlac Province	Construction of 50 deepwell pump irrigation systems with an aggregate area of 2,500 ha to increase food production in the province.	1, 887.00 Yen	JBIC	July 1997	December 2005	
6. Second Irrigation Systems Improvement Project (ISIP-II)	Region VIII	ISIP-II is an ADB Project located in the province of Leyte. It will rehabilitate nine (9) National irrigation systems (NIS) for a duration of seven years. The project will reduce poverty and the living standard of the farming communities by increasing the income of about 16,000 farm household, increase food production, improved the road network leading to better access to market, provide control of schistosomiasis and promote environmental.	US \$30.0 million	ADB	April 1997	31-Dec-04	
7. Lower Agusan Development Project-IC	Agusan Del Norte	Construction of two (2) diversion dams measuring 20-25 meters high and 100-120 meter long in Casecanan and Taang rivers along Alfonso Castaneda, Nueva Viscaya. Underground tunnel-6.3 meters in diameter and approximately 26 kms. long from the province of Nueva Viscaya.	4, 940 Billion Yen	JBIC	January 1986	December 2003	
8. Water Resources Development Project (WRDP)	Nationwide	WRDP would help the government implement a broad policy and institutional framework in the water sector, formulate a national water resources management strategy that reflect's the nation's social, economic and environmental objectives	\$ 58.00 Million	IBRD	1997	June 2004	

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Annex 13 List of Flood Control Related Projects Implemented by the National Government Agencies Surveyed - NIA (9c/11)

Name of Project	Location	Description of Project	Cost	Source of Fund	Date Started	Date Completed	Remarks
9. Southern Philippines Irrigation Sector Project		The project will construct and improve samal to medium scale irrigation systems, strengthen system operation and maintenance through beneficiary participation and capacity building of beneficiary associations and executing agencies (NIA & LGU).	\$60.00 million	ADB	June 2000	December 31, 2005 and December 31, 2007 (Proposed)	
10. Bohol Irrigation Project Stage II	Bohol	HCAAP, a multi-component project will alleviate poverty by raising farm income levels, generate employment opportunities and improve social infrastructures and services part of the Catubig Valley and Northern Samar.	6,078 Billion Yen 5,210 Million Yen	JBIC JBIC	January 2000 October 2000	31-Dec-05 2008	
11. Help for Catubig Agricultural Advancement Project (HCAAP)	Northern Samar						
12. Banaoang Pump Irrigation Project	Ilocos Sur	The Banaoang Pump Irrigation Project is a medium scale irrigation project. It is envisioned to provide year-round irrigation water supply to about 6,000 hectares with rice as the main crop.	816.00 million	China National Construction and Agricultural Machinery Import and Export Corporation (CAMC)	March 2003	December 2006	
Locally Funded Projects:							
1. Agno River Integrated Irrigation Project	Tarlac Province	The project envisions the provision of year-round irrigation to some 70,800 ha of land lying in the province of Pangasinan and Tarlac. The major civil works for the irrigation phase comprises of repair of existing Agno RIS diversion weir and sluiceway, construction of new intake structure, regulating pond with capacity of 4.6 mcm and two headgates for ARIS and ADRIS area.		JBIC (for approval)	December 1997	March 2008	
2. Balog-Balog Multi-purpose Project (Phase II)	Province of Tarlac	The project envisions to provide water supply for year round irrigation of about 39,150 ha. It similarly envisions to mitigate flooding in low-lying areas and to provide the upland communities with the opportunity to engage in inland fish production on the 2,004 ha. reservoir.		Local Funds (GOP)	January 1999	December 31, 2004 (original) December 31, 2008 (Revised)	
3. Apayao-Abulog Irrigation System Improvement Project	Abulog and Pamplona in Cagayan	Construction of the Dacao Dam and irrigation facilities to rehabilitate some 10,535 ha. of existing system and generate some 6,465 ha.		Local Funds (GOP)	July 1999	December 31, 1999 (original) December 31, 2003 (Revised)	

Annex 13 List of Flood Control Related Projects Implemented by the National Government Agencies Surveyed - NIA (9d/11)

Name of Project	Location	Description of Project	Cost	Source of Fund	Date Started	Date Completed	Remarks
4. Addalam River Irrigation Project	Aglibay & Saguday in Quirino and Jones & Echaque in Isabela	Construction of 190 m. long ogee shaped and 9.2 m high dam, construction of 21.6 km main canal and 78 km laterals and sub-laterals and construction of 180 km main farmditches, 180 km supplementary farmditches, 420 units canal structures to irrigate 5,830 ha of new area and construction of 3.6 km of new access roads.		Local Funds (GOP)	March 1997	December 2003	
6. Small Reservoir Irrigation Project (SRIP)	Nationwide	Construction of earthfill dam including appurtenant structures and irrigation facilities and canal structures to provide year round irrigation to an estimated 18,792 ha of farmlands nationwide.	7,985.10	DPWH-SWIMP / CARP-SWIMP	January 1990	December 2007	
7. Nasig-id SRIP	Zamboanganita, Negros Oriental	Construction of a zoned earthfill dam 30 meters high, with a crest length of 161 meters, reservoir area of 3.1 ha. and reservoir capacity of 0.66 million cu.m. to irrigate an area of 915 ha.	153.70	Local Funds (GOP)	January 1999	December 2002	
8. Tanglad SRIP	Samal and Orani, Bataan	Construction of a zoned earthfill dam 28.5 meters high, with a crest length of 252.7 meters, reservoir area of 9.2 ha. and reservoir capacity of 0.82 million cu.m. to irrigate an area of 860 ha.	286.27	Local Funds (GOP)	Septemebr 1996	December 31, 2002 (Original) December 31, 2004 Revised)	
9. Aulo Irrigation Project	Palayan City, Nueva Ecija	Construction of a Zoned Earthfill dam 30 meters high, with a crest length of 425 meters and reservoir area of 10.3 ha. to irrigate an area of 810 ha.	551	Local Funds (GOP)	March 1995	December 31, 2002 (Original) December 31, 2004 Revised)	

Annex 13 List of Flood Control Related Projects Implemented by the National Government Agencies Surveyed - LBP (10/11)

Name of Project	Location	Description of Project	Cost	Source of Fund	Date Started	Date Completed	Remarks
Land Bank of the Philippines (LBP)							
1. Water District Development Program (Sewerage, Sanitation, Drainage (WDDP-SSD))			36.3 US dollars	World bank			
2. Water Supply and Sanitation				World Bank			
3. LGU Urban Water and Sanitation (LGUUSWP) Project 1 & 2				World Bank			
4. Mindanao Basin Urban Services Sector Project				World bank			
5. Local Government Units Support Credit Program				JBIC			

Annex 13 List of Flood Control Related Projects Implemented by the National Government Agencies Surveyed - LLDA (11a/11)

Name of Project	Location	Description of Project	Cost	Source of Fund	Date Started	Date Completed	Remarks
Laguna Lake Development Authority (LLDA)							
1. Watershed Management							
a. Establishment of Coconut Nursery							
b. Agro-Forestry Nursery Project							
c. Apia Reforestation Project							
d. A Multi-Storey Approach Towards Watershed							
e. Laguna de Bay Institutional Strengthening and Community Participation Project		This project will transform LLDA into a more watershed management agency through its institutional strengthening while promoting the sustainable use of environmental resource.		World Bank			Completed
2. Water Resource Management							Completed
a. Water Balance Study for De Bay							Completed
b. Sedimentation Patterns Sediment Quality Bathymetry of Laguna de Bay							Completed
c. Successfully completed the "Laguna de Bay Water Balance Study" (BAYWATS-1) through the NHRF with funding support from DOST							Completed
d. Sustainable Development of the Laguna de Bay Environment Project							Completed
e. Completed the Framework Outline for the Formulation of Policy Framework on Water Pricing and Its Implementing Rules							Completed
f. Completed year II of the Development of Laguna de Bay Water Management							Proposed
g. Participated in the UNEP-IJTC /ILEC International Joint Symposium on Building Partnerships with Citizen and Local Government for sustainable lake Management							Proposed
3. River Rehabilitation Program							
a. Lakkay-Ilog		The LLDA launches its river rehabilitation program and placed it under community development for implementation the flagship, utilizes and integrated approach to watershed management. It takes into account both water quantity in the continuum of the downstream areas of thriving urbanization all the way to the lake basin.		World Bank			Proposed
b. Information, Education and Communication							
c. River Rehabilitation and Protection Councils/Foundations							
d. Formulation of River Rehab Plans							Completed
e. Environment Army							Proposed
f. Water Quality Monitoring							Proposed

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Annex 13 List of Flood Control Related Projects Implemented by the National Government Agencies Surveyed - LLDA (11b/11)

Name of Project	Location	Description of Project	Cost	Source of Fund	Date Started	Date Completed	Remarks
4. Water Forecasting		Monitor flood control situation. They advise DPWH to close the Napindan Channel in coordination of EFCOS.					Proposed
5. LGU Flood Control and Drainage Project		The LGU's under the jurisdiction of LLDA will coordinate their office on any flood control related projects like drainage system before the planning/design.					Proposed
6. International and Local Projects:							
a. International Living Lakes Network				World Bank			Proposed
b. Laguna de Bay Institutional Strengthening and Community Participation Project				World Bank			Proposed
c. Polder Island Development Plan-Water Supply and sanitation Project				World Bank			Proposed
d. Sister lake Partnerships with Lake Taihu, People Republic of China				World Bank			Proposed
e. River Rehabilitation and Protection Councils Foundations				World Bank			Proposed
f. Recognizing the LLDA as a Step Towards its Institutional Re-Engineering							
9. Coastal Marine Projects		The Laguna de Bay Environmental Management Project may include investments in the areas of diversion and treatment of municipal and industrial waste.		World Bank			
h. Sustainable Development of Laguna de Bay Environment Project		Twenty-four sub-basins comprise the Laguna de Bay. These sub-basins were used as the following river rehabilitation strategies.		Netherlands Funded			

Annex 14

*Information Regarding
PCM Workshop 2 attached
to the Letter of Invitation*

Annex 14 Process and Outline of PCM Workshop 1

WS-1: PCM Method Process

PCM Workshop 1 (Draft) **(Draft PDM 1)**

Title : Flood Control Implementation System of Principal Rivers
Time of Conduct : Within one month after Inception Report Meeting
Organizations to Attend:
Bureaus and PMOs in DPWH Central Offices
(PS, BOD, BOC, PMO-MFCP, PMO-FS)
Central Offices of Relevant Organizations
(NEDA, DBM, DENR, DILG, NIA, NDCC, NWRB, PAGASA)
Purpose: Identify current conditions of laws/regulations, institutions, roles of relevant organizations and problems in the implementation of flood control projects for principal rivers in the Philippines
Venue: Meeting Room of DPWH Central Office
Attendants: Approx. 30 (DPWH (10), Relevant Organizations (15, 1 to 2 each organization, others)
Method: Identify the problems by PCM Method, and summarize the discussion to prepare PDM 1 by referring to PDM 0

PS: Planning Service
BOD: Bureau of Design
BOC: Bureau of Construction
PMO-MFCP: Project Management Office for Major Flood Control Projects
PMO-FS: Project Management Office for Feasibility Study
NEDA : National Economic and Development Authority
DBM : Department of Budget and Management
DENR : Department of Environment & Natural Resources
DILG : Department of Interior and Local Government
NIA : National Irrigation Administration
NDCC: National Disaster Coordination Council
NWRB : National Water Resources Board
PAGASA : Philippine Atmospheric, Geophysical and Astronomical Services Administration

Annex 15

*Information Regarding
PCM Workshop 2 attached
to the Letter of Invitation*

Annex 15
Information Regarding PCM Workshop 2 Attached to the Letter of Invitation

Attachment

**THE STUDY ON FLOOD CONTROL PROJECT IMPLEMENTATION SYSTEM
FOR PRINCIPAL RIVERS IN THE PHILIPPINES**

Under

**THE PROJECT FOR ENHANCEMENT OF CAPABILITIES IN FLOOD
CONTROL AND SABO ENGINEERING OF
THE DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS**

PCM WORKSHOP 2

The Philippines has frequently suffered from natural disasters such as typhoons, volcanic eruptions and earthquakes while the government has continuously endeavored to mitigate the damages. Such disasters have brought heavy losses to the country's economy and claimed hundreds of lives every year. Approximately 700 lives have been lost and damages have amounted 8.1 billion pesos annually. It has affected primarily agricultural productions, transportation and communication resulting in aggravated and long time economic depression, and enlargement of regional differential and influx of the poor to the urban areas. The Government of the Republic of the Philippines has hardly prevented disasters due to its limited technical background, organization structures, regulations as well as budgetary constraint.

Therefore, the Government has requested a technical cooperation project to develop the capacities of engineers by means of establishing "Flood Control and Sabo Engineering Center" to the Government of Japan. In response to the request, Japan International Cooperation Agency (JICA) has started "The Project for Enhancement of Capabilities in Flood Control and Sabo Engineering of the Department of Public Works and Highways" (herein after referred to as "the Project") on 10 January 2000.

The Project has been implemented aiming at enhancing the capacities of the engineers of the engineers of DPWH regional offices, while the Project is now under the Stage 2 (10 January 2003 to 30 June 2005) to accomplish the objectives below :

Under the Project Stage 2, DPWH engineers of 50 officers are trained for structural designing/planning through OJT and those of 30 offices are trained for construction supervision and maintenance until June 2005. It is envisaged that the counterpart personnel, who are conducting the training will continue the said training activities to the engineers of other DPWH regional offices, and capabilities of DPWH engineers in planning, designing, construction and maintenance of flood control and sabo structures will be enhanced.

In the course of the Project, it is that the flood control project implementation system be improved to accomplish the Project Purpose: "Capability of the selected DPWH offices in planning, design, construction and maintenance of flood control structures will be enhanced, especially for the flood control projects in principal rivers". This "*Study on Flood Control Project Implementation System for Principal Rivers in the Philippines*" is decided to conduct to prepare and propose an effective flood control project implementation system.

Introduction

The main objective of the "Study on Flood Control Project Implementation System for Principal Rivers in the Philippines" is "To prepare and propose an improvement plan of implementation system for flood control projects for principal rivers in the Philippines". In order for the improvement plan to be more effective and sustainable, participation of all stakeholders in the preparation of the plan is encouraged. One of the ways being used in the Study where stakeholders can participate in the formulation of the plan is through the conduct of Project Cycle Management (PCM) Workshops.

As an initial step in the Participatory Planning of the PCM method, the Study Team conducted a Stakeholders Analysis wherein, among others, the number of PCM workshops to be conducted and the participants of each workshop were determined. The 1st Workshop is for decision-makers, funding agencies, implementing agencies, and other relevant agencies in the national level / central offices. The succeeding workshops will be for other stakeholders, such as: the direct beneficiaries, negatively affected groups, community leaders, potential opponents, and supporting groups; with the participation of representatives from the DPWH central office, regional offices of DPWH and other relevant agencies/organizations, and DPWH district offices.

Purpose of the Workshop

The purpose of PCM Workshop 2 is to "Identify problems in the existing flood control project implementation system through attitude survey with relevant government officers and local residents".

Problem Analysis is the 2nd step in the Participatory Planning of the PCM method. It involves the selection of a core problem, which is analyzed to identify the causative factors as well as consequent effects. It is usually diagrammatically presented in the form of a cause-effect tree or problem tree. The effects of the core problem indicate its wider dimensions and impacts on flood mitigation and the economy. The causative factors identify the variables influencing the problem and provide the basis for solution.

Through the workshop, the participants should be able to:

- Gain appreciation of the Participatory Planning of the PCM method;
- Identify and analyze the causes and effects of existing problems in the existing flood control project implementation system, and come-up with the Cause-Effect/ Problem Tree;
- Identify the roles/functions of different stakeholders in the planning, implementation and maintenance of flood control projects;
- Discuss possible interventions to solve existing problems in the existing flood control project implementation system, including the roles of each stakeholder in each solution;

The outputs (including other lessons learned) of the workshop will be collated and used as one of the important bases in the preparation of an improvement plan of implementation system for flood control projects for principal rivers in the Philippines.

Duration, Schedule and Venue

The PCM Workshop-2 for each region will be conducted in one day on the following dates and venues:

<u>Region</u>	<u>Date</u>	<u>Venue</u>
I	June 04, 2004 (Friday)	DPHW - RO I, San Fernando City, La Union
III	June 07, 2004 (Monday)	DPHW - RO III, San Fernando, Pampanga
IV-A (Group A)	June 09, 2004 (Wednesday)	DPHW - RO IVA, EDSA, Diliman, Quezon City
IV-A (Group B)	June 10, 2004 (Thursday)	DPWH – DEO Batangas 1 st , Batangas City, Batangas
IV-A (Group B)	June 11, 2004 (Friday)	Municipal Hall, Bacoor, Cavite
V	June 17, 2004 (Thursday)	DPHW - RO V, Legaspi City, Albay

Participants

Approximately 40 participants from the following stakeholders are proposed to attend the PCM Workshop-2.

1. Regional Offices
 - DPWH – Planning, Design, Construction
 - DENR
 - NIA
 - NEDA
 - DILG
 - DAR
2. DPWH Dist. Engr'g. Office covering the selected river – Planning, Design, Construction and Maintenance
3. Provincial LGU covering the selected river
 - Provincial Planning and Development Coordinator
 - Provincial Engineer
4. City/Municipal LGU affected by the selected river
 - City/Municipal Planning and Development Coordinator
 - City/Municipal Engineer
5. Barangays affected by the selected river
 - Barangay Chairmen
6. Other stakeholders (i.e. NGO-Environment Concern, NGO-Poverty Alleviation, etc.)

Please see **Annex** for the proposed list of PCM Workshop 2 participants.

The selected rivers and their respective DEO, Province and City/Municipality are as follows:

<u>Region</u>	<u>River</u>	<u>DEO</u>	<u>Province</u>	<u>City/Mun.</u>
I	Amburayan	La Union 1 st	La Union	Bangar
III	Balanga	Bataan 2 nd	Bataan	Balanga
IV-A (1)	Imus	Cavite	Cavite	Bacoor
IV-A (2)	Pansipit	Batangas 1 st	Batangas	Lemery
V	Guinale	Albay	Albay	Malinao

Methodology

The workshop is intended to be highly experiential, interactive and participative. It is divided into two parts.

The first part of the Workshop includes: (i) a short presentation of the FCSEC and ENCA Projects to give participants a background of the "Study on Flood Control Project Implementation System for Principal Rivers in the Philippines"; (ii) an overview of the Principles and Objectives of the Study; and (iii) an overview of the Participatory Planning of the PCM method in order for the participants to appreciate their roles in the preparation of an effective and sustainable improvement plan of implementation system for flood control projects for principal rivers in the Philippines.

The second part is the Workshop proper where problem identification and analysis will be conducted. The workshop participants will be divided into two groups, as follows:

Group A - Approximately 20 participants from DPWH and relevant organization – DPWH Central Office; Regional Offices of DPWH, DENR, NIA, NEDA, DILG, DAR; and DPWH District Engineering Office.

- Identify and analyze the causes and effects of existing problems in the existing flood control project implementation system, and come-up with the Problem Tree.
- Discuss roles/functions in flood control project of relevant organizations (i.e. What are required? How to coordinate? How to cooperate?).
- Further those in O&M.

Group B - Approximately 20 participants from LGU, Barangays affected by the selected river, and other stakeholders – Provincial Planning and Development Coordinator, Provincial Engineer, City/Municipal Planning and Development Coordinator, City/Municipal Engineer, Barangay Chairmen, Representatives from negatively affected group, NGOs.

- Identify and analyze the causes and effects of existing problems in the existing flood control project implementation system, and come-up with the Problem Tree;
- Discuss different living conditions of local residents corresponding to flood.
- Discuss necessity of flood control works.
- What are required in flood control projects.
- Discuss maintenance of flood control structures.

Proposed Workshop Program

9:00 – 9:30	Registration	
9:30 – 9:45	Invocation	Ms. Judy Ann Santos
	Opening Remarks	To be named
9:45 – 10:30	Outline of the Study	Mr. Hitoshi Kin, Team Leader JICA Study Team
10:30 – 10:50	Coffee Break	
10:50 – 11:50	Introduction to PCM	Mr. Bienvenido Gilles, Moderator
11:50 – 13:00	Lunch	
13:00 – 14:50	Workshop	All Participants
14:50 – 15:10	Coffee Break	
15:10 – 16:50	Workshop	All Participants
16:50 – 17:00	Closing Remarks	To be named

ANNEX

PROPOSED PCM WORKSHOP 2 PARTICIPANTS, REGION I

June 04, 2004 (Friday)	DPHW - RO I, San Fernando City, La Union
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Region I, Amburayan River (Team A)	
Group A	Group B
DPWH-Region I	La Union Province
Chief of Planning and Design Division	Head of PPDO
Materials Quality Control and Hydrology Division	Provincial Engineer
Chief of Construction Division	PENRO
Chief of Maintenance Division	Provincial Disaster Coordinating Council
La Union 1st Eng'g District	Municipality of Bangar
District Engineer	CPDO/MPDO
Assistant District Engineer	City/Municipal Engineer
Chief of Planning and Design Division	CENRO
Chief of Construction Division	City/Municipal Disaster Coordinating Council
Chief of Maintenance Division	NGO Environment Concern
NIA-Region I	NGO Disaster Management Concern
Chief of Planning Division	NGO Poverty Alleviation/UPAO
DENR-Region I	Business Club
Chief of Planning Division, Forest Management Service	Task Force
Chief of Planning Division, Mines	Representative, Solid Waste Management Board
Congressman	Barangays of Bangar
Representative of the Congressman, Sudipen	Barangay Chair (1)
DA-Region I	Barangay Chair (2)
Chief of Regional Agricultural Engineering Group	Barangay Chair (3)
NEDA-RDC I	Barangay Chair (4)
Chief of Infrastructure Staff	Barangay Chair (5)
RDCC or DILG Region I	Barangay Chair (6)
Chief of Planning Division	
Other DEOs	
District Engineer, La Union 2nd Eng'g District	
District Engineer, Ilocos Sur 1st 2nd Eng'g District	
District Engineer, Ilocos Sur 2nd Eng'g District	
District Engineer, Pangasinan 2nd Eng'g District	

ANNEX

PROPOSED PCM WORKSHOP 2 PARTICIPANTS, REGION III

June 07, 2004 (Monday)	DPHW - RO III, San Fernando, Pampanga
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Region III, Balanga (Talisay) River (Team B)	
Group A	Group B
DPWH-Region III	Bataan Province
Chief of Planning and Design Division	Head of PPDO
Materials Quality Control and Hydrology Division	Provincial Engineer
Chief of Construction Division	PENRO
Chief of Maintenance Division	Provincial Disaster Coordinating Council
Bataan 2nd Eng'g District	Municipality of Balanga
District Engineer	CPDO/MPDO
Assistant District Engineer	City/Municipal Engineer
Chief of Planning and Design Division	CENRO
Chief of Construction Division	City/Municipal Disaster Coordinating Council
Chief of Maintenance Division	NGO Environment Concern
NIA-Region III	NGO Disaster Management Concern
Chief of Planning Division	NGO Poverty Alleviation/UPAO
DENR-Region III	Business Club
Chief of Planning Division, Forest Management Service	Task Force
Chief of Planning Division, Mines	Representative, Solid Waste Management Board
Congressman	Barangays of Balanga
Representative of the Congressman, Balanga	Barangay Chair (1)
DA-Region III	Barangay Chair (2)
Chief of Regional Agricultural Engineering Group	Barangay Chair (3)
NEDA-RDC III	Barangay Chair (4)
Chief of Infrastructure Staff	Barangay Chair (5)
RDCC or DILG Region I	Barangay Chair (6)
Chief of Planning Division	
Other DEOs	
Chief of Planning Division, MPE-PMO	
District Engineer, Zambales Eng'g District	
District Engineer, Olongapo City Sub-Eng'g District	
District Engineer, Bulacan 1st Eng'g District	

ANNEX

PROPOSED PCM WORKSHOP 2 PARTICIPANTS, REGION IVA

June 09, 2004 (Wednesday)	DPHW - RO IVA, EDSA, Diliman, Quezon City
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Region IVA, (1) Imus River (Team C)
Group A
DPWH-Region IVA
Chief of Planning and Design Division
Materials Quality Control and Hydrology Division
Chief of Construction Division
Chief of Maintenance Division
Cavite Eng'g District
District Engineer
Assistant District Engineer
Chief of Planning and Design Division
Chief of Construction Division
Chief of Maintenance Division
NLA-Region IV
Chief of Planning Division
DENR-Region IV
Chief of Planning Division, Forest Management Service
Chief of Planning Division, Mines
Congressman
Representative of the Congressman, Bacoor
DA-Region IV
Chief of Regional Agricultural Engineering Group
NEDA-RDC IV
Chief of Infrastructure Staff
RDCC or DILG Region I
Chief of Planning Division
Other DEOs
District Engineer, Batangas 1st Eng'g District
District Engineer, Batangas 2nd Eng'g District
Chief of Planning Division, Quezon 1st Eng'g Dist.
Chief of Design Division, Quezon 2nd Eng'g Dist.

ANNEX

PROPOSED PCM WORKSHOP 2 PARTICIPANTS, REGION IVA

June 10, 2004 (Thursday)	DPWH – DEO Batangas 1 st , Batangas City, Batangas
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Region IVA (2); Pansipit River (Team C)
Group B
Batangas Province
Head of PPDO
Provincial Engineer
PENRO
Provincial Disaster Coordinating Council
Municipality of Lemery
CPDO/MPDO
City/Municipal Engineer
CENRO
City/Municipal Disaster Coordinating Council
NGO Environment Concern
NGO Disaster Management Concern
NGO Poverty Alleviation/UPAO
Business Club
Task Force
Representative, Solid Waste Management Board
Barangays of Lemery
Barangay Chair (1)
Barangay Chair (2)
Barangay Chair (3)
Barangay Chair (4)
Barangay Chair (5)
Barangay Chair (6)

ANNEX

PROPOSED PCM WORKSHOP 2 PARTICIPANTS, REGION IVA

June 11, 2004 (Friday)	Municipal Hall, Bacoor, Cavite
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Region IVA, (1) Imus River (Team C)
Group B
Cavite Province
Head of PPDO
Provincial Engineer
PENRO
Provincial Disaster Coordinating Council
Municipality of Bacoor
CPDO/MPDO
City/Municipal Engineer
CENRO
City/Municipal Disaster Coordinating Council
NGO Environment Concern
NGO Disaster Management Concern
NGO Poverty Alleviation/UPAO
Business Club
Task Force
Representative, Solid Waste Management Board
Barangays of Bacoor
Barangay Chair (1)
Barangay Chair (2)
Barangay Chair (3)
Barangay Chair (4)
Barangay Chair (5)
Barangay Chair (6)

ANNEX

PROPOSED PCM WORKSHOP 2 PARTICIPANTS, REGION V

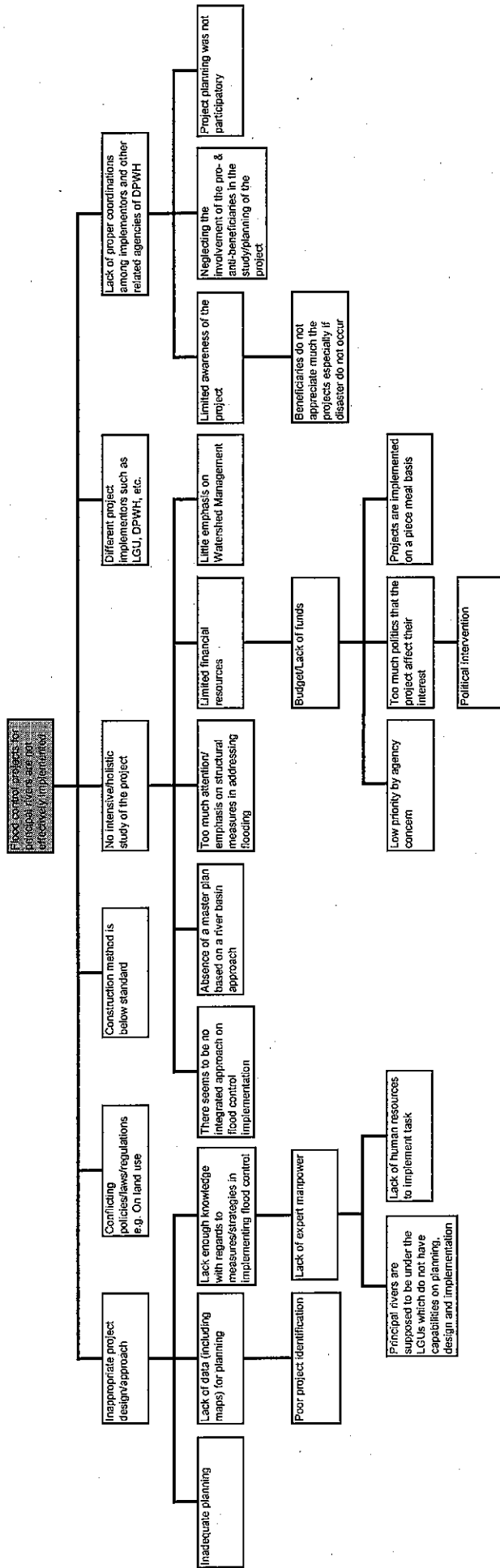
June 17 2004 (Thursday)	DPHW - RO V, Legaspi City, Albay
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Region V, Guinale River (Team D)	
Group A	Group B
DPWH-Region V	Albay Province
Chief of Planning and Design Division	Head of PPDO
Materials Quality Control and Hydrology Division	Provincial Engineer
Chief of Construction Division	PENRO
Chief of Maintenance Division	Provincial Disaster Coordinating Council
Albay Eng'g District	Municipality of Malinao
District Engineer	CPDO/MPDO
Assistant District Engineer	City/Municipal Engineer
Chief of Planning and Design Division	CENRO
Chief of Construction Division	City/Municipal Disaster Coordinating Council
Chief of Maintenance Division	NGO Environment Concern
NIA-Region V	NGO Disaster Management Concern
Chief of Planning Division	NGO Poverty Alleviation/UPAO
DENR-Region V	Business Club
Chief of Planning Division, Forest Management Service	Task Force
Chief of Planning Division, Mines	Representative, Solid Waste Management Board
Congressman	Barangays of Malinao
Representative of the Congressman, Manlinao	Barangay Chair (1)
DA-Region V	Barangay Chair (2)
Chief of Regional Agricultural Engineering Group	Barangay Chair (3)
NEDA-RDC V	Barangay Chair (4)
Chief of Infrastructure Staff	Barangay Chair (5)
RDCC or DILG Region I	Barangay Chair (6)
Chief of Planning Division	
Other DEOs	
District Engineer, Albay Sub-Eng'g District	
District Engineer, Sorsogon Eng'g District	
District Engineer, Camarines Norte Eng'g District	
District Engineer, Camarines Sur 1st Eng'g District	

Annex 16

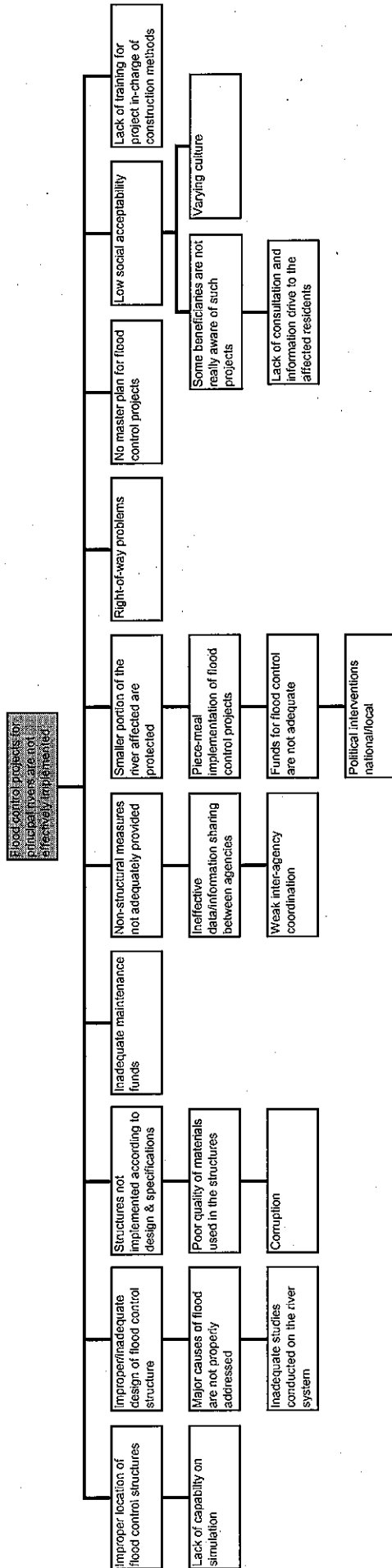
Problem Trees from PCM Workshop 1

ANNEX 16 (1/10)
PROBLEM TREE - FLOOD CONTROL PROJECT IMPLEMENTATION FOR PRINCIPAL RIVERS
 PCM Workshop 1

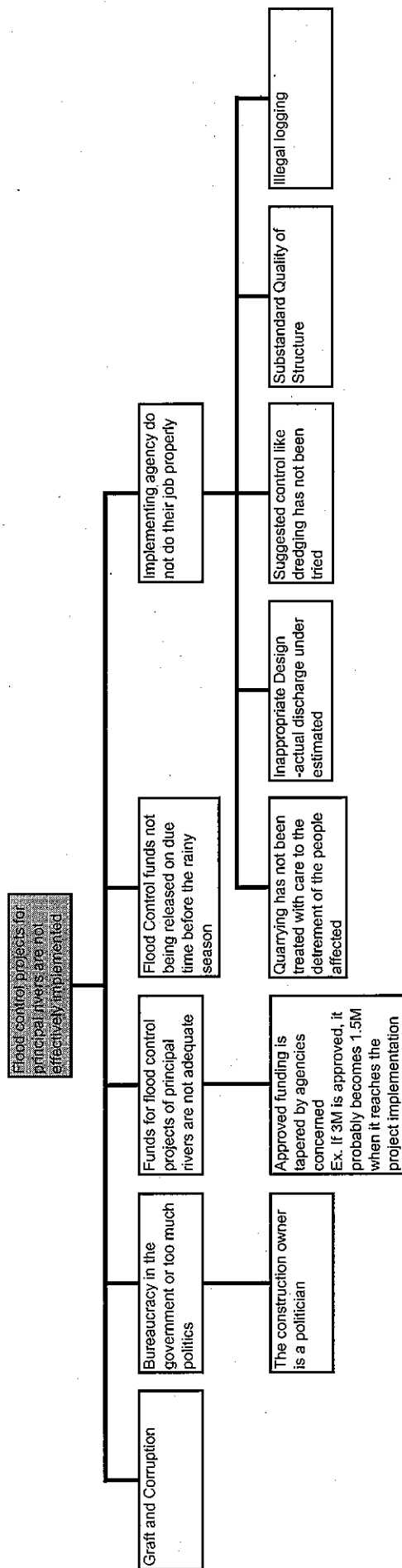


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ANNEX 16 (2/10)
PROBLEM TREE - FLOOD CONTROL PROJECT IMPLEMENTATION FOR PRINCIPAL RIVERS
PCM Workshop 2 - Region I - Group A

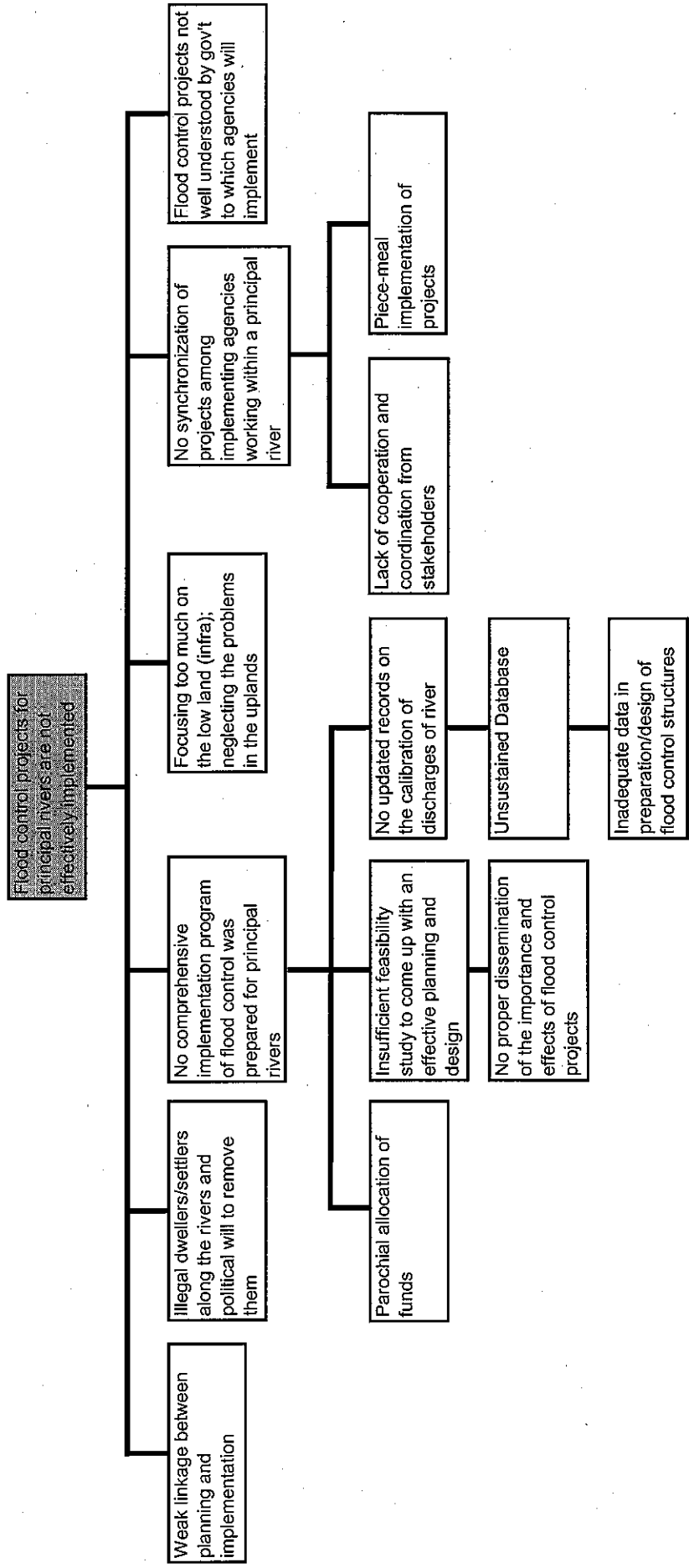


ANNEX 16 (3/10)
PROBLEM TREE - FLOOD CONTROL PROJECT IMPLEMENTATION FOR PRINCIPAL RIVERS
PCM Workshop 2 - Region I - Group B - Bangar, La Union

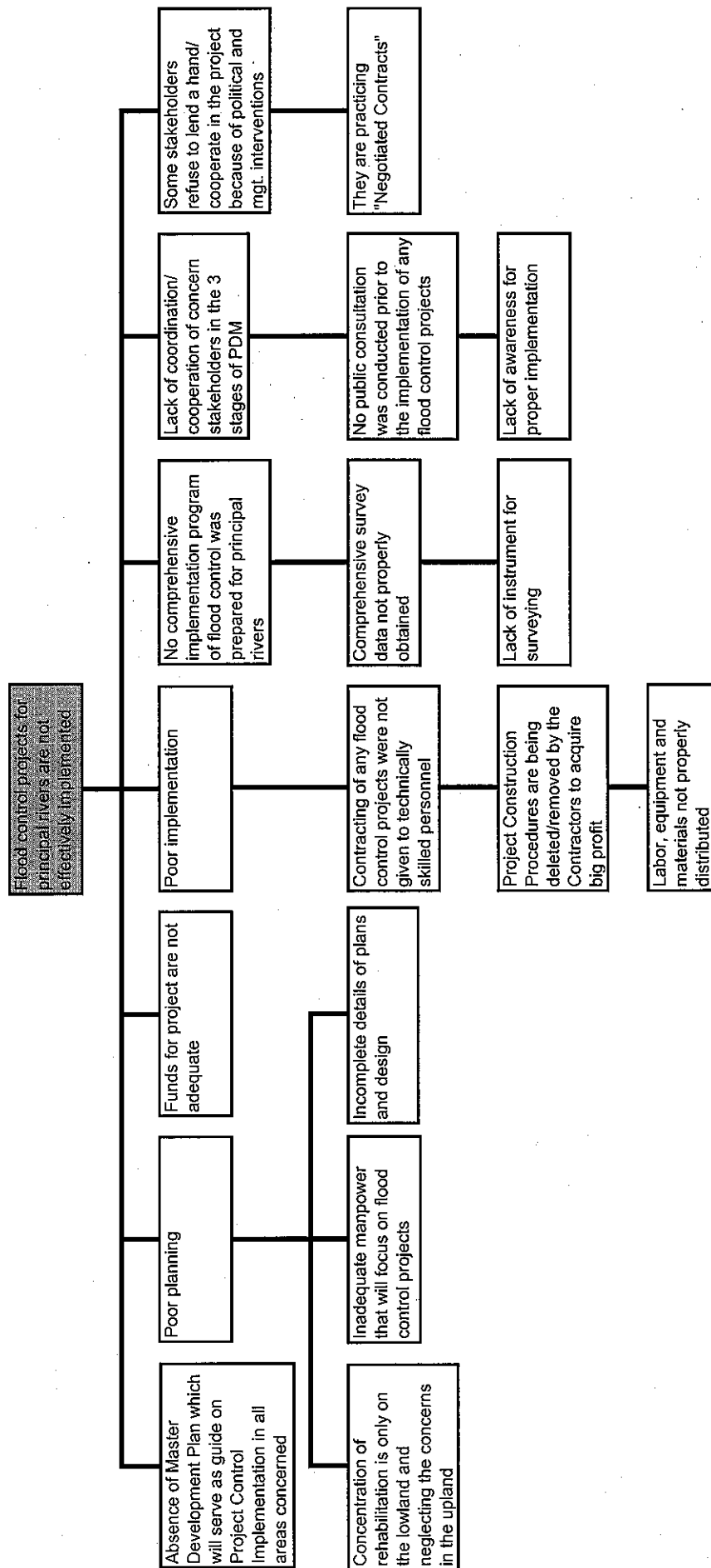


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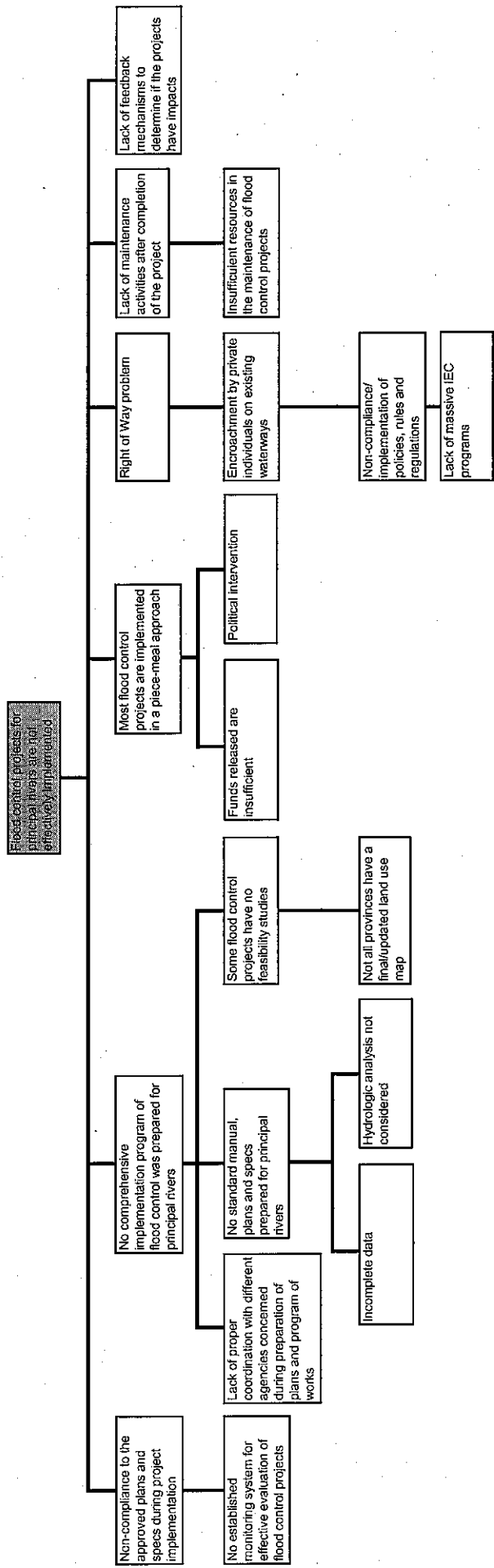
ANNEX 16 (4/10)
PROBLEM TREE - FLOOD CONTROL PROJECT IMPLEMENTATION FOR PRINCIPAL RIVERS
PCM Workshop 2 - Region III - Group A



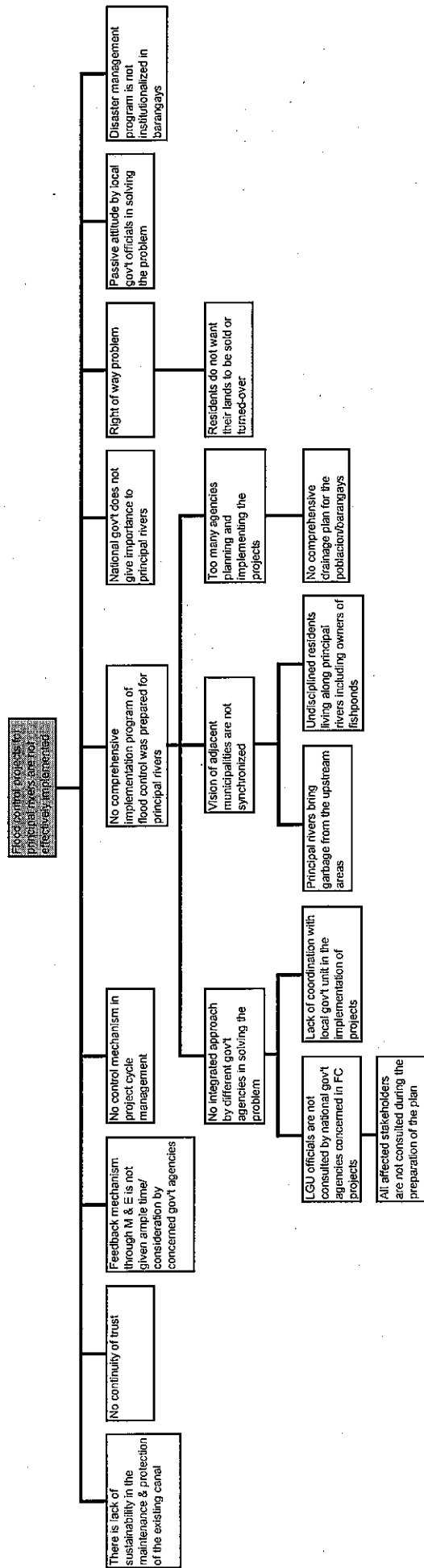
ANNEX 16 (5/10)
PROBLEM TREE - FLOOD CONTROL PROJECT IMPLEMENTATION FOR PRINCIPAL RIVERS
PCM Workshop 2 - Region III - Group B - Balanga, Bataan



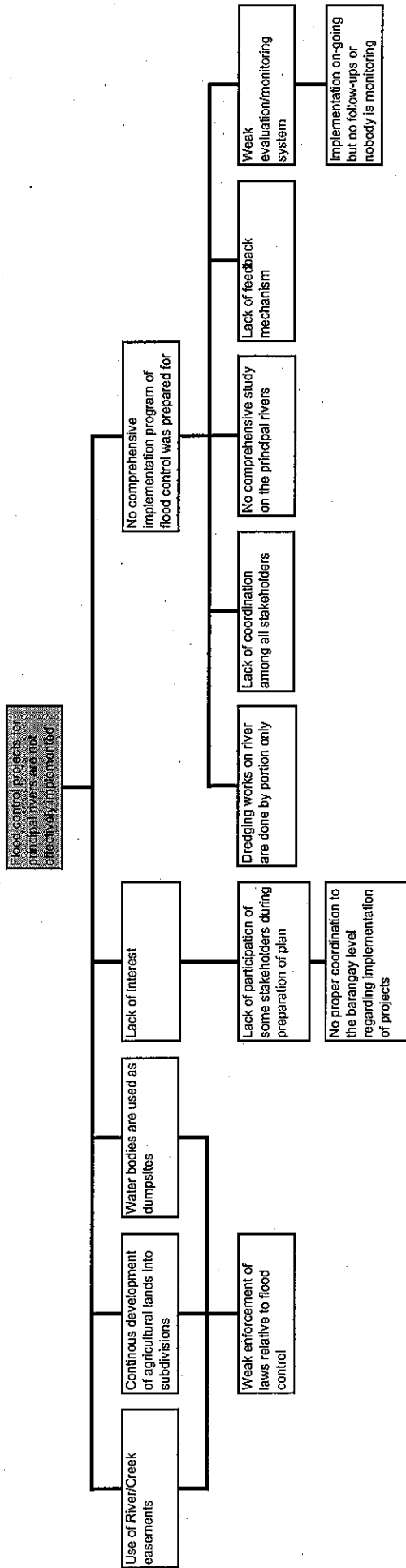
ANNEX 16 (6/10)
PROBLEM TREE - FLOOD CONTROL PROJECT IMPLEMENTATION FOR PRINCIPAL RIVERS
PCM Workshop 2 - Region IVA - Group A



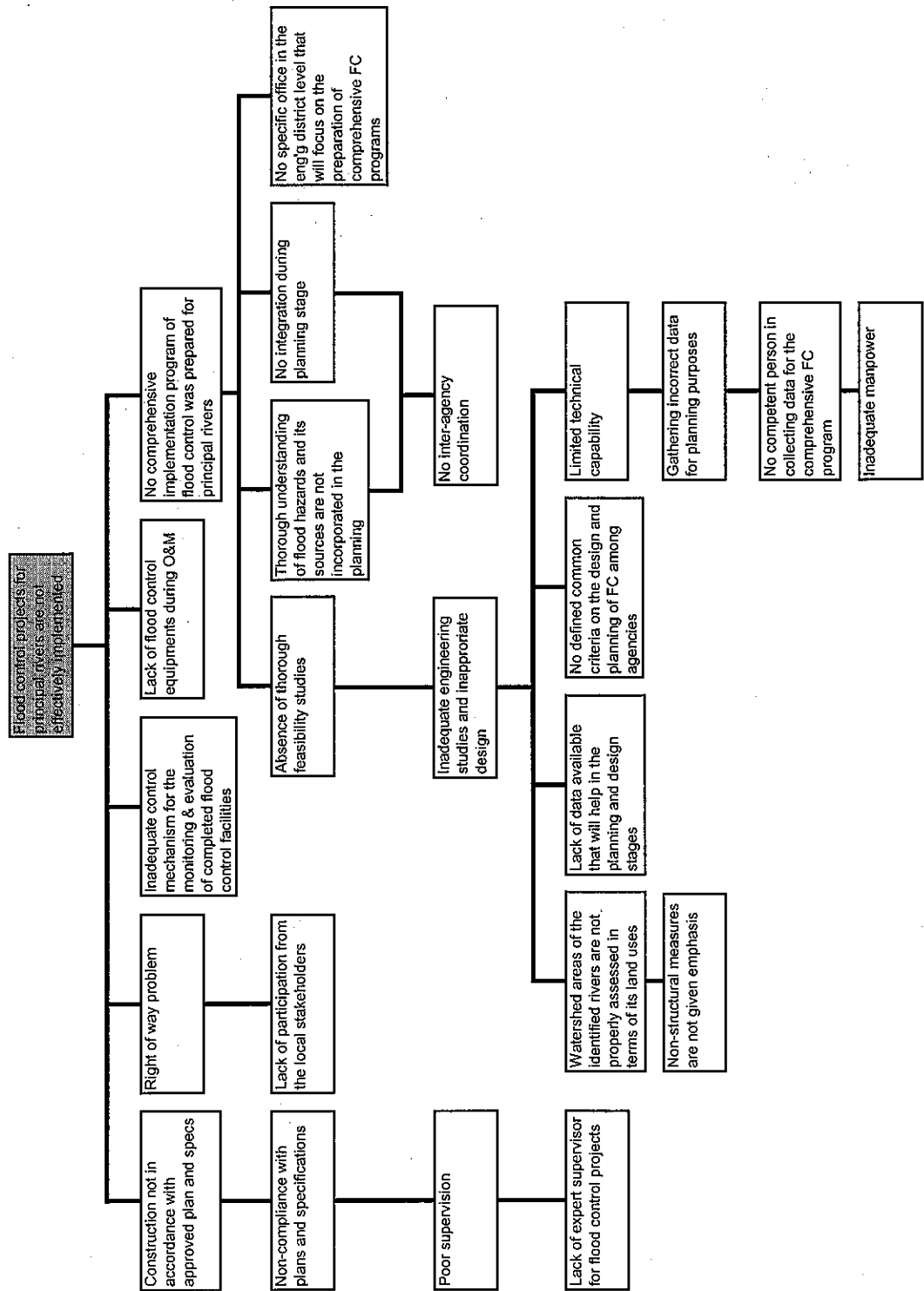
ANNEX 16 (7/10)
PROBLEM TREE - FLOOD CONTROL PROJECT IMPLEMENTATION FOR PRINCIPAL RIVERS
PCM Workshop 2 - Region IVA - Group B - Lemery, Batangas



ANNEX 16 (8/10)
PROBLEM TREE - FLOOD CONTROL PROJECT IMPLEMENTATION FOR PRINCIPAL RIVERS
PCM Workshop 2 - Region IVA - Group B - Bacoor, Cavite

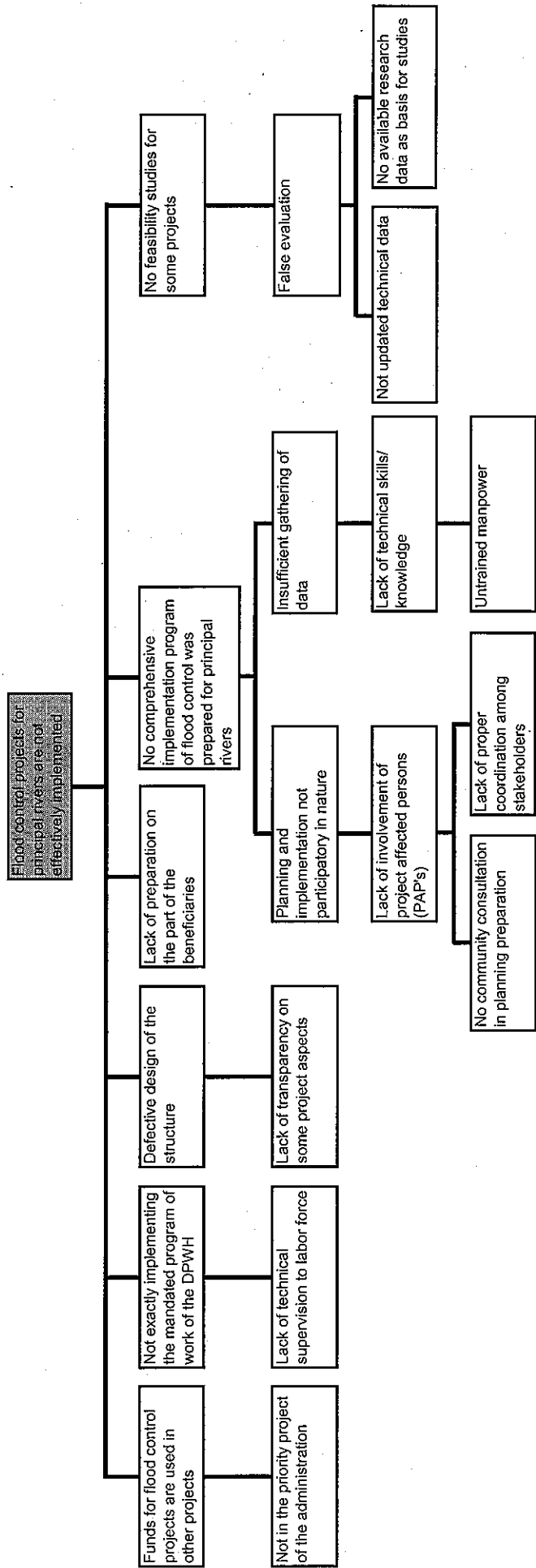


ANNEX 16 (9/10)
PROBLEM TREE - FLOOD CONTROL PROJECT IMPLEMENTATION FOR PRINCIPAL RIVERS
PCM Workshop 2 - Region V - Group A



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ANNEX 16 (10/10)
PROBLEM TREE - FLOOD CONTROL PROJECT IMPLEMENTATION FOR PRINCIPAL RIVERS
PCM Workshop 2 - Region V - Group B - Malinao, Albay



Annex 17

***Responses to Survey Questions in
PCM Workshop2***

ANNEX 17

PCM WORKSHOP 2 Region I – Group A

WHAT SHOULD BE DONE IN ORDER TO ENHANCE COORDINATION BETWEEN AGENCIES REGARDING FLOOD CONTROL PROJECT IMPLEMENTATION?

- DAR** – Coordination meetings, creation of TWG
Role: - Inputs of data (e.g. number of beneficiaries affected, number of hectares affected, etc.)
- Info drive
- NIA** – Coordination meeting quarterly
Role: Provide data to flood control personnel if NIA infrastructures are affected
- NEDA** – Conduct of M&E as secretariat of RPMC during and after project implementation
Role: Conduct of project review and evaluation at pre-investment stage
- DENR-MGB** – Creation of Inter-agency Technical Working Group
Role: Participate in gathering of data on geology
- PNP** –
Role: Provide security assistance especially at critical areas
- DPWH** – A Technical Working Group or a task force should be created by the association of regional executives as well as chief executives

WHO SHOULD BE RESPONSIBLE FOR THE O&M OF FLOOD CONTROL STRUCTURES?

- NIA** – O&M of flood control works should be turned over to Barangay Officials with proper training, funds, and technical assistance
Role: Monitor closely the project implementation
- MGB** – DPWH
Role: Assist in the monitoring of flood control project during and after typhoons/calamities
- DAR** – DPWH
Role: Info drive – “how to maintain” structures in coordination with DPWH, LGU
- RDCC** – DPWH
Role: Report to agencies concerned if there are defects in the flood control structure
- DA** –
Role: Assist in the monitoring thru the DA Regional Disaster Monitoring Team

PCM WORKSHOP 2
Region I – Group B – Bangar, La Union

WHO SHOULD BE RESPONSIBLE FOR THE O&M OF FLOOD CONTROL STRUCTURES? WHAT WOULD BE YOUR AGENCY'S ROLE IN O&M?

- LGU**
- LGUs concerned with the participation of organized associations for the purpose
 - Supervision to be done by stakeholders, Barangay Tanods and Barangay Captains
 - NGO
- Role:*
- Planning, programming and monitoring
 - As a concerned citizen - monitoring and evaluation
 - Tree planting near river bank
 - Educate people not to dump their garbage in the river

**PCM WORKSHOP 2
Region III – Group A**

WHAT SHOULD BE DONE IN ORDER TO ENHANCE COORDINATION BETWEEN AGENCIES REGARDING FLOOD CONTROL PROJECT IMPLEMENTATION?

- NEDA** – Strengthen advocacy among RLA's towards realization of central Luzon regional development plan
Role: Coordination of development plan preparation, investment programming and monitoring, and evaluation of development plan implementation
- DAR** – Dialogue/meeting with other agencies on a regular basis
Role: Fund source and project monitoring
- DA** – Coordination regarding watershed development program, water impounding projects
Role: Funding for watershed development; water impounding projects; and drainage facilities and structures
- NIA** – Strict compliance with the invitation for a coordination meeting
Role: Active participation in the discussion during coordination meeting
- PNP** –
Role: Maintain peace and order of the community (stakeholders)
- DPWH** – Creation of technical committee or board for all agencies involved in the implementation
– All involved implementing agencies should have a common planning period
Role: Planning, designing, construction and maintenance of infrastructure projects

WHO SHOULD BE RESPONSIBLE FOR THE O&M OF FLOOD CONTROL STRUCTURES?

- NEDA** – National river systems – DPWH
– Local river systems – LGUs
- DAR** – Community in the project area
Role: To train them on how to maintain properly the project prior to its completion
- DA** – LGUs
Role: Provide technical assistance if DA implemented the projects
- NIA** – Implementing agency
Role: Monitoring, supervision and maintenance
- PNP** –
Role: Ensure/safeguard the stakeholders, in fact PRO3 has created Task Force Dalampasigan "Riverine" for that matter

DPWH – DPWH

Role: Inspection and monitoring of projects; provide technical assistance to project implementers

PCM WORKSHOP 2
Region III – Group B – Balanga, Bataan

WHO SHOULD BE RESPONSIBLE FOR THE O&M OF FLOOD CONTROL STRUCTURES? WHAT WOULD BE YOUR AGENCY'S ROLE IN O&M?

- NIA** – DPWH
Role: Participate in the meetings; furnish required data
- LGU-Balanga** – LGU – General Services Office & Engineering
– DPWH
– PEO
Role: - See to it that the existing drainage system is always in working condition (Monitoring)
- Assess the existing flood control project of the city and advise the Local Executive Officer to provide additional/repair if necessary
- DPWH** – DPWH
– DPWH - Project Engineer and Project Inspector should be in-charge of the O&M of flood control projects
Role: - To implement and maintain the good condition of flood control projects
- Site inspection and monitoring
- Declogging of clogged FCD
- Restore/rehabilitate damaged embankment structure for a certain fund per priority
- DENR** – LGU
Role: Information, Education and Communication (IEC) Component
- DPWH, Maintenance Section
Role: Overall inter-agencies task force Chairman in-charge in the proper O&M activities with the members contributory to the objectives

PCM WORKSHOP 2
Region IV-A – Group A

WHAT SHOULD BE DONE IN ORDER TO ENHANCE COORDINATION BETWEEN AGENCIES REGARDING FLOOD CONTROL PROJECT IMPLEMENTATION?

- NEDA** – Organize inter-agency committee that will facilitate project implementation of a specific flood control project
Role: NEDA can assist in the convergence of different agencies/ stakeholders
- DAR** – Preparation of MOA between implementing agencies
Role: Involve on quarterly meeting
- DA** – MOA between the implementing agencies should be created
Role: Provide information for agricultural development
- MGB** – Regular meetings/conferences/workshops among the government agencies concerned
Role: Identification of flood prone areas and field mapping for hydro-geological survey
- DENR** – A multi-sectoral Task Force or Committee should be created prior to planning activities relative to flood control projects
Role: Provide data/information and integrate flood control activities of DENR in the planning process
- DPWH** – Each agency should have a focal person/group that will coordinate/meet regularly with other concerned agencies regarding their proposed flood control projects
- Form an association where concerned agencies and LGUs are members
 - Coordination meeting among all concerned agencies
 - Create a Flood Control Coordinating Council (FCCC)
 - Agencies concerned must coordinate with other line agencies in order to have a harmonious and sound result in implementation of flood control projects
 - Set a dialogue with concerned agencies regarding the proposed projects
 - Conduct regular inter-agency meetings
 - Inform and coordinate activities with other agencies
- Role:*
- To facilitate regular meetings
 - Reporting
 - Conduct seminar workshop for technical matters
 - Present the importance of the proposed flood control projects to be implemented

WHO SHOULD BE RESPONSIBLE FOR THE O & M OF FLOOD CONTROL STRUCTURES?

- NEDA** – DPWH in coordination LGUs
Role: NEDA can suggest/recommend policies/strategies on O&M
- DAR** – DAR's provincial/municipal offices

Role: Using our provincial/municipal offices, we can contribute O&M in the area

DA – Recipients with technical assistance from LGU/DPWH
Role: Organizational setting/advocacy campaign

MGB – DPWH/LGU concerned
Role: Conduct hazard assessment on the flood control project

DENR – Joint effort of DPWH and LGUs
Role: Protection and development/rehabilitation of watershed reservations

DPWH – Local Government Units
– Implementor (DPWH)
– End-Users
– LGUs and end-users
– The government must create an agency whose responsibility will focus only in flood control in order to lead all undertakings
Role: – Evaluate the existing condition of flood control structures
– Implement the flood control projects according to plans and specifications
– To prolong the lifespan of the structures
– Assist the LGUs and end-users in the maintenance
– Implement, construct, operate and maintain flood control projects
– Monitoring, reporting and getting feedbacks

PCM WORKSHOP 2
Region IV-A – Group B – Lemery, Batangas

WHO SHOULD BE RESPONSIBLE FOR THE O&M OF FLOOD CONTROL STRUCTURES?

- Brgy. Ayao-Iyao** – National government, LGUs, Implementing agencies, and all concerned and affected by floods
Role: Help the government in the implementation of projects
- Brgy. Palanas** – Barangay officials
Role: Supervise the projects
- LGU-Lemery** – Any party/agency mandated by the Law
Role: The LGU shall maintain all flood control structures within the control and supervision as mandated by the Law
- Brgy-District I** – National government, LGUs, DPWH, and barangay residents
Role: Coordinate and participate with the different agencies
- DENR** – DPWH in coordination with the barangays
Role: IEC – Environmental management; tree planting within the watershed areas; coastal/river clean-up; and seedling distribution
- PDCC** – DPWH, PEO
Role: Conduct orientation on disaster management
- OPPDC** – Task Force/Council composed of national agencies, provincial, NGOs, etc.
- Brgy. Wawa Ibaba** – Provincial and local government, DPWH, Barangay officials
- Brgy-District II** – DPWH and all government officials
Role: Maintain the cleanliness of the surroundings most especially the canals

WHAT ARE THE SPECIFIC IMPACTS OF FLOODING IN YOUR LIVING CONDITIONS?

1. Health hazard
2. Epidemic (skin diseases, diarrhea)
3. Poor market condition
4. Damages on structures and agricultural products
5. Loss of income
6. Upland barangays could not transport their goods to the markets
7. Classes were suspended
8. Contamination of water
9. Nobody goes to the market place
10. Commercial establishments were closed
11. Students cannot go to their respective schools

12. Cause of "dengue" among children
13. Fishermen not able to get fish
14. Transportation (tricycle) affected
15. Flooding lasts for 6 days

WHAT ARE THE CAUSES OF FLOODING IN YOUR AREA?

1. Improper waste disposal
2. Encroachment of residents along the waterways (Pansipit River)
3. Drainage problems
4. Siltation of Pansipit river

WHAT ARE THE FLOOD CONTROL PROJECTS THAT SHOULD BE DONE IN ORDER TO MITIGATE FLOODING IN YOUR AREA?

1. Removal of old structures under Palanas bridge
2. Embankment protection/retaining walls at affected areas
3. Establishment of slope stabilization works in the denuded upland areas of Lemery
4. Line canals at Poblacion
5. Comprehensive master drainage plan (Poblacion)

PCM WORKSHOP 2
Region IV-A – Group B – Bacoor, Cavite

WHO SHOULD BE RESPONSIBLE FOR THE O&M OF FLOOD CONTROL STRUCTURES?

- DENR** – DPWH, LGUs
Role: Provide technical assistance, rehabilitation of vegetations along rivers and watershed areas
- MPDC** – for Imus River – DPWH
– for tributaries such as drainage canals – LGUs
Role: See to it that plans and specs of the project are followed
- Mayor's Office** – DPWH
Role: Give report to the mayor regarding the status of the project
- PPDO** – Project Implementors
- PEO** – Implementing agency
Role: Proper implementation
- MEO** – DPWH, LGU, Barangay
Role: Supervision based on the plan

WHAT ARE THE SPECIFIC IMPACTS OF FLOODING IN YOUR LIVING CONDITIONS?

1. Causes traffic on the streets
2. Causes epidemic/spread of disease
3. Flooding lasts from 2 to 3 days
4. Transportation problems for employees
5. Damages to properties/livestock
6. Normal daily activities will be disrupted
7. Children can't go to school
8. Main services like electricity is also affected

WHAT ARE THE CAUSES OF FLOODING IN YOUR AREA?

1. Improper waste disposal
2. Drainage problems
3. Siltation of Imus River

WHAT ARE THE FLOOD CONTROL PROJECTS THAT SHOULD BE DONE IN ORDER TO MITIGATE FLOODING IN YOUR AREA?

1. Proper waste disposal management
2. Dredging of river
3. Rip rapping of river banks
4. Building of river dikes
5. Construction of additional drainage structures

**PCM WORKSHOP 2
Region V – Group A**

WHAT SHOULD BE DONE IN ORDER TO ENHANCE COORDINATION BETWEEN AGENCIES REGARDING FLOOD CONTROL PROJECT IMPLEMENTATION?

- DAR** – Set a regular meeting
- NIA** – Have common design criteria for flood control structures
- NEDA** – Participate if requested particularly on the evaluation of the project for IPP/RDC
– Participate in planning and monitoring of the project under the RPMES
- RDCC** – Create a task force in-charge of coordination
Role: To relay to all LGUs the importance of FCPs specifically in flood-prone barangay areas
- MGB** – There should be regular meetings of persons involved in FCPs
– There should be a permanent secretariat for the regular meetings and workshops
– There should be a permanent repository for all outputs by the members of the inter-agency committee
Role: - Provide information on flood hazards and flood hazards map
- Provide baseline geologic and geomorphologic data for principal rivers
- Identify possible non-structural measures to mitigate floods and flood effects
- DAR** – Creation of Regional Technical Working Group (RTWG) of all agencies concerned
Role: Technical assistance with regards to agricultural technology
- DPWH** – Create an inter-agency coordinating body/working committee to be participated in by the concerned agencies
– Conduct regular consultation meeting
– Monthly meeting among agencies concerned
– There should be a specific person in-charge of FCPs per agency
– MOA between DPWH and LGU
– Organization of Working Committee whose composition will be determined by NEDA
– Issuance of Executive Order defining the participation & responsibilities of each agency for every FCP
Role: - Assistance in programming, planning and design, gathering of data
- Design and supervision
- Give necessary information/data needed
- Constant meeting on specific subject shall be studied thoroughly
- Extend technical assistance and support

WHO SHOULD BE RESPONSIBLE FOR THE O&M OF FLOOD CONTROL STRUCTURES?

- NIA** – On irrigated areas and drainage area (FD) the lead agency is NIA
- MGB** – DPWH and local engineering offices
Role: Provide updated data on flood hazard maps and studies
- DAR** – DPWH and LGU
Role: Support agency on agricultural technology aspect
- RDCC** – DPWH in coordination with the LGUs concerned
Role: Provide logistical support
- DPWH** – LGU, end-users, DPWH, Maintenance section at district offices
Role: - Monitoring, give assistance to LGU, structural repairs
- Provide technical competent staff for the implementation of FCPs
- Provide technical data needed

PCM WORKSHOP 2
Region V – Group B – Malinao, Albay

WHO SHOULD BE RESPONSIBLE FOR THE O&M OF FLOOD CONTROL STRUCTURES?

- Barangay Level** – Create a committee to handle the maintenance of the flood control structures within the barangay
- barangay
 - Role:* - Supervision of all flood control structures
 - Coordination and support
- LGU** – LGU concerned thru the Engineering office
- Role:* Coordination and supervision
- DENR-CENRO** – DPWH
- Role:* Maintenance of watershed/catchment area
- PEO** – LGU (Municipal level)
- Role:* Equipment, manpower, technical and funding assistance

WHAT ARE THE SPECIFIC IMPACTS OF FLOODING IN YOUR LIVING CONDITIONS?

1. **Quinale River – Barangay Tuliw** – Ricefields and whole barangay are affected by flooding.
2. Disruption in day to day activities
3. Transportation from Albay to Camarines Sur disrupted/cut off due to inundation.
4. Floods along **Lagonog River** sweeps houses out into the sea and agricultural crops are completely damaged.
5. Floods along the **Bicol River Basin** ranges from 1.0 to 2.5 meters high and inundation lasts for as long as 1 month in the lower reaches (Cabusao, Libmanan, etc.).
6. Affect regular activities because of floods due to heavy rains at **Iriga City Proper** because of poor drainage and water from **Mount Iriga** causes flood for 1 day and even more if intermittent heavy rains doesn't stop.
7. **Quinale River – Libon** – 1,500 has affected (ricefield)
Pulangui – 1,200 has affected (ricefield)
Oas – 1,500 has affected (ricefield, road network, houses)
8. **Labo River – Camarines Norte** – 600 has of ricefield affected for almost 1 week
1,235 MCM run off – 913 sq. km. drainage area
9. In **Legaspi City**, especially in the city proper, inundation lasts for 3 days.
Problem in drainage system
10. Economic burden to constituents
11. Suspended mobility – transportation
12. **Yawa River (Daraga Section)** – Flooding hinders children from going to school; causes loss of property due to inundation; causes epidemic; no food to eat; inundate 15,000 to 20,000 sq. m. of rice/corn plantation.
13. Flooding along **Albay Hotel in Legaspi City** results in traffic congestion
14. The road from **Legaspi City** going to **1st District** is always affected by heavy run off with sediments causing travel inconvenience
15. **Virac, Catanduanes – Padurog River** causes a new route of flood in Virac.

16. **Padang River – across Legaspi – Sto. Domingo Road** – Closed to traffic of the box culvert section by volcanic materials overtopping the roadway during prolonged heavy rains. **1st Congressional District** is isolated from **2nd Congressional District** but clearing only takes an hour.
17. **Barangay Buenavista & Del Pilar of San Fernando, Camarines Sur I** – during floods, the inundation usually lasts for 3 days before subsiding
18. **Quinale River B (Ligao, Oas, Libon, Palangui, and Bato – 3rd District of Albay)** – During floods, water overflows from the earthdikes, destroying approximately 100 has of rice lands. Gravel roads are destroyed. Barangay roads are affected.
19. Displacement/Evacuation of families
20. **Makabalo River – Legaspi City** – Backwater from the sea impedes the floodwater/run off water from Metro Legaspi causing limited accessibility of the affected inhabitants, and cause of water-borne diseases.
21. **Barangay Tumpa, Camalig, Albay** – residents affected by floods due to absence of flood control structures
22. **Municipality of Oas** – The flooding is due to the unfinished “dike” at the river near the town. When heavy rains occur, the town becomes a fishpond. Flood height measures to about 1 foot and takes half-day to a day before it subsides.
23. In **Malinao**, every time heavy rains come, the river overflows affecting 6 barangays for almost 3 days with inundation of 1 meter. A portion of the National Road fronting Balza High School is not passable isolating the other barangay on the northern part going to Tiwi.
24. On **Barangay Tuliw**, the river has the tendency to move its location from time to time, affecting the farmers cultivating the nearby areas.

WHAT ARE THE FLOOD CONTROL PROJECTS THAT SHOULD BE DONE TO MITIGATE FLOODING IN YOUR AREA?

1. Re-assess previous SABO projects as to their effectiveness and implement a FCP which could contain the heavy sediments from Mount Mayon.
2. **Maoyod River** – desilting, provide a bigger drainage system
3. **Padurog River, Catanduanes** – construct a dike, re-routing of a water channel
4. Educate people not to throw their garbage in streams/rivers
5. Re-channelling of Bicol River from Albay going to Camarines Sur
6. **Yawa River** – Dredging, construction of river control like dikes or revetments, construction of lined canals on nearby residential areas
7. **Central City (Legaspi)** – construction of main drainage system, cleaning of clogged culverts and canals, construction of pumping station
8. **Basud River** – dredging
9. **Daraga River** – dredging, construction of dikes/revetment along the river
10. **Padang River** – replace the box culvert with a bridge, re-open the floodway extending some 3 km from the road. The river channel has been totally buried by volcanic materials.
11. **Makabalo River, Legaspi City** – installation of flood gate with rated capacity of pump
12. **For Quinale A** – construction of diversion channel to divert 80% of flood water from Quinale river A to Talisay River. Construction of concrete dikes and desilting of Talisay River.
13. **Malinao, Baybay-Payahan** – channel excavation, construction of bridge/box culvert, rehabilitation of drainage system, widen river bed, construction of flood protection facilities
14. Before any flood control measures should be done, adequate studies and understanding of the flood and flood source should be made.

15. **Quirangay River, Camalig, Albay** – dredging works, construction of dike, sabo dam, rehabilitation of existing sabo dam, construction of spillway, re-channeling of river course
16. **Labo River, Camarines Norte** – dredging works, continuity of existing revetment, re-channeling of river

Annex 18

Information Regarding Seminar on Flood Control in Japan

FLOOD CONTROL IN JAPAN

(MATERIAL FOR SEMINAR)

SEPTEMBER 2004

CTI ENGINEERING INTERNATIONAL CO., LTD.

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FLOOD CONTROL IN JAPAN

1. INTRODUCTION

Flood control in Japan is promoted through the integral implementation of river channel improvement, dam and sabo (sediment control) projects. River channel improvement is implemented based on the River Law, and flood control by dam is also implemented based on the River Law and other related laws. Sabo works control sediment runoff from mountain slopes and ravines. They prevent sediment disasters and control riverbed degradation. Sabo works are implemented based on the Sabo Law.

2. RIVER LAW

2.1 General

The River Law is the most principal law on flood control. Firstly enacted in 1896, it was entirely revised in 1964 with further amendments in 1997 to meet the requirements for river management.

The current river law prescribes the integrated management system of river flow, river channel and river structures to promote flood control, river water use, and river environmental conservation in a unified manner over the entire basin. Further, the law prescribes such an institutional system as any stakeholder can present his opinion on the development, conservation, and operation and maintenance plan of each river.

2.2 Designation of River

The rivers in Japan are legally classified into three (3) categories: (i) Class I river, (ii) Class II river, and (iii) small legal river, as described below.

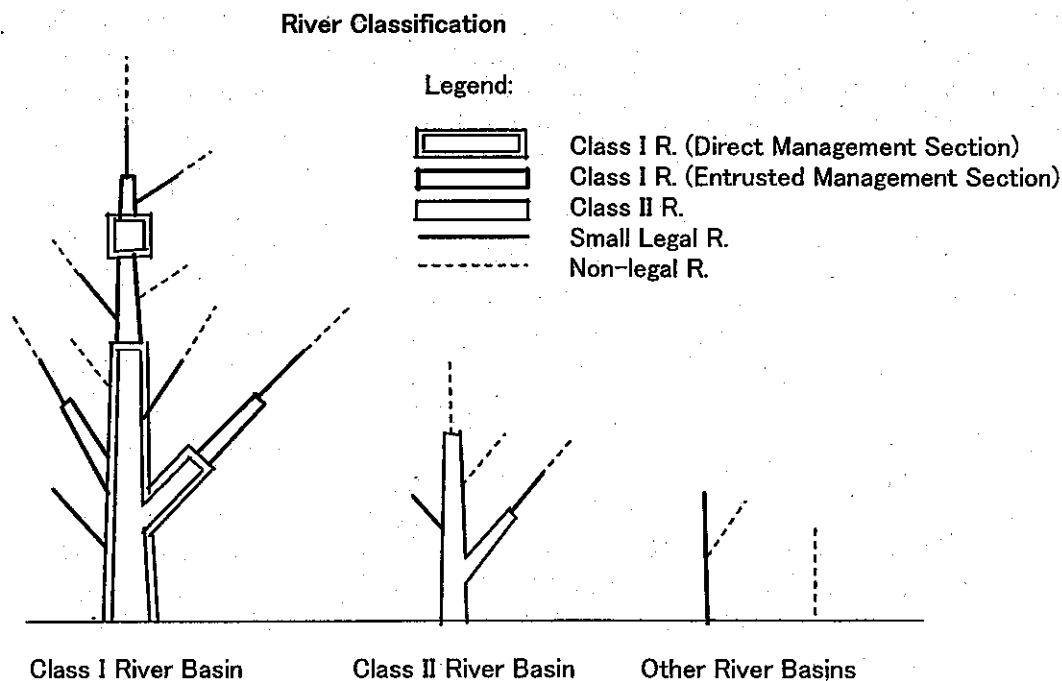
- (1) A Class I river is a river existing in a Class I river basin. Class I river basins are important to the national economy and to national land conservation, and usually drains the land of more than two (2) prefectures. The Minister of the Ministry of Land, Infrastructure and Transport (MLIT) designates Class I river basins through government ordinances. However, not all the existing river channels in a Class I river basin are defined as Class I rivers. Small tributaries are defined as small legal rivers; in some cases they are not defined as legal rivers. The Minister of MLIT designates the channel sections that can be classified as Class I rivers.

There are presently 109 Class I river basins in the whole country. The number of Class I river basins are tabulated below.

Class I River Basin Condition	No.
(1) Covers more than two (2) prefectures	44
(2) Within one (1) prefecture, but drains more than 1,000 km ²	38
(3) Within one (1) prefecture, drainage area is not large, but important from the national viewpoint	27
Total	109

- (2) A Class II river is a river existing in a Class II river basin. There are currently 2,722 Class II river basins in the whole country but not all the existing channels in these river basins are defined as Class II rivers as in the case of Class I rivers. The governor of the concerned prefecture designates Class II river basins and the channel sections that can be classified as a Class II river.
- (3) A small legal river is a legally designated small river that does not fall under either Class I or Class II. It exists in all the river basins including Class I, Class II and other minor ones. The mayor of the concerned municipality designates the sections that can be classified as a small legal river.

Public channels other than those classified as Class I, Class II and small legal rivers are called non-legal rivers. Like private channels, they are not controlled by the River Law.



The total land area of Japan is 377,900 km² of which 92% is drained by Class I and Class II rivers.

2.3 River Administrator

- (1) The Minister of MLIT administers Class I rivers. However, the minister can entrust the management of a part of a Class I river (the section designated

by the Minister of MLIT) to the governor of the concerned prefecture, except important management matters. The river section directly managed by the minister is called "direct management section", while the river section of which management is partly entrusted to the governor is called "entrusted management section".

Usually, the direct management section covers the lower and middle reaches of the main river course, the lower reaches of important tributaries and the dam/reservoir area.

Typical locations of the direct management section and the entrusted management section in a Class I river are shown in the figure in Section 2.2.

- (2) The governor of the concerned prefecture administers the Class II rivers.
- (3) The mayor of the concerned municipality administers the small legal rivers.

2.4 River Area and River-Related Facilities

The river administrator designates river areas (including river channel, retarding basin and reservoir), and manages the land, river water, river environment and river-related facilities within the river areas.

The river-related facilities include the following three (3) kinds of facilities:

- (1) River management facilities are the facilities necessary for (i) flood control, (ii) river environmental conservation, and (iii) maintenance of required minimum flow (RMF)*. The facilities include dam, weir, control gate, dyke, revetment, groin, ground-sill, drainage facilities, etc. These are constructed, operated and maintained by the river administrator.
- (2) Joint use facilities are the multipurpose facilities for river management and off-stream water use including dam, weir, control gate, etc. These are constructed, operated and maintained usually by the river administrator with an agreement between the river administrator and the water users. The construction and O/M costs are shared by the river administrator and the water users.
- (3) Permitted facilities include water use dam/intake, bridge and other river use structures. These are constructed, operated and maintained by the respective water users, the road administrator and other structure owners, with permission of the river administrator.

* Maintenance of RMF: The river administrator shall maintain the required minimum flow for the existing permitted off-stream uses (drinking, industrial, irrigation and hydropower uses) and conservation of river environment (water quality, ecology, salinity control, scenic view, navigation, etc.) at the principal stations of each river.

2.5 River Management Works

The river administrator conducts the following management works:

- (1) Preparation and custody of river ledger (river area, river facilities) and water use register (water right);
- (2) Operation and maintenance of river channels, river management facilities and joint use facilities,
- (3) Implementation of river works (works for flood control, river environmental conservation and maintenance of RMF);
- (4) Control of river water use (permission for water use and water use dam/intake construction);
- (5) Control of river channel use (permission for bridge construction and other river space uses);
- (6) Control of sand and gravel gathering from riverbed; and
- (7) Hydrological/water quality observation, longitudinal/cross-sectional survey of river course, flood forecasting/warning, water use monitoring, water use coordination in drought time, etc.

2.6 Preparation of Master Plan

The river administrator shall prepare the master plan for the management of each river based on the River Law. The master plan is usually prepared with the target of 20-30 years. The river administrator shall consult with the concerned governmental organizations and hear opinions of concerned people, communities, NGOs and experts when he prepares the master plan.

The river administrator directly implements the river works stipulated in the River Law. The river works include construction and O/M works necessary for flood control, conservation of river environments and maintenance of RMF. The river works also include joint-use facilities such as multipurpose dams and weirs. All the river works are implemented according to the master plan. The river administrator issues a permit for the construction of a water use dam/intake proposed by the water user and a bridge proposed by the road administrator after checking each proposal against the master plan.

2.7 Implementation of Flood Control Works

Flood control works include river channel improvement, flood control by dam (including multipurpose dam), flood retarding basin, drainage, high tide prevention, etc. Implementation of the works is assigned to the central and local governments as follows based on the River Law.

Class I river (direct management section): MLIT directly implements the works. Part of the cost is borne by the benefited prefectures. The cost-sharing ratio varies depending on the scale and content of the works.

Class I river (entrusted management section): The concerned prefecture implements the works with the financial assistance of the central government (MLIT). Subsidy rate of the cost varies depending on the scale and content of the works.

Class II river: The concerned prefecture implements the works with the financial assistance of MLIT. Subsidy rate of the cost varies depending on the scale and content of the works.

Small legal river: The concerned municipality implements the works with the financial assistance of MLIT. Subsidy rate of the cost varies depending on the scale and content of the works.

Note: The prefecture can appropriate a large portion of the allocated cost by issuing a local government bond with permission of the concerned ministry. The permissible appropriation rate by bond yearly varies depending on the national financial situation.

3. FLOOD CONTROL IN JAPAN

3.1 Necessity of Flood Control

Approximately 70% of the national land is mountain or steep slope, while 30% is habitable. One-third of the habitable land is flood plain with a total area of 38,000 km². Large floods are mainly caused by typhoon, which directly attacks the country more than three (3) times a year on average. Typhoons concentrate during June to September.

Paddy, the main agricultural product in Japan, is cultivated in the flood plains. The flood plains had been almost completely developed for paddy cultivation before 1896 when the River Law was firstly enacted. On the other hand, paddy is cultivated during the typhoon season (June-September) once a year. Hence, flood control is essentially necessary for successful paddy cultivation.

Population has concentrated on the flood plains since olden days. Currently, 50% of the national population inhabits the flood plains, accumulating more than 70% of the national asset. The average population density of flood plains exceeds 1,500 persons/km².

Flood allowable land is very limited so that flood control works have to be implemented for the entire river reaches.

3.2 History of Flood Control

- (1) Large-scale flood control started after 1896 when the River Law was firstly enacted. Until the end of World War II (1945), flood control was implemented mainly for the major rivers. The flood control of major rivers was directly implemented by the central government, while flood control for the middle/small rivers was implemented by prefectures with financial assistance of the central government. However, progress of the flood control works was unsatisfactory due to the financial constraint.
- (2) Japan made a rapid economic development after 1955-1960 when the social/economic confusion due to the war ceased. The flood control was on a very low level at the time of 1955-1960 and its urgent development was awaited. The government enacted a special law to promote flood control works over the whole country in 1960. The government has to prepare

5-year flood control plan based on this special law. The 5-year plan contains the target implementation and required investment for flood control during the succeeding 5 years as decided by the cabinet. The 5-year plan includes river channel improvement, dam construction and sabo works.

- (3) The government implemented the 5-year plans serially eight (8) times during the 36 years from 1960 to 1996. Flood control in the country made the highest progress during this period.

According to the River Law, flood control of the medium and small rivers is under the responsibility of local governments (prefecture and municipality). However, the projects of medium and small rivers were promoted under the leadership of the central government due to the lack of financial and technical capacities of the local governments during this period. The projects were mostly implemented with subsidy of the central government.

The implementation system under the central government initiative produced the following fruitful results:

- (a) It established the priority order of projects in the country and advanced a cost-effective implementation through reasonable financial allocation for the projects.
- (b) It strengthened the administrative capacity of local governments on project implementation through various recommendations and guidance of the central government.
- (c) It strengthened the technical capacity of local governments on project implementation by providing various kinds of technical standards on flood control measures.

As a result, flood control in Japan has reached a high level. Initiative on project implementation for medium and small rivers is being transferred from the central government to local governments since the local governments have improved their financial and technical capabilities.

- (4) These days, conservation of river environment has become more important. The government partly amended the River Law in 1997 to promote the conservation of river environments. Improvement/conservation projects on river environment have been given priority. Flood control works well-coordinated with the river environment have been required.

3.3 Products of Flood Control

The historical change of flood control investment and flood damage during 1950 to 1999 are shown in the following table. In the table, the investment and flood damage are presented in terms of average yearly amount during each 10-year period.

The flood control investment totals all the costs covering construction, rehabilitation and O/M ones for river channel improvement, dam and sabo works. The investment cost includes not only expenses of the central government but also those of local governments.

The flood damage includes direct damage, but excludes indirect damage.

10-Year Period	(Cost: at present price)				
	1950-59	1960-69	1970-79	1980-89	1990-99
(1) Ave. Yearly GDP (billion US\$)	328	818	1,810	2,607	3,428
(2) Ave. Yearly Investment (million US\$)	2,411	6,162	13,991	2,0803	29,425
(3) Investment Ratio (%): (2)/(1)	0.73	0.75	0.77	0.80	0.86
(4) Ave. Yearly Flood Damage					
(i) Ave. Yearly Damaged Area (ha)	-	211,517	151,998	86,841	40,112
(ii) Ave. Yearly Human Damage (No.)	9,931 (1,700)	1,813 (362)	739 (197)	464 (130)	525 (67)
(iii) Ave. Yearly House Damage (No.)	937,502 (16,533)	256,754 (1,696)	246,226 (1,470)	124,488 (552)	74,239 (916)
(5) Ave. Yearly Flood Damage (million US\$)	11,515	5,225	7,005	7,208	6,223
(6) Damage Ratio (%): (5)/(1)	3.5	0.64	0.39	0.28	0.18

Note:

- (1) **Ave. Yearly Human Damage:** Figures not enclosed in parenthesis indicate dead/missing/injured persons, while those enclosed in parentheses indicate only dead/missing persons.
- (2) **Ave. Yearly House Damage:** Figures not enclosed in parenthesis indicate flooded houses, while those enclosed in parentheses indicate only completely damaged houses.
- (3) Currency Exchange Rate: 1 US\$ = 110 Japanese ¥

The government invested 0.8% of GDP for flood control over 50 years (1950-1999) every year after the war with the cooperation of prefectures and municipalities. It produced the following fruitful results:

- (1) Human and house damages have much decreased although the national population increased from 89 million in the 1950's to 126 million in the 1990's. Average yearly dead/missing people decreased from 1,700 persons in the 1950's to 70 persons in the 1990's. Average yearly completely damaged houses decreased from 17,000 houses in the 1950's to 900 houses in the 1990's.
- (2) GDP increased more than 10 times between the 1950's and 1990's. Flood damage potential is generally considered to increase in proportion to the growth of GDP. However, ratio of average yearly flood damage to GDP decreased from 3.5% in the 1950's to 0.18% in the 1990's.

4. DISCUSSIONS

4.1 Why should flood be controlled in a unified manner for the entire basin?

- (1) Disorderly construction of dykes and opening of a narrow portion in the upstream may increase flood peak in the downstream. Large cities are

usually located on the riverbanks of the middle/lower reaches. Increase of flood peak may cause severe adverse effects on these cities.

- (2) Usually, it takes a long time to complete the flood control of a river. Flood control works should be implemented in stages according to the master plan. Implementation schedule of the works should be determined in due consideration of the above-mentioned hydraulic effects.
- (3) In Japan, many conflicts have occurred between the upstream and downstream reaches or between right and left banks concerning flood control measures and their priority sequence since olden days.
- (4) Accordingly, flood control should be planned and implemented in a unified manner for the entire basin. For this purpose, the river administrator (Class I river: Minister of MLIT; Class II river: Concerned Governor) plans and implements flood control in a unified manner.

4.2 Why is permission of the river administrator required to construct water intakes and bridges?

- (1) Construction of water intakes and bridges may create weak points in river against floods. Hence, they should be designed not only to keep a sufficient structural safety against floods but also to have a sufficient flood flow capacity. Japan often suffered from dyke breaches and overflows at water intake and bridge sites in the past.
- (2) For this purpose, the River Law prescribes that the water user or the road administrator shall obtain permission of the river administrator when he constructs a water intake or a bridge.
- (3) However, the request of excessive safety may make the construction of water intake or bridge difficult. The government have established the technical standards of river related structures in a government ordinance. The river administrator examines the proposed design of structures based on the ordinance.
- (4) Further, disorderly sand/gravel gathering may cause damages on the river related structures (dyke, revetment, water intake, bridge, etc.). Permission of the river administrator is necessary to collect sand/gravel according to the River Law.

4.3 What problems are there in the construction of retarding basin?

People request construction of dykes along the entire river course since the flood plain is highly developed. However, dyke construction in the upstream may increase flood peak in the downstream. Sometimes, the flood peak needs to be regulated by constructing a retarding basin in a low-lying land of the basin. In this case, the river administrator will encounter some difficulties, as follows:

- (1) One idea is to maintain the natural flood regulation effects by leaving the objective low-lying area as it is. If this idea is pursued, however, no flood control will be proposed for this area even in the future. Usually, this idea is

strongly protested by the concerned people from the viewpoint of regional inequity. The people say that they will be victims of the downstream.

- (2) Usually, the river administrator legally designates the objective area as river area to intentionally regulate flood peak. A retarding basin is planned to regulate only large floods that may affect the downstream. Middle/small floods are not introduced into the retarding basin. This plan can decrease flood frequency of the objective area and can keep equity among the basin people to some extent.
- (3) Construction of buildings is restricted within the retarding basin according to the River Law. Such a restriction produces some disadvantages on the landowner. Proper compensation is necessary for the disadvantages. However, it is difficult to theoretically estimate the proper compensation.
- (4) The retarding basin is generally used for paddy. The river administrator usually obtains the land-use right for flood retarding from the landowner since land acquisition of a large paddy field is economically unreasonable. The land-use right is legally registered. The river administrator pays a certain percentage* of the present land value.

* According to the projects in the past, the above percentage is 20-30%.

4.4 What is comprehensive flood control in metropolitan area?

(1) Comprehensive Flood Control Measures

In line with the high economic development of the country, the population has concentrated on such metropolitan areas as Tokyo, Osaka and Nagoya with a rapid housing development. As a result, flood peak of the middle/small rivers in the metropolitan areas has largely increased, causing frequent flooding in their downstream reaches.

The river administrator has promoted the construction of multipurpose retarding basin (including purposes of park, athletic field, etc.), small retention pond, rainwater infiltration facilities and others in cooperation with related governmental organizations, public corporations and communities. Further, the local government assigns a duty on housing developers to control the flood increase arising from their developments.

(2) Flood Control by Housing Developer

According to the Urban Planning Law, a developer who implements a large housing development shall provide necessary public facilities (road, park, water supply/sewerage, river, education/social welfare facilities, etc.), conforming to the proper development standards. The standards shall be prepared by each local government. The proposed housing development will be permitted by the local government based on the standards.

The developer of a large housing project shall implement the following flood control based on the above-mentioned regulation:

- (a) The developer will construct a flood retention pond within the area for development at his own expense, or
- (b) When the river administrator has a river channel improvement plan, the developer will bear part of the river channel improvement cost.

MLIT has prepared the design standard of retention pond so that the local government can proceed with administrative procedures properly.

4.5 How are non-structural measures applied?

Generally, the major non-structural flood control measures include: (i) reforestation, (ii) land use regulation of flood plain, and (iii) flood forecasting/warning.

In Japan, flood control has mainly been developed by such structural measures as dyke, flood diversion, dam, etc. Non-structural measures have been little applied. They are currently implemented as follows:

(1) Reforestation

Forests produce significant beneficial effects for ecological conservation and soil erosion/sediment runoff control. However, their flood control effect is not clear, especially at a large flood time. No reliable quantitative evaluation method has been established yet, concerning the flood control effect of forests. Development of the quantitative evaluation method is indispensable to incorporate the flood control effect of forests into the flood control plan of rivers.

In Japan, forest areas have little varied for a long time except in some special basins. Nowadays, conservation of the existing forests is more important than extension of the forest areas.

The existing flood control plans already include the flood control effects of forests, more or less, since river flood runoffs are simulated under the existing forest conditions.

(2) Land Use Regulation of Flood Plain

As mentioned before, population has concentrated on the flood plain since olden days. Currently, 50% of the national population inhabits the flood plains, accumulating more than 70% of the national asset. Average population density of the flood plain exceeds 1,500 persons/km². Hence, flood allowable land is very limited.

According to the Building Standard Act, the local government can designate an area vulnerable to severe flood and sediment disasters as "disaster risk area" and can restrict building (prohibit building, restrict structural design) within the risk area.

However, people usually protest against the designation of a flood risk area in the flood plain. The major reasons are as listed below.

- (a) Construction of new buildings is prohibited. Even when it is permitted, people must spend additional costs to meet the regulation.
- (b) Value of the land and assets will lower.
- (c) People expect the area to be protected by structural measures as soon as possible. The designation of a flood risk area will delay the realization of structural measures.

Currently, 24 flood risk areas are designated in the whole country but they are mostly small in scale.

On the other hand, many locations are designated as risk areas of sediment disaster (slope collapse, landslide, mud/sediment flow), reaching 15,500 locations in the whole country. The government is promoting resettlement of people from such risk areas. For this purpose, the government extends financial assistance to the people affected by resettlement. The government bears:

- (a) Cost to remove the existing house; and
- (b) Interest of the loan for construction or purchase of new house.

(3) Flood Forecasting and Warning

The river administrator shall conduct the following flood forecasting/warning in cooperation with the Head of the Meteorological Agency (MA) based on the Flood Fighting Law. The Head of MA shall forecast rainfall, while the river administrator shall forecast flood water level/discharge. They shall immediately report the forecasted results to the concerned mayors to assist people in their flood fighting/evacuation activities.

Effective flood forecasting/warning has become possible for Class I rivers due to the following reasons:

- (a) Drainage area is large enough to secure necessary lead-time for flood forecasting;
- (b) Hydrological observation networks have been developed to a high level, accumulating a large quantity of hydrological data. As a result, flood runoff simulation with a high accuracy has become possible; and
- (c) Currently, real-time water level is accessible through the Internet.

However, flood forecasting/warning is still unsatisfactory for the Class II rivers.

4.6 How to reserve future river area?

- (1) When the river administrator intends to construct such large projects as diversion channel, dam, retarding basin, etc., he can designate the project area as future river area based on the River Law to conduct a smooth implementation of the projects. Construction of buildings is restricted within the designated future river area.
- (2) The river administrator is sometimes requested by landowners in the future river area to purchase their lands before the start of the project. However, it is difficult to purchase the land in advance due to the existing budgetary system of the government.
- (3) On the other hand, it is essentially necessary to reserve land for the construction of public facilities (road, park, river, etc.) to promote orderly urban development. Local government can establish a land development public corporation and entrust the corporation with the authority to purchase necessary land in advance based on a special law. The corporation usually raise funds for the land acquisition by bank loan. The local government will repurchase the land from the corporation at the start of the project.
- (4) The above land acquisition system can be applied for flood control projects in urban areas.

4.7 How many engineers are necessary for the implementation of river channel improvement?

(1) Introduction

The MLIT has nine (9) regional bureaus under it. Each regional bureau carries out the administrative affairs concerning river, highway, harbour/airport, urban planning, governmental building and construction industry.

The river administrative affairs include survey, planning, construction and O/M of river channel improvement, river environmental conservation, dam (mostly, multipurpose dam) and sabo. Further, they include water right management.

Among the nine (9) regional bureaus, the Kyushu Regional Bureau is considered to be the typical one. In this report, the manpower consisting of engineers engaged in river channel improvement and O/M works (excluding construction and O/M of dam and sabo) is presented.

(2) Existing Engineer's Manpower for River Channel Improvement and O/M Works

In the Kyushu Regional Bureau, the River Department acts as its headquarters and 13 branch offices carry out the river channel improvement and O/M works of 19 Class I rivers. Among the 13 branch offices, five (5) offices are in charge of only river administrative affairs, while eight (8) offices are in charge of both river and highway administrative affairs. The

19 Class I rivers cover a total drainage area of 18,862 km² with a total direct management river section of 1,158 km.

The offices carry out the survey and design of river channel improvement and O/M works by employing engineering consultants to the maximum extent. However, the government engineers/officials directly conduct most of the land acquisition, contract and construction management works.

The following table shows the number of engineers currently engaged in the river channel improvement and O/M works, and the yearly budget.

Improvement Works		O/M works		19 Objective River	
Manpower	Yearly Budget (Million \$)	Manpower	Yearly Budget (Million \$)	C.A. (km ²)	L (Km)
Approx. 250	320	90 - 100	114	18,862	1,158

Currency Exchange Rate: 1 US\$ = 110 Japanese ¥

The average responsible work quantity of one (1) engineer is estimated at 1.3 million US\$/year in the improvement sector, while it is 1.2 million US\$/year in the O/M sector.

(3) Manpower Ratio of Officials to Engineers

A certain number of officials (engaged in general affairs, accounting, land acquisition, etc.) are necessary to implement the above river channel improvement and O/M works. The existing manpower ratio of officials to engineers is estimated to be 30-40%.