

Republic of the Philippines **REGIONAL DEVELOPMENT COUNCIL II** Regional Government Center, Carig Sur, Tuguegarao City



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Republic of the Philippines REGIONAL DEVELOPMENT COUNCIL, REGION 02 NEDA REGION II OFFICE, Tuguegarao City Tel. Nos. 844-1336; Fax No. 844-1243

RDC2 Resolution No. 02-045 Series of 2006

RDC Resolution for the President

"ENDORSING TO HER EXCELLENCY PRESIDENT GLORIA MACAPAGAL ARROYO THE CAGAYAN VALLEY FLOOD MITIGATION MASTER PLAN FOR CONSIDERATION AND FUNDING SUPPORT"

- WHEREAS, Cagayan Valley Region is the new millennium rice and corn granary of the country, besting Central Luzon and Mindanao in CY 2004
- **WHEREAS.** The region is haven to the Cagayan River adjudged as the country's longest river and its basin as one of the most significant bio-diversity areas;
- **WHEREAS** the region is frequently threatened by floods resulting to heavy damages on agriculture, infrastructure, properties including loss of lives;
- WHEREAS, the RDC02 in recognition of these threats formulated the Cagayan Valley Flood Mitigation Plan with the objective of mitigating the magnitude of flood occurrences in the region and minimizing its destructive effects to the communities;
- WHEREAS, the Region 02 Flood Mitigation Master Plan will also ensure a more rationale and responsive management of the Cagayan River, the country's largest river, including the Cagayan River Basin for purposes of sustainable economic development;
- **WHEREAS**, the support of the national leadership and all sectors of society would ensure the successful implementation of the Plan and the realization of its objectives;
- NOW THEREFORE, the Regional Development Council 02 in session assembled UNANIMOUSLY RESOLVES, as it is hereby RESOLVED, to endorse to Her Excellency President Gloria Macapagal Arroyo the Cagayan Valley Flood Mitigation Master Plan for her consideration and funding support.
- **RESOLVED FURTHER,** that copies of this resolution be forwarded to the Secretary of the Department of Public Works and Highways, Honorable Hermogenes Ebdane for information, support and favorable action.

APPROVED UNANIMOUSLY this 13th day of February 2006 at Tuguegarao City.

CERTIFIED CORRECT:

MARYANNE E.R. DARAUAY RDC02 Secretary

APPROVED:

BISHOP RAMON B. VILLENA RDC-2 Co-Chairman HON. VICENTE S. GATO RDC 02 Chairman



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CAGAYAN VALLEY FLOOD MITIGATION MASTER PLAN CY 2006 – 2030

I. BACKGROUND/INTRODUCTION

Cagayan Valley rests on an expansive physical resource called the Cagayan River Basin with an area of 27,676 square kilometers. This basin makes Cagayan Valley one of the most significant bio-diversity areas in the country. Herein also lies the Cagayan River, the longest river in the country measuring 500 kilometers long.

The flood inundation problem has been a main constraint in the promotion of socio-economic development and improvement of the living condition of people in Region 02. On the other hand, the Cagayan River Basin offers significant potentials in promoting regional development. Specifically, Cagayan River is the largest river in the Philippines with an aggregate basin area of 27,281 km2. With such a considerable resource, a rationale water resource development geared towards the mitigation of the effects of occurrences alongside agricultural development, environmental management and infrastructure support would enable the region to enhance its present development state.

It is in the above context that the President called for the need to have a collaborative and a holistic approach in dealing with the recent flooding occurrences. Thus, the Cagayan Valley Flood Mitigation Master Plan was formulated, with inputs coming the local governments, regional government agencies and the private sector. Past studies made on the Cagayan River Basin, particularly the 1987 Cagayan River Basin Flood Control Master Plan, the 2001 Feasibility Study on the Lower Cagayan River Flood Control and other sectoral plan documents also provided the basic technical framework in the crafting of the plan.

II. THE CAGAYAN RIVER BASIN

A. Geographical Location

The Cagayan River basin is located in the northeastern part of the Luzon Island. The basin lies between 15°52′ and 18°25′ north latitude and between 120°51′ and 122°18′ east longitude. It is bounded in its east, west and south by the Sierra Madre, Cordillera Central and Caraballo-Maparang mountain ranges, respectively. The basin faces the Babuyan Channel in the north.



B. Land Area and Population

The basin has a total land area of 27,281 km² extending over Region 02, CAR and a small part of Region 04. Region 02 represents about seventy percent (70%) or 18,846 km2 of the total basin area of approximately 27,281 km² (Table 1). In terms of population, Region 02 shares approximately 80% of the total basin population as of Censal Year 2000. Thus, the current state of development in the Cagayan River Basin has significant implications to the social and economic growth of Region 02.

		Cagayan R	% Share to	
Region	Province	Land Area	Numberof	basin land
		(km ²)	Municipalities	area
Region 2	Cagayan	4,251	18	15.58
	Isabela	8,237	37	30.19
	Nueva Vizcaya	3,301	15	12.10
	Quirino	3,057	6	11.21
Sub-Total				69.08
CAR	Apayao	598	6	2.19
	lfugao	2,518	11	9.23
	Kalinga	3,078	8	11.28
	Mt. Province	1,844	8	6.76
Sub-Total				29.46
Region 4	Aurora	398	4	1.46
-				1.46
Total		27,282	113	100.00

Table 1. Cagayan River Basin Land Area and Allocation by Region

C. Topography and Geology

The basin area is mostly hilly to mountainous land. According to the topographic data, land with a slope of less than 8% is around 6,600 km², which has been rather well developed as agricultural land. Hilly land with slopes between 8% and 18% covers about 3,400 km². Substantial parts of the hilly land are left to be grassland. The remaining 17,300 km² are mountainous.

D. The Cagayan River and its Major Tributaries

The Cagayan River is the main drainage channel of the basin. It flows a northerly direction from its head waters in Nueva Vizcaya to its mouth in the Babuyan Channel near Aparri. The total basin area and river length of the Cagayan Rive is 27,300 sq.km and 520 km, respectively. Its principal tributaries include the Siffu-Malling, Chico, Ilagan and Magat Rivers (Figure 1). With its large basin area, the Cagayan River offers significant potentials for agriculture, fishery, power generation and transportation. However, the river's discharge capacity of 2,000 cubic meters per second in the downstream (from Tuguegarao to the estuary) which is less than the 2-year probable flood estimate of 6,400 cubic meters per second, has caused frequent flood occurrences in the past.

E. Land Classification

Of the Cagayan River Basin, areas with land slope over 18% covers more than 60% of the basin area. This includes grasslands, brushlands and forests. On the other hand, the flood prone areas located within the inundation areas of the Cagayan River and its tributaries are located in the provinces of Cagayan, Isabela, N. Vizcaya and Quirino and most of these are devoted to agricultural production.

F. Meteorology

The climate in the Cagayan River consists of monsoons, i.e. the southwest monsoon and northeast monsoon. Typhoons normally strike during July to

December for an average of about 8 times a year. The basin is also affected by El Nino almost every three years. The basis average annual rainfall is 2,600 mm. It varies from less than 2,000 mm in the lowland to more than 4,000 mm in the mountainous area. Average annual runoff is estimated to be 1,343m3/s at the mouth of the Cagayan River.

III. IMPACT OF FLOOD OCCURENCES AND ITS CAUSES

A. ECONOMIC IMPACT

a.1 Damages caused by floods

The disaster damage report forwarded by the Office of Civil Defense (OCD) Region 2, which is the secretariat of the Regional Disaster Coordinating Council (RDCC), provides the following recent data on the damages and the total number of affected barangays and persons in the region. From 2004 to 2006, total damages reached 4.57 billion Pesos of which about 90% is accounted by damages to agriculture. Moreover, the reported values on agricultural and infrastructure damage show only the damages to properties and products and do not include opportunity losses such as losses in production and business activities during flooding period.

Province	Typhoons Marce (August 2004), Violeta (Nov. 2004) and Yoyong (Dec. 2004)		Heavy Monsoon Ra	ins (December 2005)	Heavy Monsoon Rains (January 2006)		
	Agriculture	Infrastructure	Agriculture	Infrastructure	Agriculture	Infrastructure	
Cagayan	270,841,257	13,300,000	296,854,731	285,992	353,591,139	3,000,000	
Isabela	1,101,089,941	3,914,040	599,589,048	7,500,000	580,129,471	62,500,000	
Nueva Vizcava	575,378,502	150,924,000	55,461,640	-	21,190,452	17,300,000	
Quirino	132,984,382	7,093,740	40,592,341	1,700,000	24,779,913	4,800,000	
Batanes	-	<u>-</u>	<u>-</u>	-	-	<u>-</u>	
Total	2,080,294,082	174,831,760	1,231,614,902	9,485,992	979,690,975	87,600,000	

Table 2. Damages to Agriculture and Infrastructure (In Pesos)Region 02, CY 2004 to 2006

	Aftermath of Typhoon Yoyong		Heavy Mor	isoon Rains	Heavy Monsoon Rains		
Drovinco	(Decemi	per 2004)	(Decemi	per 2005)	(Januai	ry 2006)	
TIOVINCE	Number of Affected Brgys.	Number of Affected Persons	Number of Affected Brgys.	Number of Affected Persons	Number of Affected Brgys.	Number of Affected Persons	
Cagayan	250	143,258	96	67,859	226	109,972	
Isabela							
	447	241,718	190	129,238	342	182,739	
Nueva Vizcaya	215	174,752	-	-	29	12,921	
Quirino	132	78,945	-	-	66	6,293	
Batanes	_	-	-	-	-	-	
Total	1,044	638,673	286	197,097	663	311,925	

Table 3. Number of Barangays Flooded and Persons AffectedRegion 02, CY 2004 to 2006

a.2 Unsustained economic growth

The region is basically agriculture-based with almost 50% of its Gross Regional Domestic Product (GRDP) accounted by agriculture. From CYs 2000 to 2005, GRDP growth has been erratic as the economy was negatively affected by major factors particularly the unfavorable weather.

Fig. 2. Region 02 Grdp And Agri Gva Growth Rates



B. CONTRIBUTORY FACTORS

The Problem Tree Analysis of the flood problem in the region is shown in Figure 3. A discussion of the major factors that contribute to the extent of flood damages and it implications to the regional economy is presented below.

b.1 Extensive Flood Prone Areas

The Cagayan river basin has about 1,860 sq.km of flood prone areas based on the region's experience during the 1973 flood (the heaviest flood incidence recorded so far) Most of region's flood prone areas are used as production areas for rice, corn, legumes, and vegetables. Figures 3 and 4 shows the estimated extent of flooding considering a 2-year and a 100-year probable flood scenario.

b.2 Prolonged Inundation

Prolonged inundation, which lasts to about 2 to 3 days in most of the flood plains, aggravates the magnitude of flooding in the region. Prolonged inundation is caused by the significantly low discharge capacity of the river (2,000 m3/s from Tuguegaro to the river mouth) compared to the 2-year probable flood discharge of 6,400 and the 100 year probable discharge of 21,400 cubic meters per second respectively. Floodwater flow down very slowly because of surface retention over the extensive flood plain, extremely gentle slope of the Cagayan River and the retardation of floodwater due to the constriction called Magapit Narrows and meandering river.

b.3 Constricted River Channel at Magapit Narrows

A notable feature of the Cagayan River System is the existence of a bottleneck or constricted section called as Magapit Narrows. The three (3) specific bottleneck sites in the Magapit Narrows are Tupang, Nassiping in Alcala and Magapit in Lallo, which measures about 30 kms. long, significantly hinders the flow of flood water to the Aparri Delta and finally to the Babuyan Channel, thereby causing backwater flow and meandering of the river channel in the upstream. However, widening of the Magapit Narrows is not recommended in the 2001 JICA Feasibility Study not only on economic and environmental reasons but also on the result of simulation tests conducted. The simulation test results concluded that its implementation does not give change in the riverbed fluctuation, hence, widening activities can never enhance floodwater flow significantly.

b.4 Bank Erosion

Bank erosion is serious in various places of the main Cagayan and its tributaries. The DPWH Regional Office currently lists 73 erosion prone sites, exposing infrastructure, villages, urban and agriculture areas to destructive damage. The average annual bank erosion rate reaches 10 m in the downstream of Magapit Narrows as estimated at 5 serious bank erosion sites. Similarly, that on the upstream of Alcala erosion reaches 24 m per year as estimated at 4 sites. Annual erosion rates at the 73 sites vary from 28 meters to 6 meters. (Fig. 5). The absence of deep rooted trees that are vital in the stabilization of bank and necessary in the retardation of the velocity of flood waters contributes to the destructive erosion and sudden flooding particularly at the down stream areas.

b.5 Sedimentation due to collapsed mountain slopes

In the upper Magat River Basin including the Santa Cruz River, Balilim River and Santa Fe River, issues on land collapses and sediment deposit caused by the July 1990 earthquake 1990 are remarkable. The sediment deposited in the said rivers was estimated to have reached 1 to 6 m after the 1990 earthquake. This land collapse as well as severe basin erosion have increased tremendously the sediment deposits in the Magat Dam estimated at about 188 million m³ in 1999 or 67.8% of the dam's dead storage capacity (JICA 2002 Study). With regards to the Cagayan Mainstream, the JICA 2001 Study found out that there is no serious sediment deposition rate, hence, dredging at these river segments was not recommended as a priority measure.

b.6 Meandering Channels Upstream of Magapit Narrows

The effect of the rising of the water caused by the constricted Magapit Narrows resulted to the shifting of the river course from its original alignment at the present alluvial plain extending from Alcala to Tuguegarao City in the province of Cagayan. Similarly, this meandering behavior naturally produced gentle slope gradient of the river bed, thus retarding the floodwater flow.

b.7 Denudation of watershed Cover

The forest cover of the Cagayan River basin (based on the Lower Cagayan Flood Control Study in 2001) was estimated at 41%, a decrease from the 42.3% reported in the 1987 Master Plan Study for the whole basin. The Forest Register also shows that 38% of the total forest area is olg-growth forest and 60% is residual forest. The principal cause of forest destruction are the continued expansion of slash-and-burn farming and small-scale legal and illegal logging activities.

The Land Limitations Map of Region 2 and CAR issued in 1995 by BSWM shows that the upper Magat, upper Cagayan and upper Chico watersheds are moderate to severe erosion areas. This is validated by reconnaissance survey carried out by air and land, where less forest cover and denuded areas can be seen in the upper Magat and upper Cagayan watersheds.

b.8 Low Priority given to flood control measures

Major flood control projects are being undertaken by the national government since local governments have limited financial and technical capability to undertake river projects. On the part of the national government, flood control project have been given low priority in consideration of other critical infrastructure projects such as roads and bridges. So far, river projects implemented in the region have been limited to minor bank protection works in selected portions of the Cagayan River.

b.9 Poor coordination

The region is still far from realizing the concept of treating water resource development in an integrated approach. Several agencies have their specific mandates on water and environmental management but there no designated authority or body to oversee and coordinate an overall river management and water resource development.

b.10 Financial constraints

Flood control projects implemented for the past years are limited to minor bank protection works along the Cagayan River and drainage systems in the urban areas. Flood Forecasting and Warning System of the region have problems of malfunction of equipment and insufficient operation and maintenance of the system. Major problems in the designated evacuation centers are insufficient supply of drinking water and food, and lack of cooking facilities and comfort rooms in the evacuation centers. All of the stated concerns are attributed to the lack of funding support.

IV. OBJECTIVE and STRATEGIES

A. **OBJECTIVE:** To manage the magnitude of flooding and minimize its destructive effects to the communities.

B. STRATEGIES:

In order to mitigate the magnitude of flooding and at the same time to adequately respond to its effects on the affected communities, the following strategies will guide the region's flood related interventions:



b.1. Structural Strategies

1. Protection of Urban and Agricultural Areas and Infrastructure from Bank erosion and Inundation.

This will involve the stabilization of river banks that are prone to erosion and are near residential areas, agricultural areas and infrastructure facilities. areas will be given due attention.

2. Regulation of Floodwater Inflow from Tributaries to Cagayan River

Flood waters from the tributaries contribute to the rising level of the Cagayan River. It is necessary to regulate/retard water inflow from tributaries to the main river by impounding first the run-offs at the respective upstream flood plains or reservoir.

3. Enhancement of Flood Water Flow at the Upstream of Magapit Narrows

The shifting of the river towards meandering course at the upstream at Magapit Narrows also caused retardation of water flow and rising of its water level thereby inundating the agricultural and build-up-areas. It is for this reason that it is very necessary to enhance water flow by training the river if possible to its original course while protecting the agricultural and build-up-areas from flooding.

b.2 Non-structural Strategies

1. Promotion of basin-wide approach in the planning and implementation of watershed management, water resource development and flood control works

The region will continue to advocate and support initiatives for the realization of an integrated and basin-wide approach in planning and project programming for the Cagayan River and its watershed area. including activities such as:

- Intra and inter-regional collaboration and complementation on watershed management;
- Integrated Water Resources Development that shall treat the Cagayan River and its tributaries both as protection and a production resource; and
- Creation of a Cagayan River Basin Authority to oversee the management and development of the Cagayan River Basin

2. Strict implementation of water rights policies and environmental laws

Efforts will be focused in the observance and implementation of water rights policies and environmental laws to ensure river area protection and environmental integrity in the entire basin. Monitoring of developmental activities to include rehabilitation and protection of degraded areas in the valley shall be institutionalized at the different levels of governance in the region.

3. Strengthening of Disaster Management Capability/System

The different Disaster Coordinating Councils (Regional, Provincial, City/Municipal) shall be strengthened for a more equipped, capable and responsive teams. The DCCs shall be upgraded in terms of facility, mobility, capability and preparedness. Flood monitoring, forecasting and warning systems shall be improved for a more efficient coordination and effective information dissemination.

4. Institutionalization of Local Flood Control Programs

Local Flood Councils will be highly encouraged to be organized and fully operational at the local levels i.e., Provincial, City/Municipal, specially those affected and prone to frequent flooding. This body shall look into the institutionalization of flood control programs and other related concerns such as drainage and flood control system at the community level.

5. Improvement of IEC

Lack of preparedness from among residents specifically in low lying flood prone communities has always been the culprit in the lose of life and property during flood occurrence. In addressing this concern, the present IEC shall be improved for a responsive flooding preparedness information dissemination. Institutionalization of this concern through the inclusion in the curriculum in the academe shall be encouraged.

6. Fund Sourcing

Efforts shall be pursued to hasten the implementation of identified programs and projects in the Cagayan Valley Flood Mitigation Master Plan. Fund sourcing of identified projects will be done by concerned agencies with the assistance of the RDC. Among the potential fund sources to be tapped shall include ODA, national government, local governments and the private sector.

V. INTERVENTION MEASURES

The following intervention measures will guide the identification and prioritization of projects and activities that will have to be urgently implemented and those that will be included in the short and medium term of the plan.

A. URGENT MEASURES (2006-2007)

a.1. Structural Measures

- Bank protection in identified critical high erosion rate areas in forty-three (43) sites along the Cagayan River and major tributaries;
- 2. Setting-up of multi-purpose evacuation centers in strategic areas in the identified flood prone municipalities;
- 3. Strengthening of Local Disaster Coordinating Councils (DCCs);
- 4. Conduct of FS and/or Detailed Engineering (DE) for priority dams, dikes and cut-off-channels (COCs); and
- Implementation of Small Water Impounding Projects (SWIPs) and Small Farm Reservoir (SFR).

a.2 Non-Structural Measures

- 1. Institution of disaster management measures such as:
 - 1.1 Improvement of flood warning and flood forecasting system
 - 1.2 Improvement of the capabilities of local disaster councils on disaster mitigation
 - 1.3 Identification and assessment of areas prone to flood, landslides and other geological hazards
 - 1.4 Updating/formulation of geo-hazard/flood prone map at the provincial and municipal levels
- 2. Watershed protection and rehabilitation in Upper Magat River Basin and major tributaries
- Monitoring and strict implementation of Sloping Agricultural Land Technology (SALT)
- 4. Creation of Local Councils for the Cagayan River Basin.
- Desilting of Waterways within the service area of Magat and other National Irrigation Systems

B. SHORT-TERM MEASURES (5 Years 2008-2012)

b.1 Structural Measures

- 1. Construction of other bank protection in identified high erosion rate areas;
- Implementation of the Matuno Dam and the Tumauini River Multipurpose Projects;
- Construction of SWIPs and SFR projects Implementation of the COCs and Dike Embankment projects; and
- 4. Conduct of FS/DE for proposed dams and SWIPs.

b.2 Non-Structural Measures

- 1. Watershed protection and rehabilitation in Upper Cagayan River Basin; and
- 2. Formation/Organization of Peoples Organizations (Pos) for watershed and dams.

C. LONG-TERM MEASURES (2013-2030)

c.1 Structural Measures

- 1. Completion of dike embankment system; and
- 2. Construction of SWIP and Multipurpose Dams.

c.2 Non-Structural Measures

- 1. Cagayan River Basin Watershed Management and Rehabilitation;
- Establishment and Maintenance of Tree Zones along riverbank buffer areas; and
- 3. Creation of Cagayan River Basin Authority.

As shown in Table 4, the region's structural and non-structural measures to mitigate the extent of flooding and its damages to agriculture, infrastructure, and lives would cost a total of PhP132.89 Billion, spread in a span of 30 years.

Structural measures which include the construction of multi-purpose dams, riverbank protection works and other infrastructures would cost a total of PhP130.16 Billion. On the otherhand, non-structural measures such as watershed protection, flood forecasting and flood warning systems and disaster preparedness measures would require a total of PhP2.15 Billion. The bulk of funds would be sourced from Official Development Assistance (ODA).

Measure/Fund	COST REQUIRMENT (In Billion Pesos)						
Source	Urgent (2006-2007)	Short Term (2008-2012)	Long Term (2003-2030)	TOTAL			
Structural ODA	1.38 B	124.52 B	4.256 B	130.16 B			
GOP Non-Structural	0.111 B	0.065 B	-	0.180 B			
ODA GOP	558.72 B 0.005 B	0.431 M 0.397 B	1.587 B 1.05 M	2.146 B 0.403 B			
Total	2.05 B	124.99 B	5.84 B	132.89 B			

 Table 4. Cost Summary of Flood Mitigation Measures

VI. FINANCING AND IMPLEMENTATION SCHEME

A. PRIORITY PROJECTS FOR IMMEDIATE FUNDING BY THE NATIONAL GOVERNMENT THROUGH THE NDCC

Critical projects that need immediate funding from the funds of the National Disaster Coordination Committee (NDCC) include small water impounding projects (SWIPS), small farm reservoirs (SFRs), and bank protection works. The total amount to be requested from the NDCC is estimated at PhP256.40 Million or about 77 percent of the total funding requirement of PhP329.85 Million. The balance of 23 percent or PHP73.45 Million shall be provided as counterpart cost of the provincial governments and local government units. The complete list of said projects and funding scheme is shown in **Annex** "**A**". The funding and implementation scheme for these projects is discussed in the succeeding page.

a.1 Small Water Impounding Projects (SWIPs)

1. Cost-Sharing Proportion

Small Water Impounding Projects (SWIPs) will be funded through a costsharing arrangement among the national government (through the NDCC funds), the provincial government and the municipal government. With this scheme, the national government will provide the seed money for the proposed projects (65% of the total project cost) with project counterpart provided by the provincial and municipal governments (total of 35% of the project cost) in terms of a portion of construction materials, equipment, logistics, manpower, and other items which an LGU can commit as shown in the next page.

SOURCE OF PROJECT	% SHARE TO TOTAL PROJECT
FUND	COST/NATURE OF COUNTERPART
A. National Government (NDCC Funds)	65.00%
	In the form of cash outlay provided to DA Regional Office 02 for the purchase of construction materials and payment of labor, equipment and other contingencies.
B. Municipal Government	 20.00%, to include one or combination of any of the following: Provision of construction equipment (dump truck, earth moving, etc.), including equipment operators and oil/fuel expenses Provision of earth fill, gravel and boulders Portion of labor expenses; Waiving of quarrying fees/royalties; and/or Project Supervision
C. Provincial Government	 15.00%, to include one or combination of any of the following Provision of construction equipment (dump truck, earth moving, etc.), including equipment operators and oil/fuel expenses (especially for municipalities with no capability to provide such items; Provision of earth fill, gravel and boulders; Provision of a portion of labor expenses; Waiving of quarrying fees/royalties; and/or Project Supervision in coordination with the municipality
TOTAL	100.00%

 Table 5. Cost Sharing Scheme for SWIP Projects, Region 02

2. Implementation Scheme and Institutional Responsibilities

The region's identified SWIP Projects shall be implemented by the Department of Agriculture DA) Regional Office 02 in cooperation/coordination with concerned institutions. The specific role/s of each cooperating agency are as follows:

National Disaster Coordination Committee (NDCC):

- a. Approval of the region's project proposals; and
- b. Provision of funding support

Department of Public Works and Highways (DPWH):

- a. Integration of the region's flood mitigation master plan into the national flood mitigation master plan;
- b. Provision of technical assistance in the conduct of engineering design and other project preparation activities through its regional office as requested by the regional office of the Department of Agriculture;

Department of Agriculture

- Preparation/packaging of specific SWIP project proposals to include project design and specifications, program of work and specific cost-sharing arrangements in coordination with the concerned provincial and municipal governments;
- b. Submission of packaged SWIP projects to the National Disaster Coordinating Committee (NDCC) for approval and fund release;
- c. Coordination with the concerned provincial and municipal governments in the implementation of approved/funded SWIP projects; and
- d. Overall administration of project implementation in the region;

National Irrigation Administration

 Provision of technical assistance in the conduct of engineering design and other project preparation activities through its regional office as requested by the regional office of the Department of Agriculture

Provincial Governments

- a. Assistance to the Department of Agriculture in the packaging of SWIP projects in the province, particularly in terms of technical assistance in project preparation, logistics (per diems, service vehicle, office/field supplies) in the conduct of project site validation/ocular visits, and in firming-up the commitments of the province in project funding in pursuance of the agreed cost-sharing scheme;
- b. Provision of counterpart costs in the funding/implementation of the projects located in the province;
- c. Assistance to the municipal government in project implementation/supervision;
- d. Assistance to the municipal government in the resolution of implementation issues that may arise such land acquisition, resettlement, and other related problems;
- e. Provision of other forms of assistance as may be agreed with the regional office of the Department of Agriculture and/or the concerned municipality.

Municipal Governments

a. Assistance to Department of Agriculture in the packaging of SWIP projects in the municipality, particularly in terms of technical assistance in project preparation, logistics in the validation of project sites/conduct of ocular visits to project sites and in firming-up the commitments of the municipality in project funding in pursuance of the agreed cost-sharing scheme;

- b. Provision of counterpart costs in the funding/implementation of the projects located in the municipality;
- c. Supervision of project implementation;
- d. Assumption of overall responsibility in ensuring physical and financial sustainability of implemented SWIP projects in the municipality to include the conduct of activities such as:
 - o Organization of farmer beneficiaries;
 - Watershed protection and management;
 - Physical maintenance of structure; and
 - Financial sustainability through the implementation of cost-recovery measures such collection of regular irrigation water fees, income generating activities through agro-forestry, tree plantations, among others.

a.2 Small Farm Reservoirs (SFRs)

For small farm reservoirs, funding of these projects shall be sourced from the National Disaster Coordinating Committee (NDCC) with an estimated cost of PhP25,000.00 per unit of SFR. Additional funding requirement needed to complete the project/s will be borne by the provincial and/or municipal government. The project beneficiaries, which will be organized by the municipal government, will take care of sustaining the operation of the project/s in their respective localities. These post project activities shall include tree planting and physical maintenance of the SFR.

a.3 Urgent Bank Protection Works

One hundred percent of the financial requirement for the pre-construction (survey and plan preparation) and construction stage of identified urgent bank protection works shall be sourced from the NDCC funds. The commitment of LGU beneficiaries shall consist of land and right of way acquisition, and resettlement measures including other entitlements for the directly affected households, including the preparation and conduct of land acquisition and resettlement action plans (LARAPs).

B. Other programs and projects included in the Urgent (2006-1007), Short Term (2008-2012) and Long Term (2013-2030) Plan Period

b.1 Source of Funding

The rest of the region's flood mitigation programs and projects would require a total of PhP127.78 Billlion for implementation. Funds for these would come from a mix of possible funding sources, particularly Official Development Assistance (ODA), national government, local governments and the private sector. The summary of these projects is shown in **Tables 5 and Table 6**. Annex "A" lists the specific projects contained in the Plan.

1. Projects to be funded through ODA

These include the projects classified under capital and technical assistance as follows:

1.1 For Capital Assistance

- a. Final completion of bank protection works selected in urgent projects funded by the NDCC and construction of other bank protection works along the Cagayan River;
- b. Construction of dike embankment system and cut off channels (COCs) in the lower reach of the Cagayan River;
- c. Construction of Dike Embankment System in the middle reach of the Cagayan River;
- d. Partial financing of watershed management projects in the Upper Magat and Upper Cagayan River Basin;
- e. Improvement of Flood Forecasting and Warning System (FFWS) of PAGASA;

 f. Improvement of Flood Forecasting and Warning System (FFWS) of MAGAT MARIIS

1.2 For Techncial Assistance

- a. Conduct of Feasibility Study of the Construction of Dike Embankment System in the middle reach of the Cagayan River;
- b. Updating of the Feasibility Study and Detailed Engineering of Matuno Multi Purpose Dam and Tumauini Multi Purpose Dam;
- c. Conduct of Feasibility Study for Siffu, Alimit, Mallig and Kalipkip Dam Projects; and
- d. Conduct of Feasibility Study for Dredging of Aparri Delta and other sections of the Cagayan River;

Although the above projects shall be sourced through ODA funding, the national government shall provide the local counterpart cost depending on the equity requirement of a particular ODA funding agency.

2. National Government

Projects proposed for funding by the national government categorized in terms of technical and capital assistance are as follows:

2.1 For Technical Assistance

- a. Detailed Engineering and Land Acquisition and Resettlement Action Plan (LARAP) for the following projects:
 - Dike Embankment System in the lower and middle reach of the Cagayan River;
 - o Cut off channels (COCs) in the lower reach of the Cagayan River; and
- b. FS for Siffu, Alimit, Mallig and Kalipkip Dam Projects

2.2 For Capital Assistance

- a. Partial financing of watershed management projects in the Upper Magat and Upper Cagayan River Basin;
- b. Implementation of Sloping Agricultural Land Technology (SALT);
- c. Partial financing of Strengthening Local Disaster Councils;
- d. Creation of Cagayan River Basin Authority;
- e. Implementation of SWIP and SFR Projects; and
- f. Implementation of tree zones along riverbanks

3. Local Governments

- a. Planning and financing for Land Acquisition and Resettlement for bank protection works;
- b. Support to LARAP of other flood control projects such as Cut-off-Channels, dike embankments and SWIPs;
- c. Co-financing of SWIPs and SFRs;
- d. Setting up of evacuation centers;
- e. Strengthening of local disaster councils; and
- f. Support to the Implementation of tree zones along riverbanks

b.2 Support Activities and Institutional Roles

1. Preparation and Packaging of Feasibility and Detailed Engineering Proposals.

Flood control mitigation projects, especially those that are structural in nature (multi-purpose dams, embankment dikes. etc) require enormous financial investments and therefore require feasibility studies and/or detailed engineering studies to ascertain their implementation viability. Since a substantial portion of flood mitigation projects is structural in nature, concerned regional government agencies are expected to prepare and package proposals for the conduct of appropriate feasibility and engineering

studies, particularly the DPWH (riverbank protection, dikes embankments, cutoff-channels), NIA (multi-purpose dams, irrigation systems), PAGASA (flood forecasting and warning) and DENR (watershed management projects).

2. Inclusion of identified flood mitigation projects in the budget proposals of regional line agencies

Other flood mitigation related projects identified in the plan could be funded through the annual budget appropriations of the national government. These include the construction of small water impounding reservoirs (SWIPs), Small Farm Reservoirs (SFRs), watershed protection and feasibility studies for small scale flood control structures. For such type of projects, concerned government agencies shall ensure that these are included in their respective annual budgetary allocations.

3. Localization of the flood mitigation master plan at the provincial and local levels

The provincial governments and concerned municipalities in coordination with their respective local disaster coordination councils (LDCCs) are encouraged to translate the flood mitigation master plan into a local flood mitigation master plan. The formulation of a local flood plan will enable a specific localities to reflect its unique requirements and responses to flood mitigation at the community level. Among the areas of concern which a local flood control masterplan should look into and provide area-specific mitigation measures include the following:

- a) Strict enforcement of land use plans and zoning ordinances;
- b) Formulation/updating of local maps showing areas prone to flooding and geo-hazards such as landslides;
- c) Strengthening local capabilities on disaster management;
- d) Disaster awareness campaign; and
- e) Watershed management.



Fig.2 Schematic Diagram of the Cagayan River



Fig.3 Flood Prone Areas, 2 Year Probable Flood, Region 02



Fig 4 Flood Prone Areas, 100 Year Probable Flood, Region 02



Fig. 5 Areas of Sever Bank Erosion, Region 02

Annex A

URGENT PROJECTS FOR NDCC FUNDING

NAME OF DROJECT	BRIEF DESCRIPTION	LOCATION		IMPL.		
NAME OF PROJECT			COP	L CU		AGENCY
I. URGENT BANK PROTECTION WORKS					IOTAL	
- Bank Protection along the Cagayan River	Extremely critical stretch within settlement areas.	San Vicente, Iguig, Cagayan	25,000,000.00		25,000,000.00	DPWH
	Extremely critical stretch within settlement areas.	Bagumbayan, Tuguegarao, Cagayan	5,000,000.00		5,000,000.00	DPWH
	Extremely critical stretch within settlement areas.	Cataggaman, Tuguegarao, Cagayan	30,000,000.00		30,000,000.00	DPWH
	Extremely critical stretch within settlement areas.	Baculud, Ilagan, Isabela	35,000,000.00		35,000,000.00	DPWH
S ı	ıb Total		95,000,000.00		95,000,000.00	
II. SMALL WATER IMPOUNDING PROJECTS (SWIPs)						
a) Sidem SWIP	Earth Embankment provided with irrigation outlet works and emergency spillway; vol. of embankment – 46,000 cu.m., storage capacity – 48,344 cu.m.	Sidem, Gattaran, Cagayan	9,222,606.25	4,966,018.75	14,188,625.00	DA and LGU
b) Liwan Norte SWIP	Earth Embankment provided with irrigation outlet works and emergency spillway; vol. of embankment – 29,220 cu.m., storage capacity – 513,250 cu.m.	Liwan Norter, Enrile, Cagayan	6,591,406.25	3,549,218.75	10,140,625.00	DA and LGU
c) Abbeg SWIP	Earth Embankment provided with irrigation outlet works and emergency spillway; vol. of embankment – 30,000 cu.m., storage capacity – 41,000 cu.m.	Abbeg, Solana, Cagayan	6,025,662.50	3,244,587.50	9,270,250.00	DA and LGU

NAME OF PROJECT	BRIEF DESCRIPTION	LOCATION	FUNDING REQUIREMENT			IMPL. AGENCY
			GOP	LGU	TOTAL	
d) Bessang SWIP	Earth Embankment provided with irrigation outlet works and emergency spillway; vol. of embankment – 22,000 cu.m., storage capacity – 32,000 cu.m.	Bessang, Allacapan, Cagayan	5,509,512.60	2,966,660.60	8,476,173.20	DA and LGU
e) Namamparan SWIP	Earth Embankment provided with irrigation outlet works and emergency spillway; vol. of embankment – 22,000 cu.m., storage capacity – 45,000 cu.m.	Namamparan, Diadi, Nueva Vizcaya	5,130,937.50	2,762,812.50	7,893,750.00	DA and LGU
f) Boni South SWIP	Earth Embankment provided with irrigation outlet works and emergency spillway	Boni South, Aritao, Nueva Vizcaya	6,305,000.00	3,395,000.00	9,700,000.00	DA and LGU
g) Pinaripab Sur SWIP	Earth Embankment provided with irrigation outlet works and emergency spillway; vol. of embankment – 32,500 cu.m., storage capacity – 49,000 cu.m.	Pinaripab, Aglipay, Quirino	8,163,512.50	4,395,737.50	12,559,250.00	DA and LGU
h) Divisoria Norte SWIP	Earth Embankment provided with irrigation outlet works and emergency spillway; vol. of embankment – 22,500 cu.m., storage capacity – 23,900 cu.m.	Divisoria Norte, Maddela, Quirino	5,071,991.79	2,731,072.50	7,803,064.29	DA and LGU
i) San Juan SWIP	Earthwork and construction of Earthen Dam and Spillway	San Juan, Cabagan, Isabela	5,338,400.97	2,874,523.60	8,212,924.57	DA and LGU
j) Union SWIP	Earthwork and construction of Earthen Dam and Spillway	Union, Cabagan, Isabela	3,415,197.50	1,838,952.50	5,254,150.00	DA and LGU
k) Karikkikan SWIP	Earthwork and construction of Earthen Dam and Spillway	Karikkikan, Cabagan, Isabela	3,107,000.00	1,673,000.00	4,780,000.00	DA and LGU
1) Cabannungan SWIP	Earthwork and construction of Earthen Dam and Spillway	Cabannunagn, Ilagan, Isabela	4,400,825.00	2,369,675.00	6,770,500.00	DA and LGU
m) Buenavista SWIP	Earthwork and construction of Earthen Dam and Spillway	Buenavista, Sta. Maria, Isabela	7,828,792.20	4,215,503.50	12,044,295.70	DA and LGU
n) Villaluz SWIP	Earthwork and construction of Earthen Dam and Spillway	Villaluz, Benito Soliven, Isabela	5,817,418.75	3,132,456.25	8,949,875.00	DA and LGU
o) Santa Cruz SWIP	Earthwork and construction of Earthen Dam and Spillway	Santa Cruz, Benito Soliven, Isabela	2,973,506.25	1,601,118.75	4,574,625.00	DA and LGU
p) Cabanayan SWIP	Earthwork and construction of Earthen Dam and Spillway	Cabanayan, Simmimbaan, Roxas, Isabela	5,102,256.25	2,747,369.00	7,849,625.00	DA and LGU

NAME OF PROJECT	BRIEF DESCRIPTION	LOCATION	FUN	IMPL. AGENCY		
			GOP	LGU	TOTAL	
q) San Pablo SWIP	Earthwork and construction of Earthen Dam and Spillway	San Pablo, Caua. City, Isabela	6,464,250.00	3,480,750.00	9,945,000.00	DA and LGU
r) Dumawing SWIP	Earthwork and construction of Earthen Dam and Spillway	Dumawing, Jones, Isabela	2,799,875.00	1,507,625.00	4,307,500.00	DA and LGU
s) Santa Isabel SWIP	Earthwork and construction of Earthen Dam and Spillway	Santa Isabel, Jones, Isabela	2,994,062.50	1,612,187.50	4,606,250.00	DA and LGU
t) Bangatan SWIP	Earth Embankment provided with irrigation outlet works and emergency spillway; vol. of embankment – 46,000 cu.m., storage capacity – 48,344 cu.m.	Bangatan, Gattaran, Cagayan	9,082,982.25	4,890,642.75	13,973,265.00	DA and LGU
u) Lalafugan SWIP	Earth Embankment provided with irrigation outlet works and emergency spillway; vol. of embankment – 28,000 cu.m., storage capacity – 30,000 cu.m.	Lalafugan, Lal- lo, Cagayan	10,077,748.20	5,426,479.80	15,504,228.00	DA and LGU
v) Damortis SWIP	Earth Embankment provided with irrigation outlet works and emergency spillway; vol. of embankment – 48,616 cu.m., storage capacity – 48,000 cu.m.	Damortis, Solana, Cagayan	8,174,089.95	4,401,433.05	12,575,523.00	DA and LGU
w) Iringan SWIP	Earth Embankment provided with irrigation outlet works and emergency spillway; vol. of embankment – 22,873 cu.m., storage capacity – 44,000 cu.m.	Iringan, Allacapan, Cagayan	6,803,225.00	3,663,275.00	10,466,500.00	DA and LGU
S 1		136,399,899	73,446,099	209,845,998		
III. SMALL FARM RESERVOIR (SFR)						
a) SFR (10 units)	Earth Embankment; vol. of embankment – min. 1,000 cu.m. minimum pond area of 600sq.m.	Tuguegara City, Cagayan	250,000.00		250,000.00	DA and LGU
b) SFR (10 units)	Earth Embankment; vol. of embankment – min. 1,000 cu.m. minimum pond area of 600sq.m.	Enrile, Cagayan	250,000.00		250,000.00	DA and LGU

NAME OF PROJECT	BRIEF DESCRIPTION	LOCATION	FUNDING REQUIREMENT		IMPL. AGENCY	
			GOP	LGU	TOTAL	
c) SFR (20 units)	Earth Embankment; vol. of embankment – min. 1,000 cu.m. minimum pond area of 600sq.m.	Iguig, Cagayan	500,000.00		500,000.00	DA and LGU
e) SFR (20 units)	Earth Embankment; vol. of embankment – min. 1,000 cu.m. minimum pond area of 600sq.m.	Alcala, Cagayan	500,000.00		500,000.00	DA and LGU
f) SFR (20 units)	Earth Embankment; vol. of embankment – min. 1,000 cu.m. minimum pond area of 600sq.m.	Baggao, Cagayan	500,000.00		500,000.00	DA and LGU
g) SFR (20 units)	Earth Embankment; vol. of embankment – min. 1,000 cu.m. minimum pond area of 600sq.m.	Gattaran, Cagayan	500,000.00		500,000.00	DA and LGU
h) SFR (10 units)	Earth Embankment; vol. of embankment – min. 1,000 cu.m. minimum pond area of 600sq.m.	Lal-lo, Cagayan	250,000.00		250,000.00	DA and LGU
i) SFR (10 units)	Earth Embankment; vol. of embankment – min. 1,000 cu.m. minimum pond area of 600sq.m.	Allacapan, Cagayan	250,000.00		250,000.00	DA and LGU
j) SFR (10 units)	Earth Embankment; vol. of embankment – min. 1,000 cu.m. minimum pond area of 600sq.m.	Piat, Cagayan	250,000.00		250,000.00	DA and LGU
k) SFR (10 units)	Earth Embankment; vol. of embankment – min. 1,000 cu.m. minimum pond area of 600sq.m.	Sto Niño, Cagayan	250,000.00		250,000.00	DA and LGU
l) SFR (20 units)	Earth Embankment; vol. of embankment – min. 1,000 cu.m. minimum pond area of 600sq.m.	Lasam, Cagayan	500,000.00		500,000.00	DA and LGU
m) SFR (10 units)	Earth Embankment; vol. of embankment – min. 1,000 cu.m. minimum pond area of 600sq.m.	Kasibu, Nueva Vizcaya	250,000.00		250,000.00	DA and LGU
n) SFR (10 units)	Earth Embankment; vol. of embankment – min. 1,000 cu.m. minimum pond area of 600sq.m.	Kayapa, Nueva Vizcaya	250,000.00		250,000.00	DA and LGU
o) SFR (10 units)	Earth Embankment; vol. of embankment – min. 1,000 cu.m. minimum pond area of 600sq.m.	Sta. Fe, Nueva Vizcaya	250,000.00		250,000.00	DA and LGU
p) SFR (10 units)	Earth Embankment; vol. of embankment – min. 1,000 cu.m. minimum pond area of 600sq.m.	Bambang, Nueva Vizcaya	250,000.00		250,000.00	DA and LGU

NAME OF PROJECT	BRIEF DESCRIPTION	LOCATION	FUNDING REQUIREMENT		EMENT	IMPL. AGENCY
			GOP	LGU	TOTAL	
q) SFR (10 units)	Earth Embankment; vol. of embankment – min. 1,000 cu.m. minimum pond area of 600sq.m.	Solano, Nueva Vizcaya	250,000.00		250,000.00	DA and LGU
r) SFR (10 units)	Earth Embankment; vol. of embankment – min. 1,000 cu.m. minimum pond area of 600sq.m.	Bayombong, Nueva Vizcaya	250,000.00		250,000.00	DA and LGU
s) SFR (10 units)	Earth Embankment; vol. of embankment – min. 1,000 cu.m. minimum pond area of 600sq.m.	Quezon, Nueva Vizcaya	250,000.00		250,000.00	DA and LGU
t) SFR (15 units)	Earth Embankment; vol. of embankment – min. 1,000 cu.m. minimum pond area of 600sq.m.	Bagabag, Nueva Vizcaya	375,000.00		375,000.00	DA and LGU
u) SFR (20 units)	Earth Embankment; vol. of embankment – min. 1,000 cu.m. minimum pond area of 600sq.m.	Villaverde, Nueva Vizcaya	500,000.00		500,000.00	DA and LGU
v) SFR (20 units)	Earth Embankment; vol. of embankment – min. 1,000 cu.m. minimum pond area of 600sq.m.	Dupax Del Sur, Nueva Vizcaya	500,000.00		500,000.00	DA and LGU
w) SFR (20 units)	Earth Embankment; vol. of embankment – min. 1,000 cu.m. minimum pond area of 600sq.m.	Dupax Del Norte, Nueva Vizcaya	500,000.00		500,000.00	DA and LGU
x) SFR (20 units)	Earth Embankment; vol. of embankment – min. 1,000 cu.m. minimum pond area of 600sq.m.	Diadi, Nueva Vizcaya	500,000.00		500,000.00	DA and LGU
y) SFR (10 units)	Earth Embankment; vol. of embankment – min. 1,000 cu.m. minimum pond area of 600sq.m.	Aritao, Nueva Vizcaya	250,000.00		250,000.00	DA and LGU
z) SFR (20 units)	Earth Embankment; vol. of embankment – min. 1,000 cu.m. minimum pond area of 600sq.m.	Diffun, Quirino	500,000.00		500,000.00	DA and LGU
aa) SFR (10 units)	Earth Embankment; vol. of embankment – min. 1,000 cu.m. minimum pond area of 600sq.m.	Cabbaroguis, Quirino	250,000.00		250,000.00	DA and LGU
ab) SFR (10 units)	Earth Embankment; vol. of embankment – min. 1,000 cu.m. minimum pond area of 600sq.m.	Aglipay, Quirino	250,000.00		250,000.00	DA and LGU
ac) SFR (10 units)	Earth Embankment; vol. of embankment – min. 1,000 cu.m. minimum pond area of 600sq.m.	Saguday, Quirino	250,000.00		250,000.00	DA and LGU

NAME OF PROJECT BRIEF DESCRIPTION		LOCATION	FUND	IMPL. AGENCY		
			GOP	LGU	TOTAL	
ad) SFR (15 units)	Earth Embankment; vol. of	Nagtipunan,	375,000.00		375,000.00	DA and
	minimum pond area of 600sq.m.	Quirino				LGU
ae) SFR (100 units)	Earthwork and Construction of	1st District of	2,500,000.00		2,500,000.00	DA and
	Embankment	Isabela				LGU
af) SFR (150 units)	Earthwork and Construction of	2nd District of	3,750,000.00		3,750,000.00	DA and
	Embankment	Isabela				LGU
ag) SFR (150 units)	Earthwork and Construction of	3rd District of	3,750,000.00		3,750,000.00	DA and
	Embankment	Isabela				LGU
ah) SFR (200 units)	Earthwork and Construction of	4th District of	5,000,000.00		5,000,000.00	DA and
	Embankment	Isabela				LGU
Sub Total			25,000.000.00		25,000,000.00	
TOTAL FUNDING REQUIREMENT			256,399,899	73,446,099	329,845998	

Annex B

CAGAYAN VALLEY FLOOD MITIGATION PROJECTS

NAME OF PROJECT	BRIEF DESCRIPTION	LOCATION	FUNDING REQ'T	FUNDING SOURCE	IMPL. AGENCY
I. URGENT PROJECTS (2006-2007)					
A. Structural					
1. Conduct of Feasibility Study (FS) and/or Detailed					
Engineering (DE) for priority dams, dikes and cut-off-channels (COCs).					
a) Matuno Rriver Multi- Purpose Project	Updating of FS that was prepared by JICA in 1984. 147m high, 580 m. long Multi-purpose dam w/storage cap. Of 97MCM, 180MW hydropower generating capacity and 12,800 ha. for irrigation.	Bambang, Nueva Vizcaya.	21 M for FS updating and DE	ODA	NIA
 b) Tumauni River Multi Purpose Project 	Updating of FS that was prepared by NIA in 1998. 81M high, 340 M. long Multi-purpose dam w/storage cap. Of 44.5MCM, 7,000 KW hydropower generating capacity and 6,600 ha. for irrigation	Tumauini, Isabela	12 M for FS updating and DE	ODA	NIA
c) Siffu Dam Project	Conduct of FS. 58 M. high, reservoir with effective storage capacity of 93 MCM, flood control space of 115 MCM, and hydropower generating capacity of 5,400 KW.	Roxas, Isabela	15 M for for the conduct of FS	ODA	NIA
d) Alimit Dam Project	Conduct of FS. 89 M. high reservoir with effective storage capacity of 156 MCM, flood control space of 139 MCM, and hydropower generating capacity of 12,200 KW	Lamut, Ifugao	20 M. for the conduct of FS	ODA	NIA
			1		1

NAME OF PROJECT	BRIEF DESCRIPTION	LOCATION	FUNDING REQ'T	FUNDING SOURCE	IMPL. AGENCY
e) Mallig Dam Project	Conduct of FS. 84 M. high reservoir with effective storage capacity of 545 MCM flood	Mallig, Isabela	32 M for the	ODA	NIA
	control space of 112 MCM, and Irrigation area		conduct of 15		
	of 31,200 ha.				
f) Kalipkip Irrigation Project	Conduct of FS. 40 M. high, reservoir for 2,100 ha. Irrigation area.	Cabagan, Isabela	4.5 M for the conduct of FS	GOP	NIA
g) Sabo Dams	Conduct of FS for Sabo Dams upstream of	Nueva Vizcaya,	50 M for the	ODA	NIA
	Magat Reservoir	Ifugao	conduct of FS		
h) Dredging of the	Conduct of FS and DE for the dredging of the	Aparri to Lallo	8 M	ODA	DPWH
Cagayan River	Cagayan River	(Magapit)			
i) Conduct of DE and			7 M	ODA	DPWH
related activities					
(LARAP) for the Cut-					
Off-Channels (COCs)					
and dike systems with					
tree zone.					
j) Feasibility study for the	Conduct of FS and Detailed engineering for an	Macate, Bambang	40 M	ODA	DPWH/ NIA
Establishment / Cons-	integrated flood control along tha Magat River	Bayombong			
truction of Magat River	from Macate to Sinafal, Solano until Bagabag.	Solano			
Integrated Flood Control	The study will consider the establishment/	Bagabag sections			
Project	construction of road dikes, series of spur dikes				
	and erosion control weirs and an irrigation dam				
	along the length of the Magat River.	a			
k) Feasibility study for the	Conduct of FS and Detailed engineering for the	Santa Fe River	25 M	ODA	DPWH/ DENR
establishment of flood	construction of flood control structures cum	Manga River			
control structures for the	vegetative measures along the major tributaries	San Fernando River			
Major Magat River	of Magat River	Santa Cruz River			
Iributaries		Marian River			
1) Construction / Dahah	Construction/rehabilitation of achien repreterent	Apatan Kiver			
ilitation of Pank	and spur dikes in extremely critical areas of the	Vizeovo			
Drotaction along the	And sput dikes in extremely critical areas of the Magat Divor	vizcaya Indiana Ramia	0.0 M		DDWL
Magat Divar	Magat River	Section	9.0 M	ODA	лимп
Magat Kivel		Section			

NAME OF PROJECT	BRIEF DESCRIPTION	LOCATION	FUNDING REQ'T	FUNDING SOURCE	IMPL. AGENCY
		Indiana Bridge and	25.0 M	ODA	DPWH
		approaches			
		Cupas Section	7.8 M	ODA	DPWH
		Homestead - Macate	15 M	ODA	DPWH
		Section			
		Salinas Section	3.0 M	ODA	DPWH
		Barat section	3.0 M	ODA	DPWH
		San Fernando Bridge	3.0 M	ODA	DPWH
		and approaches			
		Santo Domingo	5.0 M	ODA	DPWH
		Section			
		Bayombong, N.			
		Vizcaya			
		Busilac Section	2.5 M	ODA	DPWH
		Vista Hills Section	10.0 M	ODA	DPWH
		Santa Rosa – Lingay	15 M	ODA	DPWH
		Section			
		Vista Alegre Section	15 M	ODA	DPWH
		Solano, N. Vizcaya			
		Solano Drainage	10 M	ODA	DPWH
		System			
		Curifang – Dadap	5.0 M	ODA	DPWH
		Section			5 5WW
		Bagahabag Section	5.0 M	ODA	DPWH
		Bangar Section	10.0 M	ODA	DPWH
		Bagabag, N. Vizcaya	10.034		DDUUU
		Pogonsino Section	10.0 M	ODA	DPWH
		Tuao Section	3.0 M	ODA	DPWH
2. Strengthening of Local DCCs i.e., training of Local DCCs, setting-up of multi-purpose	Acquisition of land, construction of building, facilities for a humane handling evacuees, training of personnel, procurement of equipments needed in rescue operations.	Multipurpose evacuation center in Cabagan, Isabela	8 M	GOP	DPWH

NAME OF PROJECT	BRIEF DESCRIPTION	LOCATION	FUNDING REQ'T	FUNDING SOURCE	IMPL. AGENCY
evacuation centers in		Procurement of	15 M		LDCC
strategic areas,		equipments			
procurement of		Training of	3 M		NDCC/LDCC
equipments, etc		personnel			
3. Bank protection in	Construction of bank protection in extremely				
identified critical areas	critical areas specifically in urban areas along				
	the Cagayan River				
a) Bank Protection along		San Vicente	P 55.1M	ODA	DPWH
the Cagayan River		Bagumbayan,	P /./M		
		Cagayan Tuguegarao	D 77 OM		
		Daculud, Hagan	P //.8M		
		Cataggaillail, Tuguegarao	r /0.01v1		
		Agusi	P 35 6M		
		Camalaniugan Cag	P 22 9M		
		Tucalana, Lallo, Cag.	P 46.6M		
		Sta. Maria, Isabela	P 34.0M		
		Tupang, Alcala, Cag	P 8.2M		
		Dugayong	P 7.1M		
		Namabbalan	P 48.7 M		
b) Bank Protection along		Sitio Gabit, Roxas	P11.6M	ODA	DPWH
the Siffu River		San Placido, Roxas	P 20.2M		
		Anao-Karagsakan,	P 25.2M		
		Roxas			
c) Bank Protection along		Agasian, Ilagan	P 22.9M	ODA	DPWH
the Ilagan River					
d) Bank Protection along		Centro I, Angadanan	P 77.7M	ODA	DPWH
the Cagayan River		Baringin, Cauayan	P 79.2M		
		San Vicente, Jones	P 34.8M		
		Brgy. I, Jones	P 28.6M		DDW/U
e) Bank Protection along		Bugnay, Solano	P 10.8M	ODA	DPWH
ule Magat Kiver					
			1	1	1

NAME OF PROJECT	BRIEF DESCRIPTION	LOCATION	FUNDING REQ'T	FUNDING SOURCE	IMPL. AGENCY
f) Bank Protection along		Indiana, Bambang	P 15.6M	ODA	DPWH
the Sta. Fe River		Salinas, Bambang	P 30.4M		
		Inaban, Bambang	P 7.0M		
		Pob., Sta. Fe	P 1.9M		
g) Bank Protection along		Cabanglasan,	P 5.7M	ODA	DPWH
the Sta. Cruz River		Kayapa			
		Pingkian, Kayapa	P 8.6M		
		San Fabian, Kayapa	P 2.6M		
h) Bank Protection along		Lamo, Dupax Del	P 5.9M	ODA	DPWH
the Apatan River		Norte			
		Bitnong, Dupax Del	P 2.9M		
		Norte			
i) Bank Protection along		Dopaj, Dupax Del	P 3.4M	ODA	DPWH
the Benay River		Sur			
4. Implementation of Small					
Water Impounding					
Projects (SWIPs) and					
Small Farm Reservoirs					
(SFRs).					
4.1 SWIPs					
a) Sidem SWIP	Earth Embankment provided with irrigation	Sidem, Gattaran,	14.189 M	GOP/LGU	DA and LGU
	outlet works and emergency spillway; vol. of	Cagayan			
	embankment – 46,000 cu.m., storage capacity –				
	48,344 cu.m.				
b) Liwan Norte SWIP	Earth Embankment provided with irrigation	Liwan Norter, Enrile,	10.141 M	GOP/LGU	DA and LGU
	outlet works and emergency spillway; vol. of	Cagayan			
	embankment – 29,220 cu.m., storage capacity –				
	513,250 cu.m.				
c) Abbeg SWIP	Earth Embankment provided with irrigation	Abbeg, Solana,	9.27 M	GOP/LGU	DA and LGU
	outlet works and emergency spillway; vol. of	Cagayan			
	embankment – 30,000 cu.m., storage capacity –				
	41,000 cu.m.				

NAME OF PROJECT	BRIEF DESCRIPTION	LOCATION	FUNDING REQ'T	FUNDING SOURCE	IMPL. AGENCY
d) Bessang SWIP	Earth Embankment provided with irrigation outlet works and emergency spillway; vol. of embankment – 22,000 cu.m., storage capacity – 32,000 cu.m.	Bessang, Allacapan, Cagayan	8.476 M	GOP/LGU	DA and LGU
e) Namamparan SWIP	Earth Embankment provided with irrigation outlet works and emergency spillway; vol. of embankment – 22,000 cu.m., storage capacity – 45,000 cu.m.	Namamparan, Diadi, Nueva Vizcaya	7.894 M	GOP/LGU	DA and LGU
f) Boni South SWIP	Earth Embankment provided with irrigation outlet works and emergency spillway	Boni South, Aritao, Nueva Vizcaya	9.7 M	GOP/LGU	DA and LGU
g) Pinaripab Sur SWIP	Earth Embankment provided with irrigation outlet works and emergency spillway; vol. of embankment – 32,500 cu.m., storage capacity – 49,000 cu.m.	Pinaripab, Aglipay, Quirino	12.559 M		DA and LGU
h) Divisoria Norte SWIP	Earth Embankment provided with irrigation outlet works and emergency spillway; vol. of embankment – 22,500 cu.m., storage capacity – 23,900 cu.m.	Divisoria Norte, Maddela, Quirino	7.803 M	GOP/LGU	DA and LGU
i) San Juan SWIP	Earthwork and construction of Earthen Dam and Spillway	San Juan, Cabagan, Isabela	8.213 M	GOP/LGU	DA and LGU
j) Union SWIP	Earthwork and construction of Earthen Dam and Spillway	Union, Cabagan, Isabela	5.254 M	GOP/LGU	DA and LGU
k) Carikkikan SWIP	Earthwork and construction of Earthen Dam and Spillway	Karikkikan, Cabagan, Isabela	4.780 M	GOP/LGU	DA and LGU
l) Cabannugan SWIP	Earthwork and construction of Earthen Dam and Spillway	Cabannugan, Ilagan, Isabela	6.771 M	GOP/LGU	DA and LGU
m) Buenavista SWIP	Earthwork and construction of Earthen Dam and Spillway	Buenavista, Sta. Maria, Isabela	12.044 M	GOP/LGU	DA and LGU
n) Villaluz SWIP	Earthwork and construction of Earthen Dam and Spillway	Villaluz, Benito Soliven, Isabela	8.950 M	GOP/LGU	DA and LGU
o) Santa Cruz SWIP	Earthwork and construction of Earthen Dam and Spillway	Santa Cruz, Benito Soliven, Isabela	4.575 M	GOP/LGU	DA and LGU

NAME OF PROJECT	BRIEF DESCRIPTION	LOCATION	FUNDING REQ'T	FUNDING SOURCE	IMPL. AGENCY
p) Cabanayan SWIP	Earthwork and construction of Earthen Dam and Spillway	Cabanayan, San Mariano, Isabela	7.850 M	GOP/LGU	DA and LGU
q) San Pablo SWIP	Earthwork and construction of Earthen Dam and Spillway	San Pablo, Cauayan City, Isabela	9.945 M	GOP/LGU	DA and LGU
r) Dumawing SWIP	Earthwork and construction of Earthen Dam and Spillway	Dumawing, Jones, Isabela	4.308 M	GOP/LGU	DA and LGU
s) Santa Isabel SWIP	Earthwork and construction of Earthen Dam and Spillway	Santa Isabel, Jones, Isabela	4.605 M	GOP/LGU	DA and LGU
t) Bangatan SWIP	Earth Embankment provided with irrigation outlet works and emergency spillway; vol. of embankment – 46,000 cu.m., storage capacity – 48,344 cu.m.	Bangatan, Gattaran, Cagayan	13.973 M	GOP/LGU	DA and LGU
u) Lalafugan SWIP	Earth Embankment provided with irrigation outlet works and emergency spillway; vol. of embankment – 28,000 cu.m., storage capacity – 30,000 cu.m.	Lalafugan, Lal-lo, Cagayan	15.504 M	GOP/LGU	DA and DA and LGU LGU
v) Damortis SWIP	Earth Embankment provided with irrigation outlet works and emergency spillway; vol. of embankment – 48,616 cu.m., storage capacity – 48,000 cu.m.	Damortis, Solana, Cagayan	12.575 M	GOP/LGU	DA and LGU
w) Iringan SWIP	Earth Embankment provided with irrigation outlet works and emergency spillway; vol. of embankment – 22,873 cu.m., storage capacity – 44,000 cu.m.	Iringan, Allacapan, Cagayan	10.466 M	GOP/LGU	DA and LGU
x) Dumanisi SWIP	Earth Embankment provided with irrigation outlet works and emergency spillway; vol. of embankment – 20,500 cu.m., storage capacity – 39,000 cu.m.	Dumanisi, Diffun, Quirino	4.725 M	GOP/LGU	DA and LGU
y) Bugnay SWIP	Earth Embankment provided with irrigation outlet works and emergency spillway; vol. of embankment – 43,926 cu.m., storage capacity – 37,657 cu.m.	Bugnay, Tuao, Cagayan	9.366 M	GOP/LGU	DA and LGU

NAME OF PROJECT	BRIEF DESCRIPTION	LOCATION	FUNDING REQ'T	FUNDING SOURCE	IMPL. AGENCY
z) Dalayap SWIP	Earth Embankment provided with irrigation outlet works and emergency spillway; vol. of embankment – 27,658 cu.m., storage capacity – 84,125 cu.m.	Dalayap, Allacapan, Cagayan	11.133 M	GOP/LGU	DA and LGU
aa) Malaram SWIP	Earth Embankment provided with irrigation outlet works and emergency spillway; vol. of embankment – 14,818 cu.m., storage capacity – 32,251 cu.m.	Malaram, Allacapan, Cagayan	6.489 M	GOP/LGU	DA and LGU
4.2 SFRs					
a) SFR (10 units)	Earth Embankment; vol. of embankment – min. 1,000 cu.m. minimum pond area of 600sq.m.	Tuguegara City, Cagayan	0.250 M	GOP	DA and LGU
b) SFR (10 units)	Earth Embankment; vol. of embankment – min. 1,000 cu.m. minimum pond area of 600sq.m.	Enrile, Cagayan	0.250 M	GOP	DA and LGU
c) SFR (20 units)	Earth Embankment; vol. of embankment – min. 1,000 cu.m. minimum pond area of 600sq.m.	Iguig, Cagayan	0.500 M	GOP	DA and LGU
d) SFR (20 units)	Earth Embankment; vol. of embankment – min. 1,000 cu.m. minimum pond area of 600sq.m.	Amulung, Cagayan	0.500 M	GOP	DA and LGU
e) SFR (20 units)	Earth Embankment; vol. of embankment – min. 1,000 cu.m. minimum pond area of 600sq.m.	Alcala, Cagayan	0.500 M	GOP	DA and LGU
f) SFR (20 units)	Earth Embankment; vol. of embankment – min. 1,000 cu.m. minimum pond area of 600sq.m.	Baggao, Cagayan	0.500 M	GOP	DA and LGU
g) SFR (20 units)	Earth Embankment; vol. of embankment – min. 1,000 cu.m. minimum pond area of 600sq.m.	Gattaran, Cagayan	0.500 M	GOP	DA and LGU
h) SFR (10 units)	Earth Embankment; vol. of embankment – min. 1,000 cu.m. minimum pond area of 600sq.m.	Lal-lo, Cagayan	0.250 M	GOP	DA and LGU
i) SFR (10 units)	Earth Embankment; vol. of embankment – min. 1,000 cu.m. minimum pond area of 600sq.m.	Allacapan, Cagayan	0.250 M	GOP	DA and LGU
j) SFR (10 units)	Earth Embankment; vol. of embankment – min. 1,000 cu.m. minimum pond area of 600sq.m.	Piat, Cagayan	0.250 M	GOP	DA and LGU
k) SFR (10 units)	Earth Embankment; vol. of embankment – min. 1,000 cu.m. minimum pond area of 600sq.m.	Sto Niño, Cagayan	0.250 M	GOP	DA and LGU
1) SFR (20 units)	Earth Embankment; vol. of embankment – min. 1,000 cu.m. minimum pond area of 600sq.m.	Lasam, Cagayan	0.500 M	GOP	DA and LGU

NAME OF PROJECT	BRIEF DESCRIPTION	LOCATION	FUNDING REQ'T	FUNDING SOURCE	IMPL. AGENCY
m) SFR (10 units)	Earth Embankment; vol. of embankment – min.	Casibu, Nueva	0.250 M	GOP	DA and LGU
	1,000 cu.m. minimum pond area of 600sq.m.	Vizcaya			
n) SFR (10 units)	Earth Embankment; vol. of embankment – min.	Kayapa, Nueva	0.250 M	GOP	DA and LGU
	1,000 cu.m. minimum pond area of 600sq.m.	Vizcaya			
o) SFR (10 units)	Earth Embankment; vol. of embankment – min.	Sta. Fe, Nueva	0.250 M	GOP	DA and LGU
	1,000 cu.m. minimum pond area of 600sq.m.	Vizcaya			
p) SFR (10 units)	Earth Embankment; vol. of embankment – min.	Bambang, Nueva	0.250 M	GOP	DA and LGU
	1,000 cu.m. minimum pond area of 600sq.m.	Vizcaya			
q) SFR (10 units)	Earth Embankment; vol. of embankment – min.	Solano, Nueva	0.250 M	GOP	DA and LGU
	1,000 cu.m. minimum pond area of 600sq.m.	Vizcaya			
r) SFR (10 units)	Earth Embankment; vol. of embankment – min.	Bayombong, Nueva	0.250 M	GOP	DA and LGU
	1,000 cu.m. minimum pond area of 600sq.m.	Vizcaya			
s) SFR (10 units)	Earth Embankment; vol. of embankment – min.	Quezon, Nueva	0.250 M	GOP	DA and LGU
	1,000 cu.m. minimum pond area of 600sq.m.	Vizcaya			
t) SFR (15 units)	Earth Embankment; vol. of embankment – min.	Bagabag, Nueva	0.375 M	GOP	DA and LGU
	1,000 cu.m. minimum pond area of 600sq.m.	Vizcaya			
u) SFR (20 units)	Earth Embankment; vol. of embankment – min.	Villaverde, Nueva	0.500 M	GOP	DA and LGU
	1,000 cu.m. minimum pond area of 600sq.m.	Vizcaya			
v) SFR (20 units)	Earth Embankment; vol. of embankment – min.	Dupax Del Sur,	0.500 M	GOP	DA and LGU
	1,000 cu.m. minimum pond area of 600sq.m.	Nueva Vizcaya			
w) SFR (20 units)	Earth Embankment; vol. of embankment – min.	Dupax Del Norte,	0.500 M	GOP	DA and LGU
	1,000 cu.m. minimum pond area of 600sq.m.	Nueva Vizcaya			
x) SFR (20 units)	Earth Embankment; vol. of embankment – min.	Diadi, Nueva	0.500 M	GOP	DA and LGU
	1,000 cu.m. minimum pond area of 600sq.m.	Vizcaya			
y) SFR (10 units)	Earth Embankment; vol. of embankment – min.	Aritao, Nueva	0.250 M	GOP	DA and LGU
	1,000 cu.m. minimum pond area of 600sq.m.	Vizcaya			
z) SFR (20 units)	Earth Embankment; vol. of embankment – min.	Diffun, Quirino	0.500 M	GOP	DA and LGU
	1,000 cu.m. minimum pond area of 600sq.m.				
aa) SFR (10 units)	Earth Embankment; vol. of embankment – min.	Cabbaroguis,	0.250 M	GOP	DA and LGU
	1,000 cu.m. minimum pond area of 600sq.m.	Quirino			
ab) SFR (10 units)	Earth Embankment; vol. of embankment – min.	Aglipay, Quirino	0.250 M	GOP	DA and LGU
	1,000 cu.m. minimum pond area of 600sq.m.				

NAME OF PROJECT	BRIEF DESCRIPTION	LOCATION	FUNDING REQ'T	FUNDING SOURCE	IMPL. AGENCY
ac) SFR (10 units)	Earth Embankment; vol. of embankment – min. 1,000 cu.m. minimum pond area of 600sq.m.	Saguday, Quirino	0.250 M	GOP	DA and LGU
ad) SFR (15 units)	Earth Embankment; vol. of embankment – min. 1,000 cu.m. minimum pond area of 600sq.m.	Nagtipunan, Quirino	0.375 M	GOP	DA and LGU
ae) SFR (100 units)	Earthwork and Construction of Embankment	1st District of Isabela	2.500 M	GOP	DA and LGU
af) SFR (150 units)	Earthwork and Construction of Embankment	2nd District of Isabela	3.750 M	GOP	DA and LGU
ag) SFR (150 units)	Earthwork and Construction of Embankment	3rd District of Isabela	3.7500 M	GOP	DA and LGU
ah) SFR (200 units)	Earthwork and Construction of Embankment	4th District of Isabela	5 M	GOP	DA and LGU
B. Non-Structural					
1. Improvement of flood warning and flood forecasting system (GIS)					
a) Upgrading of instruments used in Elocal Forecasting and		Magat Complex, Ramon, Isabela	14 M	ODA	NIA-MARIIS
Warning System (FFWS) for Magat Dam Complex		Mun. along the tributaries of Magat River	3.0M	GOP	PAGASA/ PDCC/MDCC
 b) Rehabilitation of existing and establishment of additional Flood Forecasting and Warning System (FFWS) units at downstream of Gamu Bridge up to Aparri. 		Gamu, Isabela to Aparri, Cagayan	250 M	ODA	NIA-MARIIS/ PAG-ASA
2. Watershed protection and rehabilitation in Upper Magat River Basin and					

NAME OF PROJECT	BRIEF DESCRIPTION	LOCATION	FUNDING REQ'T	FUNDING SOURCE	IMPL. AGENCY
major tributaries					
a) Forest Protection/ Deployment of Forest Rangers to conduct forest patrol and surveillance operation		N. Vizcaya, Quirino, Isabela, Cagayan	30 M	ODA	DENR
b) Reforestation of denuded/open areas (1,500 has.)		Quirino and Nueva Vizcaya	64.72 M	ODA	DENR
c) Management and protection of the Magat Dam	The project covers 2,000 has Forest plantation in the Magat Watershed	Ramon, Isabela	2 M	GOP	NIA-MARIIS
3. Creation of Local Councils for Cagayan River Basin (CRB).	The CRB Council will be the primary local body to look into the development and protection of the Cagayan River to include flooding concerns.	Concerned provincial LGUs		Provl LGUs	Provl. LGUs
4. Desilting of Waterways within the service area of Magat and other National Irrigation Systems					
a) Desilting of MARIIS drainage system	Desilting of waterways/drainage within the service area of MARIIS covering 82,294 hectares	Congressional District I, II, III and IV in the Province of Isabela	200 M	ODA	NIA-MARIIS
II. Short –Term (2008-2012)					
A. Structural					
1. Construction of other bank protection in	Continuing river bank protection will be pursued to minimize lose of properties and			ODA	DPWH

NAME OF PROJECT	BRIEF DESCRIPTION	LOCATION	FUNDING REQ'T	FUNDING SOURCE	IMPL. AGENCY
identified high erosion rate areas	investments				
a) Bank Protection along the Cagayan River		Magapit, Gattaran Gattaran Babayuan Natappian, Solana Jet., Enrile Alibago, Enrile Sta. Maria, Isabela Cabagan, Isabela Larion, Tug. Caggay, Tug. Tanza, Tug. Dammang East, Echague Gucav, Echague	P 24M P 22.8M P 5M P 24.4M P 10.2M P 8.0M P 37.5M P 61.9M P 2M P 8.3M P 2.1M P 25.1M P 44.2M	ODA	DPWH
b) Construction of bank protection along the Magat River	Construction of gabion revetments and series of spur dikes including rechanneling of Magat River	Bayombong Batu Ferry Vista Hills Busilac Magsaysay Vista Alegre Santa Rosa Bonfal East Bonfal Proper Solano Bagahabag Curifang Dadap Bangar	50.0 M 50.0 M	ODA	DPWH

NAME OF PROJECT	BRIEF DESCRIPTION	LOCATION	FUNDING REQ'T	FUNDING SOURCE	IMPL. AGENCY
		Bagabag Pogonsino Tuao Baretbet San Pedro Lantap Santa Lucia	25. M		
c) Construction of SWIM Projects in the upper tributaries of Magat River	Construction of gabion type dams in upstream/ upland tributaries of Magat River	Santa Fe, Kayapa, Dupax del Sur, Dupax del Norte, Aritao, Kasibu, Ambaguio, Bambang	300.0 M	ODA	DPWH/ DENR
d) Construction of revetments along the Apatan River	Construction of gabion type revetments	Lamo, Dupax del Norte Almaguer, Bambang Santo, Domingo Bambang	15.0 M	GAA	DPWH
e) Construction of revetments along the Marian River	Construction of gabion type revetments	Dupax del Sur	50.0 M	GAA	DPWH
f) Construction of Gabion revetments with series of spur dikes	Construction of revetments with spur dikes along the Santa Fe river and Santa Cruz river	Bambang, Nueva Vizcaya Santa Fe River Indiana Barrio Section Almaguer North Section Santa Cruz River Salinas Section Barat Section San Leonardo	10.0 M 15.0 M 20.0 M 15.0 M 15.0 M	ODA	DPWH

NAME OF PROJECT	BRIEF DESCRIPTION	LOCATION	FUNDING REQ'T	FUNDING SOURCE	IMPL. AGENCY
		Section			
		San Fernando River San Fernando Section	15.0 M		
2. Implementation of the	Identified projects in the "urgent phase" will	COC	7.392 B	ODA	DPWH
COCs and Dike Embankment projects.	determine the exact location and amount of COCs and Dikes along the lower Cagayan River.	DIKE	5.735 B	ODA	DPWH
3. Construction of flood control structures identified in the Magat River Integrated Flood Control Project specifically the ff:					
a) Darubba-Caliat- Nalubbunan Prot- ection Dike	Construction of protection earth dikes along the Nalubbunan River	Quezon, N. Vizcaya	50.0 M	ODA	DPWH
b) Macate and Santo Domingo Hurdles and protection dike	Construction of earth protection dike and gabion type hurdles to reclaim the land	Bambang, N. Vizcaya	150.0 M	ODA	DPWH
 Constuction of the Matuno, Tumauini, Siffu, Alimit, Mallig and Kalipkip Dam Projects 		Matuno Irrig Proj. Tumauini Irrig. Proj. Siffu Alimit Mallig Kalipkip	22.47 B 3.22 B 26.7 B 12 B 42.67 B 3.33 B	ODA	NIA
5. Implementation of Small Farm Reservoirs (SFRs).				GOP	DA and LGU
a) Cagayan - 200 units			5M		
b) N. Vizcaya - 200 units			5M		
c) Quirino – 200 units			5M		

NAME OF PROJECT	BRIEF DESCRIPTION	LOCATION	FUNDING REQ'T	FUNDING SOURCE	IMPL. AGENCY
B. Non-Structural					
1. Watershed protection and rehabilitation in Upper Cagayan River Basin.					
a) Forest Protection	Deployed Forest Rangers to conduct forest patrol and surveillance operation	N. Vizcaya, Quirino, Isabela, Cagayan	0.09 M	GOP	DENR
b) Reforestation of open/denuded areas (10,000 has.)		N. Vizcaya, Quirino	0.431 M	ODA	DENR
c) Assisted Natural Regeneration		Isabela, Quirino, N. Vizcaya	396.74 M	GOP	DENR
2. Formation/Organization of POs for watershed and dams.				GOP	LGUs
3. Conduct of FS/DE for proposed dams and SWIP.				GOP	DA
III. LONG-TERM (2013-2030)					
A. Structural					
1. Completion dams and dike embankment system.					
2. Full implementation of the Magat River Integrated Flood Control Project specifically the ffg:	Implementation of the structures contained in the project study.				
a) Road Dike from Batu	Concrete surfaced dike with a concrete road on	Bayombong and	320.0 M	ODA	DPWH

NAME OF PROJECT	BRIEF DESCRIPTION	BRIEF DESCRIPTION LOCATION		FUNDING SOURCE	IMPL. AGENCY
Ferry, Bayombong to Curifang, Solano (Western River Bank of Magat River)	top with an estimated length of16.0 kms. This road will serve as alternate road for the existing Cagayan Valley national road.	Solano, Nueva Vizcaya			
 b) Road Dike from Curifang to Santa Lucia (Western River Bank of Magat River) 	Concrete surfaced dike with earth road on top	oncrete surfaced dike with earth road on top Solano and Bagabag 21		ODA	DPWH
c) Road dike from Batu Ferry to Santa Lucia (Eastern side of the Magat River)	dike from Batu to Santa Lucia ern side of the MagatConcrete surfaced dike with road on top BagabagBayombong, Solano, Bagabag		434.0 M	ODA	DPWH
d) Macate – Santo Domingo Hurdles	Construction of series of gabion type hurdles Acting as land reclamation structures Domingo,		151.20 M	ODA	DPWH
e) Macate – Almaguer Road Dike	Construction of a road dike on the eastern side of Magat River going to Santa Fe River. The dike has concrete facing and PCCP on top. It will act as alternate road to National Road at Bambang.	Macate to Almaguer Bambang	220.0 M	ODA	DPWH
f) Batu Ferry – Santo Domingo Road Dike	Construction of a road dike on the western side of Magat river going to the Matuno River. The dike has concrete facing with an earth road on top.	Santo Domingo, Bambang	42.0 M	ODA	DPWH
g) Construction of series of Sabo Dam Weirs along the Magat River(stepped dams)	Construction of a gabion type sabo dam weirs to retard the flow of Magat River. It will mitigate the sharp drop in gradient of the Magat River and control erosion and siltation.	Bambang, Bayombong, Solano, Bagabag	1.595 B	ODA	DPWH

NAME OF PROJECT	BRIEF DESCRIPTION	LOCATION	FUNDING REQ'T	FUNDING SOURCE	IMPL. AGENCY
h) Construction of cut off channel/ pilot channel	Construction of pilot channel along the Magat river to train the river flow and aligned/ anchored with the sabo dams	Bambang, Bayombong, Solano, Bagabag	264.0 M	ODA	DPWH
i) Dynamite Hill overflow dam with headgate for irrigation and overflow bridge on top of the dam for light vehicles (480 m)	A low irrigation dam will be constructed to irrigate the ricelands along the footslopes of the valley and the lowland un-irrigated riceland of Villaverde and Bagabag. In like manner, an overflow bridge will be built on top as an access road to the other side of river. The water once impounded will also become as a tourism attraction.	Vista Alegre – Paitan Section, Bayombong	20.0 M	ODA	DPWH
3. Implementation of the Magat River Tributaries Flood Control Measures	Construction of erosion control measure structures like sabo dams at the major tributaries and upstreams. Also include vegetative measures that control landslides and erosions.	Kayapa, Santa Fe, Aritao, Kasibu, Bambang, Dupax del Sur, Dupax del Norte, Ambaguio of N. Vizcaya and Asipulo of Ifugao	1.0 B	ODA	DPWH
B. Non-Structural					
1. Cagayan River Basin Watershed Management and Rehabilitation.					
a) Forest Protection		N. Vizcaya, Qui- rino, Isa., Cag.	0.19 M	GOP	DENR
b) Reforestation of open/denuded areas (10,000 has.)		N. Vizcaya, Quirino, Isabela, Cagayan	0.863 M	GOP	DENR
c) Assisted Natural Regeneration		Isabela, Cagayan, Quirino,	1.587 B	ODA	DENR

NAME OF PROJECT	BRIEF DESCRIPTION	LOCATION	FUNDING REQ'T	FUNDING SOURCE	IMPL. AGENCY
2. Establishment and				GOP	LGUs
Maintenance of Tree					
Zones along Buffer					
Zone.					
3. Creation of Cagayan				GOP	Congress
River Basin Authority					
TOTAL FUNDING REQUIREMENT			132.890 B		

SUMMARY OF REGION 02 FLOOD MITIGATION PROJECTS

URGENT PROJECTSCostFund Sourcea) Structural:	PROJECTS	FUNDING RE	QUIREMENT
URGENT PROJECTS		Cost	Fund Source
a) Structural:	URGENT PROJECTS		
1. Conduct of Feasibility Study (FS) and/or Detailed Engineering (DE) for priority dams, dikes and cut-off-channels (COCs). 390.80 M ODA 2. Strengthening of Local DCCs i.e., training of Local DCCs, setting-up of multi-purpose evacuation centers in strategic areas, procurement of equipments, etc 26 M GOP 3. Bank protection in identified critical areas 809.30 M ODA 65%. 4. Implementation of Small Water Impounding Projects (SWIPs) and Small Farm Reservoirs (SFRs). 557.25 M ODA 65%. 5. WIPS 157.25 M ODA 65%. 84.68 M GOP (35%) 5FRs 25 M ODA 65%. 6. 84.68 M GOP (35%) 0DA 60P 1. Improvement of flood warning and flood forecasting system (GIS) 3 M GOP 2. Watershed protection and rehabilitation in Upper Magat River Basin and major tributaries 2 M GOP 4. Desilting of Waterways within the service area of Magat and other National Irrigation Systems - GOP 5. HORT TERM PROJECTS - - - a) Structural - - - 1. Construction of the CoCs and Dike Embankment projects. 13.13 B ODA 3. Construction of flood control structures identified in the Magat River Integrated Flood Control Project specifically t	a) Structural:		
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(SFRs).	5. Implementation of Small Farm Reservoirs	15 M	ODA
	(SFRs).		

PROJECTS	FUNDING REQUIREMENT	
	Cost	Fund Source
b) Non-Structural		
1. Watershed protection and rehabilitation in Upper Cagayan River Basin.	0.431 M	ODA
	396.83 M	GOP
2. Formation/Organization of POs for watershed and dams.		
3. Conduct of FS/DE for proposed dams and SWIP.		
a) Structural		
1. Completion dams and dike embankment system.	2 256 P	
2. Full implementation of the Magat River integrated Flood Control Project specifically the ffg:	3.230 B	ODA
3. Implementation of the Magat River Tributaries	1.0 B	ODA
Flood Control Measures		
b) Non-Structural		
1. Cagavan River Basin Watershed Management and	1.587 B	ODA
Rehabilitation.	1.05 M	GOP
2. Establishment and Maintenance of Tree Zones		
Creation of Cagavan River Basin Authority		
5. Creation of Cagayan Kiver Dasin Autionty		
T o t a l	132.89 B	

COST SUMMARY

FUND SOURCE	URGENT	SHORT TERM	LONG TERM	TOTAL
Structural				
ODA	1.38 B	124.52 B	4.256 B	130.16 B
GOP	0.111 B	0.065 B	-	0.180 B
Non-Structural				
ODA	558.72 B	0.431 M	1.587 B	2.146 B
GOP	0.005 B	0.397 B	1.05 M	0.403 B
Total	2.05 B	124.99 B	5.84 B	132.89 B