CHAPTER III PRESENT CONDITION OF WATER RESOURCES DEVELOPMENT AND USE

III. PRESENT CONDITION OF WATER RESOURCES DEVELOPMENT AND USE

3.1 Municipal and Industrial Water

3.1.1 General Water Use

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(1) Registered water rights

The water rights of a water resource have been granted by the NWRB, before applicants utilize a water source for their own facilities. The granted water right data have been stored in a database of NWRB with respect to the purpose of water use, quantity of water, etc. The NWRB's database is the only source to grasp the state of use of water resources on a nation wide basis. The propriety of each water right application is evaluated by the NWRB based on registered data on available water sources and the standard criterion for each water use sector. The standard criterion or procedure for water rights grant is as follows:

Water Use Sector	Standard Criterion or Procedure for Water Rights Grant
Domestic	0.0029 lps per capita
Commercial	The application shall be examined and approved by NWRB, while WD issues a clearance for processing water permit.
Industrial	The application shall be examined and approved by NWRB, while DENR issues a clearance for processing water permit.
Irrigation	1.5 lps per ha for paddy field (Other crops and plants have the different standard values.)
Livestock	0.00024 lps per head for cattle and swine, and 0.0000146 lps per head for poultry
Recreation	0.6 lps per ha for the planned golf course area
Fishery	3.15 and 6.30 lps per ha for prawns in freshwater and brackish water respectively, and 0.9259 lps per ha for other than prawns
Hydropower	The application shall be examined and approved by NWRB, while NPC issues a clearance for processing water permit.

(2) Type of source

The water resource is generally categorized into two types, namely "surface water" and "groundwater". The groundwater is classified into "wells" and "springs" in accordance with the mode of its extraction. In the NWRB's database on water right, the water resources for which water rights are applied are classified into one of those three types. In case of well, on the other hand, it is noted that the different kind of structures, namely "shallow and deep wells", "dug and driven wells", "infiltration wells and galleries" and so on, are utilized to extract groundwater.

It might be advantageous for water rights applicants to develop surface water, if it is sufficiently available in quality and quantity. Especially in case of large-scale municipal, industrial and irrigation water supply, development of surface water is preferred to groundwater due to the lower cost. On the other hand, generally, groundwater is assessed

to have higher quality (suitable as drinking water) than surface water and it is distributed more widely in populated area. Especially in an area where it is costly to develop surface water due to the topographical disadvantage such as an area which does not allow water supply by gravity flow, groundwater consisting chiefly of spring source could be developed at adequate cost.

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(3) Water usage

In the NWRB's database, the water use sectors are classified into eight categories, namely domestic, commercial, industrial, irrigation, power, livestock, recreation and fishery sectors. All of the water rights applications are classified into one of the eight sectors. In this study, registered data in the NWRB's database were analyzed statistically under the following conditions:

- Municipal water comprises domestic, commercial and industrial water.
- Some of commercial and industrial water is categorized into domestic water concerning the Level-III water supply system.
- Unutilized surface water amount for water rights which were granted to MWSS and Leyte Metro WD were excepted from the present water use based on the information obtained from the concerned agencies.
- Water for hydropower is utilized for energy generation only. Therefore, it isn't consumed actually.

Other water uses take place in the livestock, recreation and fishery sectors except for irrigation sector. In this study, the water use in sectors other than the irrigation sector is categorized into municipal, industrial and other water use taking into account the present situations of the public water supply and privately owned systems as shown below:

Allotment of Water Use

Water Use Sector	Public Water	Privately Owned Facility	
	Level-III	Level-II and -I	
Domestic water	Municipal	Municipal	Municipal
Commercial water	Municipal	-none-	Municipal
Industrial water	Municipal	-none-	Industrial
Other usage	Municipal	-none-	Other water use
Irrigation water	-ne	one-	Irrigation

Table 3-1 represents the registered water rights by water use sector. The features of sectoral water use are seen from the water right data as follows:

- The irrigation water reaches about 56,000 MCM/year, accounting for 91.8% of total water amount for the granted water rights.
- Municipal and industrial water occupies only 6.7% of the total granted water amount.
- 52.6% of municipal water relies on surface water, while remaining 47.4% on

groundwater.

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- The granted municipal water amount is closely related with population.
- In WRR III, there is a large amount of surface water for the granted water rights, including that for "Angat River". The river water is utilized for water supply to the service area of MWSS, which is located within WRR IV.
- WRR IV has a large amount of the granted groundwater for municipal water, which is mainly utilized in the outskirts of Metro Manila.
- More than 40% of the granted municipal water is occupied by the NCR and its outskirts.
- The majority of sources of industrial water are surface water, which accounts for 85.3% of the granted total industrial water.
- The granted industrial water amount is closely correlated with GRDP.
- In the four water resources regions, WRR VI, X, XI and XII, a larger proportion of the granted surface water for industrial water use is applied for the use in mining including refinery, milling and manufacturing.
- The majority of irrigation water relies on surface water, accounting for 98.8% of the total granted irrigation water.

3.1.2 Existing Water Supply Systems

(1) Municipal water supply

In this study, municipal water supply comprises public water supply for urban and rural areas and privately owned water sources for domestic and commercial use. This study focuses on the water demand projection for public water supply.

Types of facilities and Definition of Service Level Standard

The National Sector Plan defines the service levels and system components of water supply systems and facilities as shown in Table 3-2 and summarized below:

(a) Level-III System

The Level-III system, individual house connection system at the municipal level, is usually established and operated by the Water Districts under the technical and financial assistance of LWUA. Presently, the number of water supply system presently in operation reaches 404 systems all over the country. Table 3-3 shows them by water resource region. Meanwhile, MWSS, which is the largest water supply system in the Philippines, provides water to about 7.1 million persons as of 1995 in Metro Manila and its adjoining area.

(b) Level-II System

The Level-II system, communal faucet system, is designed to cater for barangay level water supply with a limited service coverage and supply capacity. These systems have been implemented by different agencies such as DPWH, LWUA, DENR and DILG/LGU's, relying mainly on spring water sources. These facilities are operated by LGU's, RWSA's or NGO's. The following table

shows the number of Level-II systems relating to DPWH:

Number of Level-II Water Supply Systems

Region	1	11	111	IV		VI	VII	VIII	lΧ	X	XI	XII	total
Operational	-	18	15	67				18		230	65	-	942
Non-Operational	_		-	3	8	9	4		34	10	6	1	7 5
Total		18	15	70	184	61		18				l	1017

Data Source: Spring Development for Water Supply Level-II System, as of January 1997 (DPWH/PMO)

(c) Level-I Facility

Level-I facility, point source system, is common in rural barangays, the majority of which are owned privately. Major facilities are different types of wells equipped with hand-pumps or developed springs with conveyance pipes and one communal faucet.

Classification of Urban and Rural Areas

The NSO classifies a barangay as urban when it satisfies any of the following conditions on the economic and social functions:

- (a) In their entirety, all municipal jurisdictions which, whether designed as chartered cities, provincial capital or not, have a population density of at least 1,000 persons per square kilometer.
- (b) Poblaciones or central districts of municipalities and cities which have a population density of at least 500 persons per square kilometer.
- (c) Poblaciones or central districts (not included in nos. 1 and 2) regardless of population size which have the following:
 - Street pattern, i.e., network of streets either at parallel or in right angle orientation,
 - At least six establishments (commercial, manufacturing, recreational and/or personal services), and
 - At least three of the following:
 - i) a town hall, church or chapel with religious services carried on at least one month,
 - ii) a public plaza, park or cemetery,
 - iii) a market place or building where trading activities are carried on at least once a week, and
 - iv) a public building like school, hospital, culture and health center or library.
 - Barrios/barangays having at least 1,000 inhabitants which meet the conditions set forth in No. 3 above, and in which the occupation of inhabitants is predominantly non-farming/fishing.

All areas not falling under the urban classification are defined as rural area.

Service Coverage

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In this study, service coverage was classified into two groups, namely Level-III system and Level-I system including II system, since the Level-II system is limited in service coverage and supply capacity utilizing spring sources.

The service coverage of Level-III system in both urban and rural areas was clarified based on the data obtained from MWSS and LWUA. That of Level-I facility including Level-II system was estimated considering several provincial sector plans prepared by DILG and the report prepared by DPWH.

Table 3-4 shows existing service coverage of urban and rural areas of the provinces which are referred in the provincial sector plan. Table 3-5 tabulates the nationwide Level-I service coverage.

As for the provinces, which are not included by the provincial sector plan, an average service coverage of the plan of 69% was applied to urban areas and likewise an average service coverage of 73% was applied to rural areas. The existing service coverage by WRR is shown in the following table and Figure 3-1:

Region	_1	11	111	IV	v	VI	VII	VIII	ìΧ	X	XI	XII	Total
Urban	74	64	64	66	67	69	69	69	69	69	84	69	68
Rurai	75	67	67	69	79	80	77	80	76	78	77	74	75
Total	74	67	67	66	76	73	73	77	73	74	80	72	72

The overall existing service coverage is summarized in following table:

Overall Service Coverage

		Rural Area	Total		
· · · · · · · · · · · · · · · · · · ·	Metro Manila	Other Urban Area	Sub-total		
Level III system	62%	30%	39%	5%	22%
Level I, II system		40%	29%	70%	49%
Total	62%	70%	68%	75%	72%

As of 1995, around 72 % of the total population were assumed to have an access to the public water supply system. The service coverage reaches 62% in Metro Manila, 70% in other urban areas and 75% in the rural areas. The remaining 28% of the population were not covered by the public water supply system and were considered to have utilized privately owned water sources.

Present Water Demand

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The present water demand of Level-III system was estimated based on the data collected

from MWSS and LWUA, while that of Level-I facility including Level-II system was estimated by multiplying the population served by an assumed unit water consumption of 30 lpcd. Tables 3-6 and 3-7 show the present water demand of MWSS and the WDs.

Table 3-8 together with Figures 3-2 and 3-3 represents the present water demand for municipal water supply by WRR. The total amount of water was estimated to be 1,958 MCM/year. Among them, water demand in WRR IV including Metro Manila was estimated at 1,131 MCM/year, which accounts for 57 % of the total water demand for public water supply.

Adding the water demand for the above privately owned water sources to that for public water supply, the total water demand for domestic use comes to be 2,172 MCM/year applying the same unit water consumption rate of 30 lpcd to the domestic use as shown in Table 3-9.

Further, if the privately owned commercial water which is shown below is added to the above total water amount, the total amount of municipal water was estimated to be 2,187 MCM/year:

Privately Owned Commercial Water by WRR

											(Unit: MC	M/year)
1	11	Ш	iv	ν	VI	VII	VIII	IX	X	ΧI	XII	Total
0.2	0.0		8.9		2.4		0.6			0.3	1.7	15.0

Data Source: NWRB

(2) Industrial Water Supply

Industrial water is classified into two groups; the water supplied by municipal water supply system and privately owned water sources (self-supplied industrial water). However, industrial water through municipal water supply systems generally occupies a small proportion. Accordingly, in this study, the privately owned water sources are focused on.

Likewise, registration of water rights for other water uses is required in utilizing water sources for industrial purposes. However, many factories/facilities seem to utilize the water sources, especially ground water, without registration.

Table 3-10 represents past water rights granted for industrial use. Based on these water rights, the existing industrial water demand was estimated to be 2,335 MCM/year as shown in Table 3-11 and Figures 3-4 and 3-5.

The water demand in WRR IV including Metro Manila and WRR VI, among them, occupied 28% and 25% of the total volume, respectively. Especially in WRR VI, there exist milling facilities and sugar factories, which consume a large amount of surface water.

3.1.3 Issues and Problems of Existing Water Supply Systems

(1) Metro Manila

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The water shortage in Metro Manila, in particular, is critical because of the high population density and brisk economic activities therein. Further, the unaccounted-for water shares more than half of the total water production as shown in Table 3-6. The operation and management of water supply system of Metro Manila has been just turned over to the private sector from MWSS. The key issue would be how to expand and improve the whole system including water source and distribution facilities to meet the water demand.

(2) Metro Cebu

According to the annual report of the Metro Cebu Water District (MCWD), as of December 1995, MCWD was able to serve 36% of total demand and produced water of 11,220 m³/day on an average. Even with these figures, demand still far outweighs supply. Hence, a series of water resource development projects need to be studied and implemented to reduce the gap between the supply and demand. These projects include the Mananga Phase I and II, Lusaran Dam, and Inabanga I and II. Yet, despite these projects, the need for more water continues.

(3) Davao City

On the other hand, regarding water source for Davao City, the water district is planning a surface water development by BOT. The water shortage in Davao City is expected to be solved through the realization of the new development project.

3.2 Agriculture

3.2.1 Existing Irrigation Systems

As of December 1996, there are 11,089 irrigation systems all over the country, of which 173 are NIS, 9,107 are CIS, 256 are SWIM, 569 are diversion dams and 984 are STW. As a whole, the present irrigation systems cover a total irrigation service area of about 1.36 million ha or about 43 percent of the 3.2 million ha potential irrigable area to be devoted to rice cultivation. The status of the irrigation development as of December 1996 is presented in Table 3-12 by province and water resources region. In the Table, a province with coverage of more than two water resources regions is delineated based on the hydrological boundaries. Figures 3-6 to 3-17 show the location of irrigation development schemes in each water resources region.

(1) National Irrigation System (NIS)

Presently, there are 651,812 ha of irrigation service area covered by the 173 NIS or about 48 percent of the total irrigation service area of the country. However, it was observed that the average irrigated areas between 1985 and 1995 account for only 73 percent of the total irrigation service area during wet season and about 62 percent of the total irrigation service area during the dry season. The average cropping intensity is derived to be 135.2 percent.

(2) Communal Irrigation System (CIS)

Generally, the CIS is served by the unregulated flow of small rivers and streams. An intake without diversion weir is usually provided for this system. As of December 1996, there are 9,107 CIS with a total service area of 670,018 ha, occupying about 49 percent of the total irrigation service area. The CIS is further classified into amortizing, non-amortizing and private systems. During wet season, the irrigated area reaches 63 percent of the total irrigation service area, but during the dry season, irrigated area drops to 44 percent. The average cropping intensity is derived to be 107.3 percent. A summary of the inventory of the Communal Irrigation Systems (CIS) is presented in Table 3-13.

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(3) Small Water Impounding Projects (SWIM)/Diversion Dams

NIA, BSWM and DPWH implemented a total of 256 SWIM projects with total irrigation service area of 15,762 ha. BSWM developed 569 diversion dams with a total irrigation service area of 21,233 ha. The SWIM projects and diversion dams nationwide cover an irrigation service area of 36,995 ha, which is equivalent to about 3 percent of the total irrigation service area.

(4) Groundwater Irrigation Systems

The use of groundwater for irrigation is being explored at many places where surface water is unavailable. This is an alternative solution to the more costly construction of complex irrigation facilities. As of December 1996, BSWM implemented 984 shallow tubewell irrigation systems nationwide with a total irrigation service area of 2,878 ha. The NWRB's water rights data reveal that there are 1,382 approved permits allowing the tapping of groundwater for irrigation. The total amount of water to be withdrawn is 21,200 lps, which covers a service area of approximately 14,400 ha. The service area was estimated based on average water requirement of 1.5 lps/ha per the NWRB's datum as shown in Table 3-14.

3.2.2 Issues and Problems of Existing Irrigation Systems

The performance of irrigation systems is affected not only by the delayed onset of rainy season, droughts and floods, but also by poor water management and operation and maintenance (O&M) of the systems. The water management and O&M of the systems are not being conducted properly and effectively due to the following factors:

(1) Water Management

One factor is given by the absence of measuring devices for river as well as irrigation canal discharge. With this situation, it becomes difficult to determine whether the present water use is sufficient or not. Consequently, the NIS offices were unable to prepare an applicable cropping calendar based on the probable water supply.

Another factor is the insufficient information to the farmers on water delivery and distribution schedule. More often, farmers do not follow the cropping calendar due to lack of water delivery and distribution schedules.

Another contributing factor is the lack of drainage and water control facilities. Most systems have defective diversion works, inadequate drainage and other on-farm facilities.

(2) Operation & Maintenance (O&M)

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Problems on this aspect include poor O&M works due to the shortage of fund and technical staff. Insufficient fund for O&M is given by low ISF collection being encountered by irrigation offices. For this reason, funds for O&M cost of water control facilities are not properly allocated to NIS offices concerned. This causes deterioration of irrigation and drainage facilities resulting in poor water management wherein irrigation water cannot be delivered and distributed efficiently.

Another factor is the lack of O&M manuals that can be put into proper use by farmer-beneficiaries. The O&M manuals available to them cannot be easily understood and utilized effectively. The "General Operation and Maintenance Manual" prepared by NIA was not utilized for the purpose because the field staff were not able to understand its contents.

3.2.3 Existing Irrigation Development Plans Formulated by NIA and BSWM

The 10-year Irrigation Development Programs prepared by each of the Planning Group of NIA and BSWM covering the period from 1997 to 2006 were collected for the Study. These programs describe the irrigation development plans under the jurisdiction of each agency. There are twenty seven (27) on-going major irrigation projects, twenty three (23) priority irrigation projects, eighteen (18) other irrigation projects, and three (3) other related projects. NIA planned to develop a total of 373,845 ha of new irrigation areas and rehabilitate or improve existing irrigation areas of 882,056 ha. The new irrigation areas include 340,308 ha for National Irrigation Projects (NIPs) and 33,537 ha under the Communal Irrigation Projects (CIPs). For rehabilitation of existing areas, 833,915 ha are under NISs and 44,141 ha are under CISs. NIA is also planning to undertake the improvement of selected NISs with a total service area of 211,000 ha. It is also endeavored to sustain O&M of NISs covering a total service area of 651,812 ha as well as to reforest 11,300 ha in the Magat watershed. On top of these, NIA also planned to improve a total of 2,350 km drainage facilities and access roads with a total length of 6,061 km. Moreover, sixty-seven (67) SWIM projects would also be implemented within the period.

The Department of Agriculture (DA) has entrusted the implementation of Small Scale Irrigation Infrastructure Project to the BSWM. These projects include SWIP/DD, STW and SFR. The BSWM programmed the development of new irrigation areas with a total area of 132,015 ha for SWIP/DD, 165,933 ha for STW and 23,068 ha for SFR. No rehabilitation of existing systems is included in the program.

The on-going and proposed major irrigation projects are listed as follows:

On-going projects

- 1) Diversified Crops Irrigation Project II (WRR 3)
- 2) Palawan Integrated Area Development Project II Irrigation Component (WRR4)

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- 3) Bohol Irrigation Project I (WRR 7)
- 4) Visayas Communal Irrigation Participatory Project (WRR 6, WRR 7,& WRR 8)
- 5) Malitubog-Maridagao Irrigation Project (WRR 12)
- 6) Second Communal Irrigation Development Project (Nationwide)
- 7) Kabulnan Irrigation & Integrated Area Development Project (WRR 12)
- 8) Pampanga-Delta Development Project-Irrigation Component (WRR 3)
- 9) Irrigation Operation Support Project II (IOSP II) (Nationwide)
- 10) Lower Agusan Development Project- Irrigation Component (WRR 10)
- 11) Irrigation Systems Improvement Project II (WRR 7)
- 12) Casecnan Multipurpose Irrigation Project (WRR 3)
- 13) Water Resources Development Project (Nationwide)
- 14) Repair and Rehabilitation of Existing National and Communal Irrigation Facilities (Nationwide)
- 15) Repair and Rehabilitation of Existing Service and Access Roads in NIS and Farm to Market Roads (Nationwide)
- 16) Repair and Establishment of Groundwater Pump Projects (Nationwide)
- 17) Small Reservoir Irrigation Project (Nationwide)
- 18) Rehabilitation, Repair and Improvement of Drainage & Flood Protection System in NIS and CIS (Nationwide)
- 19) Feasibility Study and Detailed Engineering of Proposed Irrigation Projects (Nationwide)
- 20) Agri-Institutional Development Program (Nationwide)
- 21) Apayao-Abulog Irrigation System Improvement Project (WRR 2)
- 22) Rehabilitation of Areas Affected by Mt. Pinatubo (WRR 3)
- 23) Itbayat Integrated Agricultural Development Project (WRR 2)
- 24) Catubig Irrigation Project (WRR 8)
- 25) Dolores Irrigation Project (WRR 8)
- 26) Basey Irrigation Project (WRR 8)
- 27) Bubunawan-Tumalaong Irrigation Project (WRR 10)

Priority Irrigation Projects

- 28) Addalam River Irrigation Project (WRR 2)
- 29) Infanta Impounding Project (WRR3)
- 30) Pump Projects for Corn and Other Diversified Crops (WRR 2)
- 31) Upland Irrigation & Small Rural Development Project (WRR 4)

- 32) Revitalization of Central Luzon Groundwater Irrigation Project (WRR 3)
- 33) Southern Philippines Irrigation Sector Project (WRR 6, WRR 10 & WRR 11)
- 34) Aklan RIS and Rural Areas Environment Improvement Project (WRR 6)
- 35) Bohol Irrigation Project II (WRR 7)

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- 36) Lower Agno (San Roque) Irrigation Project (WRR 3)
- 37) Pump Irrigation Project II (Nationwide)
- 38) Rationalization Project and Irrigation Water Use for Angat-Maasim River Irrigation System (WRR 3)
- 39) Baligatan Mini-Hydro Project II (WRR 2)
- 40) North Lawis Irrigation Project (WRR 3)
- 41) Help for Catubig Agricultural Advancement Project Stage I (WRR 8)
- 42) Control and Prevention of Sedimentation and Siltation in Irrigation Canal and Facilities (Nationwide)
- 43) Mapanuepe Lake Irrigation Project (WRR 3)
- 44) Sibalom-San Jose Reservoir Project (WRR 6)
- 45) Ilocos Sur Transbasin Project (WRR 1)
- 46) Ilocos Norte Irrigation Project(Palsiguan) Phase II (WRR 1)
- 47) Land Reclamation and Resettlement Project (WRR 12)
- 48) Lake Mainit Integrated Area Development Project-Irrigation Component (WRR10)
- 49) Negros Occidental Irrigation Package (WRR 6)
- 50) Jalaur Irrigation Systems and Rural Area Development Project (WRR 6)

Other Irrigation Projects

- 51) Improvement of O&M of Pump Irrigation Systems (WRR 1, WRR2, WRR 5)
- 52) Quipot Irrigation Project (WRR 4)
- 53) Malitbogay Irrigation Project (WRR 8)
- 54) Kadingilan Irrigation Project (WRR 12)
- 55) Tumauini Reservoir Project (WRR 2)
- 56) Small Scale Irrigation Development Project (Nationwide)
- 57) Bicol River Basin Flood Control & Irrigation Development Project- Irrigation Component-Package I (WRR 5)
- 58) Balintingon Reservoir Project (WRR 3)
- 59) Titay Valley Irrigation Project (WRR 9)
- 60) Wind Turbine for Pump Irrigation Systems (Nationwide)
- 61) Magat Watershed and Erosion Control Project (WRR 2)
- 62) Matuno River Irrigation Project (WRR 2)
- 63) Malitubog-Libungan Transbasin Irrigation Project (WRR 12)
- 64) Jalaur Alternative Scheme Project (WRR 6)
- 65) Mabini Irrigation Project (WRR 3)
- 66) Asue River Basin Development Project (WRR 6)
- 67) Saug River Multipurpose Project (WRR 11)
- 68) Malitubog-Maridagao Irrigation Project (WRR 12)

Other Programs

- 69) Operation and Maintenance Subsidy for NIS (Nationwide)
- 70) Comprehensive Agrarian Reform Project-Irrigation Component (Nationwide)
- 71) Agrarian Reform Infrastructure Support Project- Irrigation Component (Nationwide)

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Small Scale Irrigation Projects (BSWM)

- 72) Small Water Impounding Projects/Diversion Dams (SWIP/DD)
- 73) Shallow Tubewell (STW)
- 74) Small Farm Reservoir (SFR)

3.2.4 Present Condition of Livestock, Poultry and Fishery Production

(1) Livestock and Poultry

Livestock consists of cattle, carabao and hog. But goats and sheep are not included in this classification. In case of poultry, only broiler chicken was considered. The population and production of cattle, carabao, hog and chicken in 1996 are as follows:

1996 Inventory of Livestock and Poultry

	Population (1000 head)	Production (1000 metric ton)	Slaughtered Livestock (1000head)
Cattle	2,012	213	533
Carabao	2,708	104	260
Hog	8,807	1,213	7,582
Total	13,606	1,530	8,374
Poultry (Chicken)	100,273	947	100,273

Data Source: Bureau of Agricultural Statistics

The 1996 inventory shows that the shares of slaughtered livestock consist of 13.9 % for cattle, 6.8 % for carabao and 79.3 % for hog. According to the LDC, the average live weight of cattle and carabao is 380 kg/head, hog is 80 kg/head and chicken is 1.3 kg/head. The market age of cattle and carabao ranges from 2 to 3 years, hog from 4 to 6 months and broiler chicken is about 45 days.

(2) Fisheries

The total fish production in 1996 is 2.69 million tons. The commercial fishery accounted for 893,210 tons or 33 percent of the total production. Municipal inland production accounts for 186,670 tons or 7 percent of total production, while municipal marine is 785,720 tons or 29 percent of the total production. The aquaculture production accounted for 825,390 tons or 31 percent of the total production.

3.2.5 Existing Expansion Plans of Livestock and Fishery Production and National Policy

The target of the Medium-Term Livestock Development Plan by 1998 is to increase the population of cattle, carabao and hog to 3.0 million, 2.5 million and 10.8 million, respectively and chicken to more than 100 million. Since there is no available study results on livestock beyond 1998, this study made the projection based on the framework for major agricultural commodities in terms of GDP and production estimated in the socio-economic analysis.

The study adopted the average live weight per head of cattle, carabao and hog, as determined by the Livestock Development Council (LDC). As a result, the population of cattle was estimated to increase from 2.02 million heads in 1996 to 3.0 million heads by the year 2000.

The BFAR prepared the Medium-Term Fisheries Management and Development Program for the period from 1993 to 1998. The said program aims to achieve aquaculture productivity of 2.4 tons per ha per year by 1998.

Recently, the Agricultural and Fisheries Modernization Act of 1997 was passed by the Philippine Congress and was subsequently signed into law as Republic Act (R.A.) No. 8435. This has paved the way for the enactment of the Philippine Fisheries Code of 1998 (R.A. 8550) mandating the DA and the BFAR to ensure the attainment of the following objectives:

- a. Conservation, protection and sustained management of the country's fishery and aquatic resources,
- b. Poverty alleviation and the provision of supplementary livelihood among the municipal fisherfolk,
- c. Improvement of productivity of aquaculture with ecological limits,
- d. Optional utilization of offshore and deep-sea resources, and
- e. Upgrading of post-harvest technology.

3.3 Surface Water and Hydropower Development

3.3.1 Existing Large-Scale Reservoir Type Projects

(1) Existing Major Dams

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There exist five major dams in the Philippines, which were developed as multipurpose project. These are Angat dam, Magat dam, Pantabangan dam, Ambuklao dam, and Binga dam, all of which lie in Luzon island. Their main features are summarized below:

Main features of Existing Major Dams in the Philippines

Item	Angat	Magat	Pantanb-angan	Ambuklao	Binga
Purpose	WS/IR/HP/FC	IR/HP/FC	WS/IR/HP	HP/FC	HP/FC
Year of completion				1956	1960
Name of river	Angat	Cagayan	Pampanga	Agno	Agno
Catchment area (km²)	568	4,123	853	617	860
Mean inflow (m³/sec)	59.2	210.0	-	30.0	52.3
Type of dam	Rockfill	Rockfill	Earthfill	Rockfill	Rockfill
Height of dam	131	114	107	129	107.4
- Effective storage volume (10 ⁶ m ³)	850	782	1,757	258	33
- Sediment storage volume (10 ⁶ m ³)	-	210	130		32.6

Note: WS; Water Supply, IR; Irrigation, HP; Hydropower, FC; Flood control

As seen in table above, the existing major storage type dams were constructed in Luzon island as the multipurpose dam, not exclusively for hydropower generation. Thus, it is foreseen that the large-scale storage type dams in the country will be implemented unexceptionably for the purpose of development of the hydropower generation, combined by other development purposes such as irrigation, municipal water supply, flood control.

(2) Other Existing Large Scale Reservoir Type Projects Utilizing Natural Lake

The other existing reservoir type schemes with comparatively large regulation capacity are those developed for the single purpose of hydropower generation utilizing natural lake. These are the Caliraya Hydroelectric Project on the Caliraya river flowing down into the Laguna de Bay in Luzon island, and a series of hydropower projects on the Agus river in Mindanao island which harness the Lanao lake for the reservoir as well as the head along the Agus river.

The first pumped storage type development was realized in the Kalayaan Pumped Storage Hydroelectric Project (KPSHP) by providing waterway facilities between the Laguna lake and Caliraya reservoir. The KPSHP utilizes the surplus energy during the off-peak time of power demand to pump up the lake water to the upstream Caliraya reservoir, while the stored water is released to the Laguna lake to generate power during the high peak demand.

In the Agus river basin, there are six power stations (Agus I, II, IV, V, VI, VII) on the Agus river which is a sole outlet of the Lanao lake with a surface area of about 360 km². The lake water is first regulated by the Agus I project which utilizes the lake with a large active storage volume of 1,715 million m³ for the seasonal regulation of inflow thereto.

The main features of the above existing hydropower projects are summarized below:

Name of Existing Hydropower Project	Region	River Name	Installed Capacity	Effective Storage Volume
			(MW)	(million m³)
- Caliraya Pumped H.E. Plant (KPSHP)	. 17	Kaliraya & Laguna De Bay	32	78
- Agus I	XII	Agus I	80	1,715

3.3.2 Situation of Existing Major Reservoirs in the Philippines

(1) General

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The information on present situation of the existing major dams and reservoirs was obtained from the previous study reports on their rehabilitation as well as the documents describing sedimentation studies on those basins during the first stage field investigation. In general, the specific problem on those reservoirs is the current remarkable increase of sediment inflow into the reservoir except for the Angat reservoir for which no sedimentation problem is reported so far.

Out of the five existing major dams, the sedimentation on the Magat and Pantabangan reservoirs have been investigated by the joint team of NPC and NIA. According to the latest information by the joint team, the Magat reservoir is affected by the extraordinary increase of sediment inflow after the July 1990 earthquake took place.

(2) Sedimentation on the Magat Reservoir

The Magat dam situated in the Cagayan river basin, whose construction was completed in 1982, occupies a larger catchment area of around 4,123 km² as compared with the other four major existing dams. In the original design, the sediment rate was adopted at 5.5 MCM per year or 1.3 mm/year in the denudation rate. According to the "Report on the Sedimentation Study on the Magat Reservoir", the sediment transport into Magat reservoir has increased significantly after the July 1990 earthquake took place. The following table shows the historical sedimentation rate of the reservoir that was analyzed through the bathymetric survey of the reservoir:

Year of Survey	Measured Volume of Sediment deposited in reservoir	Estimated Average Sedimentation	Total Cap in	•	Estimated Catchment Denudation
	(MCM)	Rate (MCM/Year)	Active Storage	Dead Storage	Rate (mm/year)
984	22.0	7.3 (1982-84)	1.3	3.0	1.77
988/1989	49.0	6.7 (1985-89)	2.3	11.0	1.63
.995	179.0	18.6 (1990-95)	8.4	44.0	4.50

The report states that the extraordinary high sedimentation rate observed between 1990 and 1995 is attributable primarily to the 1990 earthquake which has led to the massive landslides in the upper basins of the Magat reservoir. It emphasizes that the catchment degradation also results from the man-made activities such as uncontrolled forest fires,

illegal logging, unmanaged grazing, shifting cultivation and other improper land management practices. Consequently, the reservoir life has been diminished to about 43 years, should the present sedimentation rate continue from now on. To improve and cope with the aggravated basin condition, the concerned governmental agencies recommended to rehabilitate more than 50 % of the catchment area which covers the most critical area with respect to the catchment degradation through the implementation of effective forest protection schemes, massive reforestation as well as adoption of other various erosion control measures/practices in cooperation with the DENR and concerned provincial government. However, it is informed that those rehabilitation plans have not yet been implementated due to lack of funds required therefor.

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(3) Pantabangan Reservoir

With regard to the Pantabangan reservoir on the Panpanga river, the reservoir sedimentation rate was measured three times to date. However, the results of the most latest measurement performed in September 1996 has not been made available yet, since the survey results are still under collation by the joint team. The results of the earlier two times of measurements for the reservoir sedimentation rate are summarized as follows:

Observed and E	istimated Sedime	ntation Rate of the	Pantabangan Reservoi
Year of Survey	Period Covered by the Survey	Estimated Sediment Rate (MCM/year)	Estimated Catchment Denudation Rate (mm/year)
1985	1973-1985	7.36	8.6
1989	1986-1989	4.70	5.5
Mean	1973-1989	6.75	7.8

It appears that the above denudation rates are considerably high, even in comparison with those of severely eroded basins in the world. As a result of the estimate, the reservoir life is estimated to be 107 years based on the observed sedimentation rate of 6.75 MCM/year. However, there is a possibility that the latest survey results might reveal the extraordinarily high rate as came out in case of the Magat reservoir, since the Pantabangan dam is located nearer to Baguio, epicenter of the 1990 earthquake, than the Magat dam.

(4) Ambuklao Reservoir

There exist two reservoir type dams on the Angat dam, namely the Binga dam and Ambuklao dam. In 1988, the study of the Ambuklao dam rehabilitation was completed by JICA. The study clarified the situation of and necessity of rehabilitation for the main dam and its appurtenant structures as well as the reservoir sedimentation. As a result of the study, it was pointed out that the sedimentation is the most critical problem of the project and that, due to the problem, hydropower generation would be suspended for a certain period.

The report states that the deposit level around power intake had reached almost the intake sill level. It was estimated through the study that the annual sediment yield of the Agno

river basin would be about 3.6 million m³ at the Ambuklao dam with a catchment area of 617 km². It corresponds to specific sedimentation rate of 5,337 m³/km²/year or denudation rate of 5.3 mm/year.

(5) Necessity of Watershed Management Programs for Water Resources Development Plans

As mentioned above, some of the existing reservoirs in the Philippines have been filled up with larger sediment inflow than originally designed, shortening the reservoir life to a considerable extent. The sediment inflow into existing irrigation facilities has become significantly large in recent years, as stressed in the WRDP's report, so that the huge amount of costs are required to be disbursed to dredge the sediment deposited in those irrigation facilities. Therefore, the appropriate measures need to be taken for the existing reservoirs and their catchments, which face the increase of sediment inflow due to the watershed degradation, in order to restore the normal reservoir function as well as to keep the reservoir life as originally designed and to retain it as long as possible.

To cope with the sedimentation problems in the existing reservoirs, first of all, it is recommended that the watershed management plan contemplated for the Magat reservoir be implemented in earlier stage in coordination with the concerned agencies and regional governments.

In planning the new reservoir schemes for water resources development, it is indispensable to contemplate the watershed management plan in addition to the favorable water resources development plan in order to ensure the sustainable development, taking into consideration the aforesaid present situation of existing reservoirs.

3.3.3 Storage Type Dam Development Plans by NPC

(1) Hydropower Projects Proposed by NPC

Table 3-15 lists the existing hydropower projects and proposed schemes by NPC. Out of them, the proposed hydropower schemes were studied at different levels such as definite design, feasibility study, pre-feasibility study. The hydropower projects are largely classified in accordance with the mode of utilization of streamflow for the purpose of power generation as follows:

- Run-of-river type with or without a pond for daily regulation of streamflow
- Reservoir type with a reservoir for seasonal regulation of streamflow
- Lake outlet type which utilize a natural lake for reservoir
- Pumped storage type

Out of the above four development types, the reservoir and lake outlet types have the function to seasonally regulate the streamflow. The proposed schemes categorized into these two types were picked out by water resources region from the project list provided by NPC as shown in Table 5-2 of the succeeding Chapter V.

(2) 1996 Power Development Program (1996 PDP)

To date, most of the development plans for major reservoir type projects have been worked out with the initiative of NPC, placing the first priority on hydropower development. NPC has an intention to implement those promising hydropower projects proposed in the previous studies, sooner or later, with funds from international financing agencies or by BOT in order to meet the increasing power demand with the indigenous resource as far as possible. Accordingly, the implementation plan on the reservoir type schemes that are established by NPC would have a significant effect on the available water in the concerned river basins from the quantitative point of view. The latest power development plan prepared by NPC was collected during the first stage field investigation, titled the 1996 Power Development Program (1996) PDP. It is foreseen that the future power development plan including reservoir type hydropower schemes be implemented in line with the 1996 PDP. The overall policy on hydropower schemes is explained in the following paragraphs.

(3) Background

The main participants in the Philippine electric power sector consist of National Power Corporation (NPC), independent power producers (IPP), electric power distributors and retailers, and other regulatory agencies. The power generation is undertaken by either NPC or other power producers through energy conservation arrangements, but the bulk transmission line is exclusively owned by NPC. The government regulatory bodies with regard to the power supply are the Department of Energy (DOE) and Energy Regulatory Board (ERB). The DOE is the policy-making body in the energy sector, while the ERB regulates the prices of electricity and petroleum products.

NPC prepared the 1996 Power Development Program (the 1996 PDP) in September 1996 to set out the country's total plan in meeting future power requirements through the coordinated addition of required generation and transmission facilities. Although the 1996 PDP aims to set out the power requirements in the short term of 1996 to 2000 and the midterm of 1997 2005, it also attempts to envision those in the long term of 2006 to 2025. Thus, the 1996 PDP shows the new power development plans including hydropower so as to cope with the future economic growth in the gross domestic products (GDP), dividing the horizon into the three categories, namely the short-term, medium-term and long-term horizons.

(4) Power Demand Projection in the 1996 Power Development Program

The power demand forecast in the 1996 Power Development Program is made for each of the short-term, medium-term and long-term programs which cover the period between 1996 and 1999, between 2000 and 2005 and between 2006 and 2025, respectively.

Short-term and middle-term demand forecast

The forecast is primarily based on the Gross Domestic Products (DRDP) and its components projected by the National Economic and Development Authority (NEDA). The power demand forecast reveals that the power and energy demand in each grid system

grows at comparatively high ratio as shown in Tables 3-16.

As a result of the power demand forecast, the power demand is forecast to increase at an annual average rate of 11.2 %, 11.9 %, 14.6 % in the Luzon, Visayas, Mindanao power systems for the period from 1996 to 2005, respectively. While, the energy sales in those three power systems are predicted to increase at an annual average rate of 10.8 %, 12.3 %, 16.3 % for the same period, respectively. Consequently, the power demand and energy sales for the entire Philippines are estimated to reach 16,256 MW and 93,313 GWh in 2005, respectively. This shows that the power demand and energy sales in the entire Philippines would increase at annual average rate of 11.9 % for the period. Thus, the 1996 Power Development Program exhibits considerably high growth rates of power and energy demand up to the year 2005 in order to support the high economic growth rates forecast by NEDA. The high growth rates of power demand and energy sales thus predicted are attributed to the high annual increase rates of the GRDP estimated by NEDA at more than 7 % for the period from 1996 to 2005.

Long-term demand forecast

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The 1996 Power Development Program presents the results of the long-term power demand forecast for the period from 2006 to 2025 in order to provide the framework for designing the appropriate policy direction for the long-term power development programs. Since the NEDA's figures of GRDP were not available for the period, the annual growth rates between 2006 and 2015 and between 2015 and 2025 were assumed at 7.2 % and 6.2 %, respectively. Consequently, the power demand in the Philippines is predicted to reach 71,267 MW in 2025, which is equivalent to around 13.4 times that in 1995 (5,299 MW).

Hydropower Potential

The major hydropower potential in the entire Philippines is identified at 245 sites, amounting to 12,308 MW in total installed capacity as shown in Table 3-17. These potential sites include the 2,278 MW of existing hydropower plants. Thus, hydropower potential sites of about 10,000 MW are left undeveloped over the country. The hydropower potential to be developed in the future in the respective major grid systems is summarized as follows:

Hydropower	Potential Rema	ined Undevelo	ped (MW)
-	Major Grid		
Luzon	Visayas	Mindanao	Philippine
7,316	417	2,297	10,030

3.3.4 Hydropower Projects Committed and Needed by NPC

(1) Committed Hydropower Projects for Early Implementation

Almost all of the power projects needed by NPC for the period from 1996 to 1999 are already under construction or proceeded for implementation. Table 3-18 lists those committed power plants including hydropower projects. Of those, the following hydropower projects are planned to be developed as reservoir type projects which are

expected to contribute the seasonal regulation of streamflow of the river:

Mindanao (Region XII)

Luzon (Region I)

	S	torage Type Hydropower Pro	jects Committe	d by NPC	
No.	Name of Hydropower Project	Location	Active Storage Capacity (MCM)	Installed Capacity (MW)	Scheduled Commissioning Year
1	Casecnan	Luzon (Region II)	1,183	140	1999
2	Tagoloan II	Mindanao (Region X)	121	68	2002
3	BulBatang	Mindanao (Region X)	102	150	2004

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(2) Prioritized Small Hydro Projects

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The 1996 PDP mentions the proposals for new and renewable energy (NRE) systems, which comprise, solar, wind, etc., as well as small hydro projects included in the first priority list. Out of those small hydro projects, the following two ones are planned to be developed as storage type hydropower projects:

300

345

1.190

530

2004

2005

	Storage Type Small Hydro Projects Prioritized by NPC												
No.	Name of Hydropower	Location	Active Storage Capacity	Installed Capacity									
	o. Hydropower Project		(MCM)	(MW)									
l	Addalam A	Luzon (Region II)	32	45									
2	Ilaguen B	Luzon (Region II)	31	46									

3.4 Groundwater

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3.4.1 Municipal Groundwater

(1) Level-III Water Supply Systems

The management of the viable L-III water supply systems is handled by two organizations: MWSS and LWUA, under the DPWH. These independent organizations, formed from the previous agency NWASA, have different service areas. Metro Manila and its surrounding area are under the aegis of MWSS and those areas outside of Metro Manila are LWUA's territories.

Ex-MWSS (turned over to Manila Water Company and Maynilad Water Service Inc.)

The ex-MWSS L-III water supply system has large surface water fed system that has three water rights for utilizing the intake facilities located at the Angat Dam in the province of Bulacan in WRR-III. Also, a large number of wells are located in the ex-MWSS service area. According to the operation records provided by the MWSS, there are 265 existing wells owned by the MWSS. The production amount and facility numbers of these wells decreased year by year. As of December 1995, 156 wells (58.9%) were abandoned due to saline water intrusion, lowered water levels, or the deterioration of the facilities.

The records for groundwater production in 1995 provided by the MWSS are shown in Table 3-19. The features of these operation records are as follows:

- The majority of the groundwater in the ex-MWSS service areas was produced in the southern part of Manila, where the municipalities of Taguig, Paranaque, Las Pinas and Muntinlupa are located.
- MWSS had 17 registered wells (1995)—down from 265 wells in 1991.
- The groundwater production of MWSS was 26.9 MCM/year in 1995.

LWUA (Level-III operated by the WDs)

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The production of each WD's facilities was summarized as shown in Table 3-20. However, the data from the WDs doesn't mention the categorized sources' production. As reasonable approach, well production was estimated by taking the grant amount for spring and surface water from total production. This was because the number of grants and facilities for spring and surface water sources were probably almost the same quantity of their production, and usually their intake amount was larger than groundwater sources. Therefore, the WDs might have been granted such water rights.

The grant amount ratio is shown in Figure 3-18. The groundwater production amount and unit consumption, based on production amount and service population, is shown in Figure 3-19. The particulars of this information are shown below.

- For L-III water supply systems, 85.9% of their sources were developed using groundwater (with wells and springs).
- The groundwater production of the WDs facilities was estimated at 560.1 MCM/year in 1995. The total figures for each WRR and source type are:

									.			(Unit: M	(CM/year)
WRR	_1	H	111	IV	<u> </u>	VI	VII	VIII	<u>1X</u>	<u>X</u>	Χŧ	XII	Total
Well	18.9	6.2	130.4	60.8	16.9	38.3	59.2	2.8	21.9	35.3	45.1	9.2	445.0
Spring	5.8	1.0	5.4	38.6	15.9	7.4	11.2	3.5	8.5	9.3	1.9	6.7	115.1
Level-III	24.7	7.2	135.8	99.4	328	45.7	70.4	6.3	30.4	44.6	47.0	15.8	560.1

(2) Level-II Water Supply Systems

These systems have been implemented by different government agencies (the DPWH, LWUA, the DILG and the DENR), who encouraged the use of spring sources. LGUs, the RWSA or NGOs operated these systems. These Level-II water supply systems have an adequately served consumption rate of at least 60 lpcd. Therefore, the estimated production for Level-II systems is shown in Table 3-21 and below.

(Unit: MCM'y												('year)	
WRR	Į.	11	Ш	iv	v	VI	VII	VIII	IX	X	ΧI	XII	Total
Level-II	2.7	3.5	7.0	11.3	4.3	5.4	4.5	3.8	3,7	3.7	3.0	4.5	57.4

(3) Level-I Water Supply Facilities

The DILG/DPWH Level-I water supply services cover parts of the rural areas and also those urban areas that are not covered by the Level-III systems. The DPWH was the leading implementing government agency until 1991, when the DPWH transferred the responsibilities for the rural water supply programs to the DILG/LGUs. Thereafter, the DILG has prepared the master plan for the provincial sectors such as water supply and sanitation. However, for implementing projects, the DILG/LGUs still need a great deal of the DPWH's assistance and technology.

(1)

The DPWH provided well construction records until 1995 based on the inventory survey in 1987. These records include the annual Level-I well construction results. These records are shown in Table 3.4-4 and Figure 3.4-3. The DPWH estimated the operational Level-I wells and their production, which are shown in Figure 3.4-4. The features of this information are as follows:

- · On average, more than 14,000 wells were constructed by the DPWH annually.
- The DPWH concentrated on the construction of L-I wells on the Central Luzon Plain.
- The groundwater production of L-I wells was estimated at 312.1 MCM/year in 1995;
 the production figures by each WRR are:

												(Unit: M	CM/year)
WRR		11	111	IV	V	Ví	VII	VIII	ΙX	X	Χŧ	XII	Total
Level-1	11.8	17.4	43.7	37.1			30.1		19.8		18.6	31.4	312.1

(4) Privately Owned Level-I Facilities

To determine the L-I production figures, the population served and unit water consumption were estimated. The 1995 census and the service coverage were used to calculate the rest of the population. The unit water consumption was adopted from LWUA's standard L-I service level.

The L-I water supply facilities have an adequately served consumption rate of at least 20 lpcd. In consideration of the population density by province level, an additional unit water consumption, based on the consumption rate of 20 lpcd, was adopted in the same manner as the public L-I water supply. Finally, the unit water rate for the L-I systems was modified for a more realistic result. The estimated production for privately owned L-I systems is shown below.

												(Unit: M	ICM/year)
WRR	I	H	111	ΙV	V	VI	VII	VIII	IX	X	ΧI	XII	Total
Level-1	6.6	11.2	28.6	71.5	11.6	15.4	14.7	8.7	10.4	11.3	8.3	15.1	213.4

(5) Privately Owned Commercial Water Facilities

A comparative examination of the registered wells in the MWSS service areas and the facilities owned by the WDs indicated that the non-registered well production was almost proportional to the registered wells. Therefore, in addition to the estimation of

commercial groundwater source production, the well production amount was put at two times the granted amount. The estimated granted amount of groundwater water rights for commercial use is shown below:

			· · · · · · · · · · · · · · · · · · ·		 					((Init: MC	M'year)
WRR	I	11	111	IV		VII	VIII	1X	X			
Commercial	•	•	0.4	8.9	2.4	0.5	0.6				1.7	15.0

(6) Conclusion of Present Municipal Water Production

These production rates were adopted for further study of the GWRDPs. For example, municipal water demands, as well as the future additional demand, were forecasted based on these figures. It should be noted that the present groundwater production was estimated utilizing many conditional assumptions. For the future review of this master plan, a basic investigation into the actual conditions should be implemented by the concerned government agencies in the next census year.

The following figures are the aggregate of each sum of the municipal groundwater production at present (1995).

Present	Production/Demand of Municipal Water
FIGSCHI	r roduction/Deniand of Municipal Water

						(Un	it: MCM/year)
WRR	Ex-MWSS	LWUA	Level-II	Level-I	Private	Commercial	Total
Ĭ	-	24.7	2.7	8.11	6.6	0.2	46.0
Ħ	-	7,2	3.5	17.4	11.2	•	39.3
Ш	-	135.8	7.0	43.7	28.6	0.4	215.5
lV	26.9	99.4	11.3	37.1	71.5	8.9	255.1
V	-	32.8	4.3	26.1	11.6	0.0	74.8
VI	u u	45.7	5.4	34.8	15.4	2.4	103.7
VII	-	70.4	4.5	30.1	14.7	0.5	120.2
VIII	-	6.3	3.8	20.8	8.7	0.6	40.2
ΙX	-	30.4	3.7	19.8	10.4	-	64.3
X	-	44.6	3.7	20.5	11.3	-	80.1
XI	-	47.0	3.0	18.6	8.3	0.3	77.2
XII	•	15.8	4.5	31.4	15.1	1.7	68.5
Total	26.9	560.1	57.4	312.1	213.4	15.0	1,184.8

3.4.2 Industrial Groundwater

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Industrial groundwater consumers from the L-III domestic water supply systems were not included in the calculation of industrial groundwater as the other facilities for industrial water were privately owned. The only way to estimate the present production of industrial water was to use the grant amounts of the water rights registered by the NWRB database system. Also, for the industrial Economic-Zones' water supply systems, there was no available detailed data and/or information from the concerned government agencies such as PEZA or the DTI. Therefore, the detailed data and/or information from the water rights

registration provided by the NWRB estimated the existing industrial groundwater.

Using the same procedures as for the L-III groundwater categories, the production of unregistered wells was counted as the same amount as the grants. The estimation of the groundwater water rights grants amount for industrial water is as follows.

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•											(U	nit: MC	M/year)
WRR	1	11	Ш	IV	٧	VI	VII	VIII	IX	х	ΧI	XII	Total
Industrial				202.2		45.6	88.0	20.4	1.4	43.3	16.0	6.3	514.4

3.4.3 Groundwater for Irrigation

The facilities for irrigation water are primarily privately owned. The NIA, the DPWH and the BSMW provided the available data and/or information for irrigation groundwater. Only arable land areas and their coverage were included in this data. The only way to estimate the present production of irrigation water was by the capacity of the facilities, as estimated from water rights grants of the NWRB registration system.

Table 3-23 shows the existing conditions of the cultivated land areas. The coverage of irrigated land was put at 43.6 % (approximately 1,362,000 ha) of total arable area (about 3,126,000 ha). Out of this amount, 99.8 % of the irrigated land was supplied by surface water.

According to the water rights registration records, 98.8 % of grants for irrigation water was surface water. The remaining 1.2 % consisted of groundwater grants and the amount from wells was estimated as the same value of spring source. From the number of facilities provided by the NIA, etc. and their capacities as estimated by the grants amount, the production amount for irrigation groundwater was estimated in Table 3-24. These estimation results are shown in Figure 3-22. The estimation result of the groundwater water rights for irrigation water is shown below.

											((Jnit: MC	wyear)
WRR	1	П	311	lV	V	VI	VII	VIII	ix	Х	XI	XII	Total
Irrigation	64.0	29.2	120.1	46.1	25.6	110.6	64.0	9.4	19.9	40.6	41.1	125.1	695.6

3.4.4 Present Groundwater Production

Shown below is the aggregate of each usage sum for the present groundwater production.

Present Production/Demand of Groundwater

				(Uı	iit: MCM/year)
WRR	Municipal	Industrial	<u>lecigation</u>	Others	Total
l	46.0	5.3	64.0	0.0	115.3
11	39.3	0.7	29.2	0.2	69.4
111	215.5	83.7	120.1	4.3	423.6
W	255.1	202.2	46.1	20.1	523.5
v	74.8	1.6	25.6	0.6	102.6
VI	103.7	45.6	110.6	34.9	294.8
VII	120,2	0.88	64.0	29.5	301.7
VIII	40.2	20.4	9.4	0.2	70.2
īX	64.3	1.4	19.9	0.2	85.8
X	80.1	43.3	40.6	4.1	168.1
XI	77.2	16.0	41.1	26.5	160.8
XII	68,5	6.3	125.1	2.5	202.4
Nation _	1,184.8	514,4	695.6	123.1	2,517.9

3.5 Flood

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3.5.1 Major Disaster and Flood Records

As far as the annual rainfall amount is concerned, it can be said that the Philippines is endowed with water resources. Owing to the seasonally and geographically uneven distribution of rainfall occurrence, however, the Philippines has suffered from severe flooding almost every year as well as the occasional drought damages in some basins. Especially, major flood damages have been caused by typhoons which pass over islands of the Philippines during the wet season with the exception of the central and southern Mindanao. In general, there are only a limited number of the major rivers in the affected regions that have enough carrying capacity to pass down the excessive flow resulting from the unusual rainstorm.

It is said that the Philippines is the country which has suffered the greatest number of disasters in this century. Table 3-25 lists the major disaster records which occurred in the Philippines between 1980 and 1995. Out of the damages caused by disasters, the flood damage occupies a large part of the total damage in the country. It has brought about habitually destructive floods causing damages to crops, properties and inhabitants in the affected area. According to the Report on Nationwide Flood Control Plan and River Dredging Program which was prepared in 1982, the annual flood damages in the entire country were estimated to amount to seven billions of Pesos. The recent information also reveals that in the whole Philippines the annual average flood damage amounts to 5 billion pesos due to the insufficient provision of flood control facilities and drainage facilities in Metro Manila and major river basins. Thus, it is essential to promote the implementation of the flood control drainage plans formulated on a comprehensive basis to ensure the stable economic growth in the country from now on.

DPWH is responsible for planning and implementation of the flood control and drainage projects in the country. Out of the total budget of 13.9 billion Pesos allocated to the basic infrastructure program in 1994, about 1.9 billion pesos or 14 % of the total budget is disbursed to the flood control sector.

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3.5.2 Existing Flood Control Plans

The nationwide flood control plan was established through the study on river dredging. In the study, a flood control plan was worked out for each of the 12 major river basins. These river basins are the Laoag, Agno, Pampanga Bicol, Amnay-Patrick, Panay, Jalaur, Ilog, Agusan, Tagaloan and Mindanao river basins. The Study proposed mainly river dredging and diking works to expand the river carrying capacity in order to solve the flooding problems in the downstream low-land areas.

After the nationwide flood control plan, a lot of studies on flood control and drainage improvement have been carried out for the specific basins at a study level of master plan and/or feasibility. According to the Medium Term Infrastructure Program prepared by DPWH (DPWH-MTIP), the Government intends to implement the flood control and drainage projects placing a priority on the following 12 major river basins and Metro Manila:

Prioritized Basin or Area on Flood Control by DPWH

Water Resources Region	Prioritized Major River Basin or Area on Flood Control
WRR I	Laoag
WRR II	Cagayan
WRR III	Agno and Pampanga
WRR IV	Anmay-Patrick and Metro Manila
WRR V	Bicol
WRR VI	Panay, Jalaur and Ilog
WRR X	Agusan and Tagaloan
WRR XII	Mindanao

Data Source: DPWH-MTIP

The locations of above major river basins and area are shown in Figure 3-23. Out of the above river basins, the flood control works for the Agno, Pampanga and Agusan river basins are now under construction under DPWH. With regard to the Cagayan river basin, the implementation of the flood control plans has been suspended because of the long-lasting disordered public peace in the basin, although the comprehensive master plan was formulated through the previous study. At present, it is expected that a feasibility study for the promising flood control project in the Cagayan basin will proceed toward future implementation.

The total budget for these projects nominated in the DPWH-MTIP is estimated to be about 21 billion Pesos. In the DPWH-MTIP, the majority of the flood control plans are

proposed to be of the flood protection dikes or flood walls. On the other hand, it is recommended to consider the multi-purpose dam with the function of flood control, as far as possible, in formulating a new reservoir type dam for the water resources development. In the Master Plan Study on the Cagayan River Basin Development which was carried out in 1987, the comprehensive flood control plan which consists of river dredging works and provision of multi-purpose dam in the upper reaches was formulated to mitigate the flood damages in the lower reaches.

3.6 Water Quality

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3.6.1 Overview of Water Quality in the Philippines

Human settlement, industry and agriculture are thought to have considerably polluted both inland and coastal waters. Domestic sewage contributes approximately 52% of the pollution load while industry contributes the remaining 48% (DENR). This continuing pollution could seriously compromise the country's water resources' potential for domestic, agriculture and industrial uses.

The Philippines government has performed vigorous monitoring on the rivers in Metro Manila, such as the Pasig River, the Markina River, the Sun Juan River, the Paranaque River and the Tullahan-Tinajeros River. This monitoring result shows very high BOD values and low DO values, indicating that non-treated municipal sewage is flowing into the rivers. Also some monitoring has been performed on downstream reaches of the rivers in Luzon outside Metro Manila and in Visayas and Mindanao. They also show the contamination with domestic, industrial and agricultural effluents. However, the water quality data on upstream reaches of those rivers are very limited. These data are, indeed, acutely necessary to judge the water quality of rivers at the proposed dam sites. Two (2) methods are employed to judge the water quality of rivers at the proposed dam sites, in such a situation of scarce water quality data.

- (1) The Philippines government designated the list of classified rivers outside Metro Manila, and this information may be utilized to judge the water quality, especially when the water is developed for municipal and industrial purposes.
- (2) Population and land usage at the upstream of the dam sites. A high population means much domestic effluent, and this effluent must cause water quality deterioration.

3.6.2 Existing Water Quality Standards

The water quality classification in the Philippines is shown in Table 3-26. The list of officially classified rivers, excluding those of Metro Manila, as of 1997, is tabulated in Table 3-27, in which the rivers rated at class-AA and class-A are judged to be suitable for

municipal water supply. As a result, almost half of the river shown in Table 3-27 could still be tapped for drinking water, requiring only approved disinfection to meet the National Standards for Drinking Water (NSDW).

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Table 3-1 WATER RIGHTS BY USAGE-WISE (NWRB)

Water Use Sector	Турс	١	11	113	VI	٧	Vi	VII	vm	1X	X	XI	XII	Teral
Municipality	Wis	29.1	13.0	95.1	243.9	18.1	45.2	77.8	3.5	2.9	10.7	55.3	26.2	620.6
(MCM'year)	Sp	120.5	1.8	4.2	82.6	46.8	16.8	15.5	11.8	4.5	26.3	8.8	617	401.3
	\$11	29.1	t.4	909.7	47.4	0.7	8.5	24.0	32.5	15.7	6.8	44.0	14.9	1.134,7
	Tent	178.6	162	1,009.0	373.9	55.7	70.4	117.3	47.8	23.1	43.8	108.2	102.8	2,156.8
Industrial	1475	2.5	0.4	41,9	\$8.4	0.4	17.8	42.9	8.4	0.7	6.8	8.0	19	231.1
(MCM'year)	Sp	1.1	-		6.1	0.8	9.9	2.1	3.7		29.6		0.5	47.9
	SW	67.7	15.4	125.6	322.8	18.2	523.6	77.8	11.0	4.3	167.4	199.1	85.7	1,617.3
	Tool	71.3	15.8	167.4	420.3	19.4	551.4	122.8	23.0	5.0	203.5	207.1	89.L	1,896.3
Irrigation	Wis	2.3	11.5	187,4	57.8	11.1	46.9	5.8	2 5		Lt	5.5	22.7	354.8
(MCM'year)	Sp	57.6	11.8	15.6	26.6	12.0	19.3	59.3	7.1	5.1	19.8	35.6	14.2	344.6
	SW	3,309.6	8,122.0	12,396,4	5.503.4	2,693.0	4,636.4	1,588.4	2,062.0	1,037.6	4,091.5	3,460 3	5,413.5	\$5,313.9
	Total	3,369.5	8,145.3	12.599.4	5,587.8	2,716.1	4,702.5	1,653.6	2,022.2	1,042.7	4,132.4	3,501,4	5,510.4	56,013.3
Other Usage	W}s	0.0	-	2.1	6.8	-	13.2	11.6	-	0.0	0.1	G. 1	0.9	34.9
(MCM year)	Sp	0.0	02	-	6.5	0.6	8.5	5.4	0.2	0.1	3.9	26.3	0.8	53.3
	SW	0.2	9.5	8.2	389.4	73.5	109.8	138.9	1.8	45.2	6.9	48.5	0.8	832.8
	Total	0.2	9.7	10.3	402.7	24.1	531.4	156.9	1.9	45.4	109	74.9	2.5	921.0
Total	Wls	33.9	24.8	326.5	406.9	29.7	123.1	138.2	14.3	3.7	18.8	69.0	52.7	1.241.6
(MCM'year)	Sp	179.2	13.7	19.8	115.9	60 2	54.4	83.3	23.3	9.7	79.6	70.7	137.2	847.1
	SW	3,406.6	8,148.4	13,439,9	7,261.9	2.755.4	5,278.3	1,829.2	2,107.2	1,102.7	4,272.3	3,751.9	5,514,9	58,898,7
	Total	3,519.7	8,137.0	13,785.2	7.784.7	2.575.3	5,455.8	2,050.6	2,144.9	1.116.1	4,370,7	3,891.6	5,704.8	60,987.4

Data Source: Database for Water Right (NWRB), as of 31 March 1997

Note

W/S: Well
Sp : Spring
SW: Surface water

Table 3-2 COMPOSITION OF WATER SUPPLY SYSTEM AND FACILITY BY SERVICE LEVEL

	Level-I	Level-II	Level-III
Discription	(Point Source Facility)	(Communal Faucet System)	(Individual House Connection)
1. Water Sources	 Drilled driven shallow well 	 Dritted/driven shallow well 	 Drifted deep well
	 Drilled/driven deep well 	- Spring	- Spring
	- Dug well	 Infiltration gallery 	 Infiltration gallery
	- Spring		 Suface water intake
	- Rain collector		
2. Water Treatment	- Generally none.	Generally none.	 Disinfection is provided.
	 Disinfection of well is 	 Disinfection facility is 	 The system with a surface water
	conducted periodically by	provided at some places.	source has a series of water
	local health authorities.		treatment facilities.
	 Iron temoval facilities are 		
	provided in problem areas.		
3. Distribution System	None	Piped system provided with	Piped system provided with
		reservoirs.	reservoirs and pumping
			facilities.
4. Delivery and	At point	Communit faucets	Individual house connection?
Service Level	(within 250 m)	(within 25 m)	household (ap
5. Consumption Rate (Adequately served)	at feast 20 lpcd	at Jeast 60 Ipcd	at least 100 tood

Data Source: National Sector Plan

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Table 3-3 NUMBER OF LEVEL-III SYSTEM

		:		er of Munici				20,000	50,000	100,000
WRR	Province	Total	no	4,999	5,000	10,000	15,000			
			system	or less	9,999	14,920	19,999	49,999	99,999	or more
<u>-</u>	5	29	9	8	4	2	2	1	2	1
B	8	42	26	10	2	2	0	2	0	0
III	7	120	34	22	20	8	9	18	5	4
IV	12	74	6	28	16	10	2	4	4	4
v	6	43	6	17	8	2	1	7	2	0
VI	6	75	22	31	8	5	3	2	2	2
VII	4	23	4	5	8	1	1	2	1	1
VIII	6	35	13	12	4	0	4	1	0	1
IX	5	26	8	11	1	0	1	4	0	l
X	7	29	6	9	4	2	0	6	1	1
XI	4	28	7	8	4	4	2	ŀ	1	1
XH	7	32	11	12	4	0	2	2	0	1
Total	77	556	152	173	83	36	27	50	18	17

Table 3-4 EXISTING SERVICE COVERAGE BY PROVINCIAL SECTOR PLANS

·		Urba	n Water Su	pply		d Water Sup	ply
WRR	Province	Urban Population (x1,000)	Served Population (x1,000)	(%)	Rura) Population (x1,000)	Served Population (x1,000)	(%)
1	Abra	42	38	91%	154	119	77%
	Benguet	310	214	69 %	231	164	71%
	Hocos Norte	138	115	83%	345	224	65%
	Hocos Sur	128	97	76%	417	296	71%
11	Batanes	5	5	92%	9	8	90%
	Ifugao	16	9	56%	134	103	77%
	Isabela	295	159	54%	866	520	60%
	Kalinga-Apayao	45	28	62%	193	137	71%
	Nueva Vizcaya	97	83	86%	237	137	58%
	Ouirino	33	20	61%	98	62	63%
111	Bataan	346	266	77%	146	117	80%
• • •	Bulacan	1,453	1,046	72%	322	235	73%
	Nueva Ecija	443	288	65%	1,063	840	79%
	Pampamga	1,189	702	59%	447	353	79%
	Pangasinan	911	592	65%	1,268	938	74%
	Tarlac	273	188	69%	672	538	80%
	Zambales	319	287	90%	250	100	40%
IV	Batangas	831	582	70%	828	530	64%
• •	Marinduque	28	21	75%	172	52	30%
	Occidental Mindoro	178	125	70%	160	70	44%
	Oriental Mindoro	91	75	82%	517	326	63%
	Palawan	230	184	80%	411	275	67%
	Rizal	1,257	855	68%	55	40	73%
	Rombion	49	33	68%	195	94	48%
v	Albay	262	160	61%	743	557	75%
,	Camarines Norte	118	73	62%	- 321	257	80%
	Camarines Sur	501	356	71%	931	745	80%
	Total	9,588	6,601	69%	11,185	7,836	70%

Dtata Source: Provincial Water Supply, Sewerage and Sanitation Sector Plan

Table 3-5 RURAL WATER SUPPLY ESTIMATE OF NEEDS

			Pop. Served *	P	op. Served (funct	oning)**	No. of Wells
Year	Rural Pop.	Annual	Cummulative	(学)		(%)	
1987	24,356,294	0	15,379,999		11,534,999	47,369	667,80
1988	29,585,433	918,710	16,293,709	55.09%	12,453,709	42.09%	674,87.
1999	30,354,655	2,445,430	18,744,139	61.75%	14,899,139	49,08%	693,68
1990	31,158,409	3,354,780	22,098,919	70.924	18,253,919	58.589	719,49
1991	32,694,430	2,990,910	25,089,829	76.74%	21,244,829	64.98%	742,49
1992	33,539,939	1,892,930	26,992,759	80.45%	23,137,759	68.99%	757,06
1993	34,383,134	659,490	27,642,249	80.39%	23,797,249	69.21%	762,13
1994	35,226,334	1,134,250	28,776,479	81.69%	24,931,499	70.7\$%	770.65
1995	36,069,531	1,371,370	30,147,859	83.58%	26,302,869	72.92%	781.40
1996	36,901,406	522,600	30,670,469	83.10%	26,825,469	72.68%	785.42
1997	37,742,991	1,230,580	31,901,649	84.52%	28,056,049	24.33%	794,89
1998	38,578,581	1,246,960	33,148,009	85.92%	29,303,009	75.96%	804,48
1999	39,414,169	1,240,720	34,388,729	87.25%	30,543,729	77.49%	814,02
2000	40,252,044	1,280,110	35,668,839	88.61%	31,823,839	79.06%	823,87

Data Source: DPWH

Note: * Percent Population Coverage at 130 persons per well
** Population Served to account non-functioning wells 25% of stock

Table 3-6 WATER PRODUCTION AND VOLUME OF WATER SOLD BY MWSS

			Water Pr	oduction				- -	Volume Sold	Revenued Water	Non- Revenued Water
Year	GW (MCM year)	GW (mld)	SW (MCM3ear)	SW (mfd)	Total (mid)	Total (MCM/year)	year	Total (mid)	Total (MCM/year)	(%)	(%)
1985	30	81	757	2,075	2,156	787	303	830	303	38	62
1986	30	83	874	2,395	2,478	905	311	851	311	34	66
1987	28	76	835	2,287	2,364	863	337	922	337	39	61
1988	30	81	849	2,327	2,408	879	35 9	985	359	41	59
1989	29	79	859	2,354	2,433	888	376	1,030	376	42	58
1990	33	91	876	2,399	2,491	909	385	1,054	385	42	58
1991	34	93	780	2,136	2,229	814	386	1,059	386	48	52
1992	28	77	823	2,256	2,333	851	383	1,049	383	45	55
1993	26	70	907	2,485	2,556	933	397	1,088	397	43	57
1994	27	73	983	2,693	2,766	1,010	419	1,148	419	42	59
1995	27	75	949	2,599	2,674	976	426	1,168	426	44	56
1996	30	82	1,100	3,013	3,095	1,130	436	1,194	436	39	61

Data Source: MWSS

Table 3-7 EXISTING WATER DEMAND FOR WATER DISTRICTS

20 71,726 26.18 10 19.829 7.24 86 375,037 136.89 67 291,111 106.26 37 96,781 35.33 54 132,175 48.24 19 202,897 74.06 22 47,788 17.44 18 107,733 39.32 23 130,646 47.69 21 160,894 58.73 22 42,692 15.58	D. C.	Manufacture of Manue	O (m3/dm)	O (MCM/year)	Population Served	lpcd	Population '95	Service Ratio
20 71,726 26.18 440,160 10 19.829 7.24 128,920 86 375,037 136.89 1,865.560 67 291,111 106.26 1,153.980 37 96,781 35.33 489,310 54 132,175 48.24 695.740 19 202,897 74.06 516,330 22 47,788 17.44 328,750 18 107,733 39,32 488,270 18 107,733 39,32 488,270 23 160,894 58,73 1,028,500 21 160,894 58,73 1,028,500 22 42,692 15.58 251,540 22 42,692 15.58 8,103,610	Keglon	Number of wile	C (may cay)	/ mac >	00 + 00 +		1 227 180	3600
10 19,829 7.24 128,920 86 375,037 136.89 1.865.560 67 291,111 106.26 1,153.980 37 96,781 35.33 489,310 54 132,175 48.24 695,740 19 202,897 74.06 516,330 22 47,788 17,44 328,750 18 107,733 39,32 488,270 23 130,646 47,69 716,550 21 160,894 58,73 1,028,500 22 42,692 15.58 251,540 23 42,692 15.58 251,540 24 42,692 15.58 8,103,610	_	20	71.726	26.18	440,160	107.30	1.447.100	2
10 19,829 7.24 126,920 86 375,037 136.89 1,865,560 67 291,111 106,26 1,153,980 37 96,781 35,33 489,310 54 132,175 48,24 695,740 19 202,897 74.06 516,330 22 47,788 17,44 328,750 18 107,733 39,32 488,270 23 130,646 47,69 716,550 21 160,894 58,73 1,028,500 22 42,692 15.58 251,540 23 42,692 15.58 251,540 24 42,692 15.58 8,103,610	7	1	1000	ì	000 001	152.21	956 460	3%
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86 375,037 130,09 67 291,111 106.26 1,153,980 37 96,781 35,33 489,310 54 132,175 48.24 695,740 19 202,897 74.06 516,330 22 47,788 17.44 328,750 18 107,733 39.32 488,270 23 130,646 47,69 716,550 21 160,894 58,73 1,028,500 22 42,692 15.58 251,540			500 500	126 90	1.865.560	201.03	6.258,060	30%
67 291,111 106.26 1,153,980 37 96,781 35.33 489,310 54 132,175 48.24 695,740 19 202,897 74.06 516,330 22 47,788 17,44 328,750 18 107,733 39.32 488,270 23 130,646 47,69 716,550 21 160,894 58,73 1,028,500 22 42,692 15.58 251,540 22 42,692 15.58 251,540 23 612,95 8,103,610	Ш	98	150,515	150.03	20000			200
37 96,781 35.33 489,310 54 132,175 48.24 695,740 19 202,897 74.06 516,330 22 47,788 17,44 328,750 18 107,733 39.32 488,270 23 130,646 47,69 716,550 21 160,894 58,73 1,028,500 22 42,692 15.58 251,540 22 42,692 15.58 251,540 23 612,95 8,103,610	Ş	1.7	111100	106.26	1.153.980	252.27	4,664,1/0	0%C7
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54 132,175 48,24 695,740 19 202,897 74.06 516,330 22 47,788 17.44 328,750 18 107,733 39,32 488,270 23 130,646 47,69 716,550 21 160,894 58,73 1,028,500 22 42,692 15.58 251,540 399,00 1,679,309 612,95 8,103,610	**	27	96 781	35.33	489.310	77.79	2,331,140	9/17
54 132,175 48,24 695,740 19 202,897 74.06 516,330 22 47,788 17,44 328,750 18 107,733 39,32 488,270 23 130,646 47,69 716,550 21 160,894 58,73 1,028,500 22 42,692 15.58 251,540 399,00 1,679,309 612,95 8,103,610	>			i ! !	1 1 1	000	066 619 6	100%
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18 107,733 39,32 488,270 23 130,646 47,69 716,550 21 160,894 58,73 1,028,500 22 42,692 15.58 251,540 1,679,309 612,95 8,103,610	V 1.11	11)			22000	1 372 040	360%
23 130,646 47.69 716,550 21 160,894 58.73 1,028,500 22 42,692 15.58 251,540 1 399,00 1,679,309 612,95 8,103,610	<u>}</u>	82	107.733		488,470	†0.024	\$17.4.C.	
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21 160.894 58.73 1.028,500 22 42.692 15.58 251.540 1 399.00 1.679.309 612.95 8.103.610	>	23	30,646	47.69	00001/	104.33	2/2:-/:	2 1
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399.00 1.679.309 612.95 8.103.610		C	707 67	35.51	251540	169.72	1.906.570	13%
1 399.00 1.679.309 612.95 8.103.610		77	760.74	00.01	Q1 (M1) 7 (M2)		VIII	2000
	Mean	300 00	1 679 309	612.95	8,103,610	207.23	29,964,670	0/,17
221272	lotal	00:00	10 mt/ 1011					

Data Source: List of WDs as of Jan. 1997 and LWUA'a Annual Reports as of 1995 & 1996

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Table 3-8 WATER DEMAND FOR PUBLIC WATER SUPPLY IN 1995

WRR	Туре	Vater Demand (MCM/y Total	Urban Area	Rural Area
1	Lell(26	15	
	L-I, H	14	4	
	Sub-total	41	18	
11	L-III	7	5	<u>-</u>
	L-I, II	21	4	
	Sub-total	28	8	
111	L-III	137	111	
	£-1, 11	51	21	
	Sub-total	188	131	
IV	1111	1,082	1,053	
	L-I, II	48	20	
	Sub-total	1,131	1,073	
V	L-III	35	22	
	L-1, II	30	6	
	Sub-total	66	28	
VΪ	L-III	48	31	· · · · · · · · · · · · · · · · · ·
	L-1, II	40	13	
	Sub-total	89	44	
VII	L-III	74	60	
	L-1, 11	35	13	
	Sub-total	109	73	
VIII	L-III	17	9	
	L-I, H	25	6	
	Sub-total	42	15	
IX	L-III	39	34	
	L-I, II	23	5	
	Sub-total	63	39	
X	L-III	48	40	
	L-I, II	24	6	
	Sub-total	72	46	
ΧI	LIII	59	55	
	L-I, II	22	3	
	Sub-total	80	58	
XII	LIII	16	15	
	L-I, II	36	10	
	Sub-total	52	25	
Total	L-III	1,589	1,448	<u> </u>
	L-I, II	369	110	2
	Total	1,958	1,558	4

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Table 3-9 EXISTING SERVICE COVERAGE AND WATER DEMAND FOR PUBLIC WATER SUPPLY SYSTEM AND PRIVATE WATER SOURCE (1/2)

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Region	Type	Coverage/ Demand		Total	Urban	Roral
1	·	Population	(x 1,000)	2,362	775	1,587
	Public	Pop. Served	(x 1,000)	1,757	571	1,186
		Coverage	(%)	74%	74%	75%
		Water Demand	(MCM/year)	41	18	22
	Private	Pop. Served	(x 1,000)	606	204	401
		Coverage	(%)	26%	26%	25%
		Water Demand	(MCM/year)	6.63	2.24	4.40
	Total	Water Demand		47	20	27
11		Population	(x 1,000)	3,054	640	2,414
	Public	Pop. Served	(x 1,000)	2,028	406	1,622
		Coverage	(%)	66%	63%	67%
		Water Demand	(MCM/year)	28	8	20
	Private	Pop. Served	(x 1,000)	1,026	234	792
	- 1-1-1-1	Coverage	(%)	34%	37%	33%
		Water Demand	(MCM/year)	11.23	2.56	8.67
	Total	Water Demand		39	11	29
111		Population	(x 1,000)	9,111	4,933	4,178
	Public	Pop. Served	(x 1,000)	6,497	3,369	3,128
		Coverage	(%)	71%	68%	75%
		Water Demand	(MCM/year)	188	131	56
	Private	Pop. Served	(x 1,000)	2,614	1,564	1,050
	* 11*410	Coverage	(%)	2,014 29%	32%	25%
		Water Demand	(MCM/year)	28.63	17.13	11.50
	Total	Water Demand	(216	148	68
iv		Population	(1 000)	19,395	15,210	
11	Public	Pop. Served	(x 1,000) (x 1,000)	12,866	9,982	4,185
	tuone	Coverage		66%	9,982 66%	2,883
		Water Demand	(%) (MCM(usar)		1,073	69% 58
	Private	Pop. Served	(MCM/year) (x 1,000)	1,131 6,529	5,228	
	a tivate	Coverage	(%)	34%	34%	1,301 319
		Water Demand	(MCM/year)	71,49	57.25	14.25
	Total		(MCNE)car)			
	Total	Water Demand		1,202	1,130	72
V		Population	(x 1,000)	4,325	1,221	3,105
	Public	Pop. Served	(x 1,000)	3,265	823	2,442
		Coverage	(%)	75%	67%	799
		Water Demand	(MCM/year)	66	28	38
	Private	Pop. Served	(x 1,000)	1,061	398	663
		Coverage	(%)	25%	33%	219
		Water Demand	(MCM/year)	11.61	4.35	7.26
	Total	Water Demand		77	32	45
Vi		Population	(x 1,000)	5,777	2,359	3,418
	Public	Pop. Served	(x 1,000)	4,371	1,626	2,744
		Coverage	(%)	76%	69%	809
		Water Demand	(MCM/year)	89	44	44
	Private	Pop. Served	(x 1,000)	1,406	732	674
		Coverage	(%)	24%	31%	209
		Water Demand	(MCM/year)	15.40	8.02	7.38
	Total	Water Demand		104	52	51
VII		Population	(x 1,000)	5,015	2,298	2,710
	Public	Pop. Served	(x 1,000)	3,672	1,586	2,086
		Coverage	(%)	73%	69%	779
		Water Demand	(MCM/year)	108.59	72.57	36.02

Table 3-9 EXISTING SERVICE COVERAGE AND WATER DEMAND FOR PUBLIC WATER SUPPLY SYSTEM AND PRIVATE WATER SOURCE (2/2)

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I

	Private	Pop. Served Coverage	(x 1,000) (%)	1,343 27%	712 31%	630 23%
		Water Demand	(MCM/year)	15	8	7
	Total	Water Demand	(mean)	123	80	43
/[[[Population	(x 1,000)	3,367	1,013	2,354
***	Public	Pop. Served	(x 1,000)	2,576	699	1,877
	Conc	Coverage	(%)	77%	69%	80%
		Water Demand	(MCM/year)	42	15	27
	Private	Pop. Served	(x 1,000)	791	314	477
		Coverage	(%)	23%	31%	20%
		Water Demand	(MCM/year)	8.66	3.44	5.22
	Total	Water Demand	(mem year)	51	18	32
X		Population	(x 1,000)	3,581.63	1,252,21	2,329,43
•••	Public	Pop. Served	(x 1,000)	2,629.70	864.02	1,765.68
	1 done	Coverage	(%)	73%	69%	76%
		Water Demand	(MCM/year)	62.76	38.78	23.99
	Private	Pop. Served	(x 1,000)	951.94	388,18	563.75
	rrrano	Coverage	(%)	27%	31%	24%
		Water Demand	(MCM/year)	10.42	4.25	6.17
	Total	Water Demand	(membyem)	73.19	43.03	30.16
 Х		Population	(x 1,000)	3,954.76		
Λ	Public	Pop. Served	(x 1,000) (x 1,000)	3,934.76 2,926.51	1,724.81	2,229.95
	ruone	Coverage	(%)	74%	1,190.12	1,736.40 78%
		Water Demand	(MCM/year)	71.84	69% 46.25	
	Private	Pop. Served	(x 1,000)	1,028.25	534.69	25.59
	Tivate	Coverage	(%)	26%	334.09	493,56 22%
		Water Demand	(MCM/year)	11.26	5.85	5.40
	Total	Water Demand	(MCMEStar)	83.10	52.11	31.00
<u>.</u> -			(- 1 000)			
, i	Public	Population	(x 1,000)	5,777	2,359	3,418
	ruone	Pop. Served Coverage	(x 1,000)	4,371	1,626	2,744
		Water Demand	(%)	76%	69%	80%
	Private	Pop. Served	(MCM/year) (x 1,000)	89	44	44
	filvate	Coverage	(%)	1,406	732	674
		Water Demand	(MCM/year)	24% 15.40	31% 8.02	20% 7.38
	Total	Water Demand	(MCMD) cat)			
ΧII	Total	Population Population	(x 1,000)	104 4,909	52	2 208
NII	Public	Pop. Served	(x 1,000) (x 1,000)	3,533	1,701 1,174	3,208
	Luone	Coverage	(%)	3,333 72 %	69%	2,359 74%
		Water Demand	(MCM/year)	52	25	27
	Private	Pop. Served	(x 1,000)	1,376	527	849
	1111010	Coverage	(%)	28%	31%	26%
		Water Demand	(MCM/year)	15.07	5.78	9.29
	Total	Water Demand	(,	67	31	36
otal		Population	(x 1,000)	68,613	34,619	33,994
viai	Public	Pop. Served	(x 1,000)	49,120	23,548	25,572
	1 done	Coverage	(%)	72%	68%	
		Water Demand	(MCM/year)			75%
	Private	Pop. Served	(x 1,000)	1,958 19,493	1,558	400 8 422
	1 117 att	Coverage	(%)	28%	11,070 32%	8,422
		_			·	25%
		Water Demand	(MCM/year)	213,44	121.22	92.22

Table 3-10 WATER RIGHTS FOR INDUSTRIAL WATER (1/3)

(Unit: lps)

	<u>-</u>	1986	· · · · · · · · · · · · · · · · · · ·		1987			1988			1989	
Region	GW	SW	Total	GW	SW	Total	GW	SW	Total	GW	SW	Total
<u>s</u> ,	579	911	1,490	579	911	1,490	580	1,117	1,698	580	1,315	1,896
ii.	1	489	490	1	489	490	1	489	490	1	489	490
Ш	1,178	3,880	5,058	1,178	3,880	5,058	1,210	4,015	5,225	1,225	4,015	5,240
IV	1.040	7.748	8.788	1,040	7,751	8,791	1,040	7,751	8,791	1,043	7,751	8,794
V	172	444	616	172	444	616	172	444	616	172	444	616
VI	755	16,202	16,957	755	16,202	16,957	755	16,202	16,957	757	16,202	16,959
VII	1,140	1.905	3,045	1,140	1,905	3,045	1,140	1,905	3,045	1,140	1,905	3,045
VIII	382	348	730	382	348	730	382	348	730	382	348	730
IX	13	134	147	13	134	147	13	134	147	13	134	147
X	1	6.408	6,408	1	6,408	6,408	1	6,408	6,408	1	6,408	6,408
ΧI	0	4.912	4,913	0	4,912	4,913	0	5,182	5,182	0	5,182	5,182
XII	0	2,819	2.819	0	2,819	2,819	0	2,819	2,819	0	2,819	2,819
Total	5,261	46,201	51,462	5,261	46,204	51,465	5,294	46,815	52,108	5,313	47,013	52,326

Table 3-10 WATER RIGHTS FOR INDUSTRIAL WATER (2/3)

(Unit: lps)

		1990			1991		·······	1992			1993	onic ips)
Region	GW	SW	Total	GW	SW	Total	GW	SW	Total	GW	SW	Total
Ī	580	1,565	2,146	580	1,645	2,226	582	1,645	2,227	617	1,645	2,262
Н	366	489	855	366	489	855	366	489	855	377	489	866
111	1,226	4,015	5,241	1,226	4,015	5,241	1,226	4,045	5,271	1,255	4,045	5,300
IV	1,090	7,751	8,842	1,100	7,751	8,851	1,132	7,810	8,943	1,142	7,813	8,956
V	172	444	616	172	444	616	172	444	616	172	444	616
VI	757	16,202	16,959	758	16,202	16,960	833	16,452	17,285	852	16,452	17,305
VΠ	1,140	1,905	3,045	1,140	1,905	3,045	1,225	2,016	3,241	1,249	2,016	3,265
VIII	382	348	730	382	348	730	382	348	730	382	348	730
1X	13	134	147	13	134	147	17	134	151	17	134	151
X	2	6,408	6,410	2	6,408	6,410	2	6,408	6,410	2	6,408	6,410
ΧI	0	5,182	5,182	0	5,182	5,182	13	5,182	5,195	13	5,740	5,753
Xil	0	2,819	2,819	0	2,819	2,819	0	2,819	2,819	0	2,819	2,819
Total	5,729	47,263	52,992	5,740	47,343	53,083	5,950	47,793	53,743	6,079	48,354	54,434

Table 3-10 WATER RIGHTS FOR INDUSTRIAL WATER (3/3)

(Unit: lps)

								(٤	лис грхэ
		1994			1995			1996	
Region	GW	SW	Total	GW	SW	Total	GW	SW	Total
I	617	1,645	2,262	617	1,645	2,262	647	1,645	2,292
11	498	489	987	498	489	987	498	489	987
111	1,255	4,045	5,300	1,263	4,045	5,308	1,466	4,045	5,512
įV	1,157	7,813	8,970	2,897	13,053	15,950	3,463	13,093	16,557
V	172	444	616	172	503	675	172	562	734
VI	881	16,602	17,483	881	16,605	17,485	899	16,725	17,624
VII	1,407	2,442	3,849	1,418	2,476	3,895	1,430	2,511	3,941
VIII	382	348	730	382	348	730	389	365	755
ΙX	22	135	157	22	135	. 157	22	135	. 157
х	93	6,456	6.549	93	6,456	6,549	102	6,456	6,558
ΧI	64	6,567	6,632	94	6,567	6,661	220	6,567	6,787
XII	0	2,819	2,819	0	2,824	2,824	63	3,965	4,027
Total	6,548	49,807	56,355	8,337	55,147	63,485	9,372	56,559	65,931

Data Source: NWRB

Note: GW---Ground Water, SW--Surface Water

Table 3-11 INDUSTRIAL WATER DEMAND IN 1995

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I

Region	Ground Water (MCM/year)	Surface Water (MCM/year)	Total (MCM/year)
Ī	5.3	67.7	72.9
Н	0.7	15.4	16.1
111	83.7	125.6	209.3
IV	202.2	423.6	625.8
V	1.6	18.2	19.8
VI	45.6	523.6	569.3
VII	88.0	77.8	165.8
VIII	20.4	11.0	31.4
1X	1.4	4.3	5.7
X	43.3	167.1	210.4
ΧI	16.0	199.1	215.1
XII	6.3	85.7	92.0
Tetal	514,4	1,719.1	2,233.5

Table 3-12 LIST OF NATIONAL IRRIGATION SYSTEMS AS OF 1996 (1/2)

	W RR	Served	Systems	Area (ha)	Wet	Dry	Total	Wel	₽ŋ	Te131
agion t	(4)	0	_		**			(22*		^
•	11	Pangasman -	5	12130	7016	5003	12016	58 09	41 22	99 3
•	111	Pangasinan	3	63/02	3250	192	4042	\$1.57	12 57	64.1
T-burayan	1	La Union	1	3420	3250	2590	5840	95 03	75 73	170 7
oos Norte	ı	llocos Norte	8	6175	5038	4240	9278	81 59	69 66	150 2
xos Sur	1	flocos Sur	3	3340	3370	1239	4608	87.76	32 24	12
ower Agno-Totonoguan	Ų)	Pangasinan	•	7500	3772	2025	5797	50 29	27.00	77 2
	ı. I	La Union	1	1595	1300	716	2016	82 02	45.17	127.1
•										
an Fabian-Dumulod Ibtotat	118	Pangasinan	2 21	3594 41546	2395 29421	1387 1798 8	3782 47409	66 54 66 05	38 59 40 38	105 (106 :
gion 2										
bulog-Apayao-Panipiona	K	Cagayn-Apayop	2	10895	4500	5032	9532	41.30	46.19	87.
2-3-3-0	11	Cagayan	1	1812	1020	1481	2501	56 29	8173	138
• -	Ħ	Cagayan	1	1087	680	900	1670	62 5€	91.08	153
902	ŧI.	Садауал	1	1353	452	745	1198	33.41	55.14	88
அப்பு	D	Cagayan	1	1502	962	1385	2347	64 05	9221	156
APIS .	D)	Cagayan	1	2306	950	1300	2280	42 50	56 37	93
wer Chico	n		1	1856	1226	895	2121	66 06	48 22	114
		Cagayan								
agapit	Ü	Cagayan	1	7500	3730	7170	10900	43 73	95 60	145
athg	ő	15356.3	1	2427	1370	1480	2650	56 45	60.98	117.
ABitS District (Ü	Isabela	1	24054	18662	18982	37644	77 58	78 91	15
ABITS District 1	it	Isabela	1	24468	21905	21947	43342	89 89	89.70	179
AR#S Distret##	il .	isabela-Rugao	1	54493	16763	16539	33302	67.61	66 71	134
ARDS District IV	4	Isabela	,	24097	17597	17756	35353	73 06	73.72	146
	11	Isabela							54 67	108
in Pablo-Cabagan			1	1273	686	696	1382	53 89		
วโลกสะใช้ บฏิบัยฐลาลอ	11	Cagayan	1	1600	679	507	1186	67.90	50 70	11
nacenauan	11	Cagayas	1	088	460	461	921	52 27	52 39	104
amaginii	J\$	Isabela	1	3615	1651	22\$3	3304	45 67	62 32	107
per Chico (CAR)	R	Kalinga-Apayao-Isabela	1	17551	9689	9600	19283	55 20	5470	109
กษาสัชกฎลท	11	Cagayan	1	2045	1859	1869	3739	91.39	91.33	182
t-total			20	154504	104971	111083	216060	67.94	71 90	139
egion 3										
υC3O	911	Zambales	1		**					
				1231	No operation					
ngat-Maasim	H	Bulacan	1	31435	21555	26464	48019	69 46	8405	152
amiling:	H	Tarlac	1	8600	6776	3250	10026	73 79	37.79	116
olo-Caulaman	ы	Bataan-Pampanga	2	1427	400	483	883	28 03	33 85	61
ayom-Bayto	Õ1	Zambales	5	1943	1550	1625	3275	8470	83 42	168
EPIS	tii	Nueva Ecka	1	1313			0			
to. Tomas	81	Zartitiales	3	3924	No operation					
ASMORIS	BI	Tartac	2		No operation					
										_
orac-Gumain	131	Pampanga	1	4405	1031	2554	3585	23.41		81
PRIS District 1	!0	Nueva Ecija	1	24352	20618	16577	37193	82.59	65.41	
IPR3S District II	10	Nueva Edya	1	23913	22682	13063	35745	94 85	54 63	149
JPRoS District III	19		-							
		Nueva Ecga	1		20564	16052	36616	68 90	53 78	127
IPRIIS District IV	14	Nueva Ecija	1		17988	10809	28797	75 54	45 39	120
ublotal			16	170841	113262	90877	204139	66 30	53.19	139
გეიი 4										
iges:	IV	Ovezon	1	1119	1119	1113	2238	100.00	100 00	
imnay-Patrick	W	Mindoro Occ.	,	2213	900	900	1900	40.67	40 67	8
Baco-Budayao	W	Mindoro Or	,	6327	3928	3469	7397	62 08	54 83	110
Daguray	ŧ٧	Mindore Occ	1	3308	982	559	1211	29 69	6 92	31
Cantingas	١V	Renition	1	256	284	256	540	11094	100 00	21
Daville FLIS	١V	Cavite	1	13066	8425	3862	12287	64.38	29.51	9
Disa1rt	117									
		Aprora	1		320	350	700	65 98	78 35	14
)Ht,	IV	Opezon	3		2520	2787	5307	76 16	84 22	16
aguna FUS	W	Laguna	€	3250	2130	1891	4021	65 54	58.13	12
.umintao	IV	Mindora Occ	1		1002	721	1723	66 62	47.94	11
Aalatgao-Batang-Batang	iV	Palawan			3484		6001			
						2517		108 88	78.66	18
Stal Maria-Mayor	ŧ۷	Laguna		1773		991	1966	54 99	55 89	11
^o agbahan	47	Minodro Occ.	1	1005	653	653	1306	6 4.98	64.98	12
Parico	IV	Barangas	4	886	826	828	1652	93.23	93 23	15
Pula-Bansud	iV	Mindoro Or.		3830						
					3343	3313	6686	87.28	87.28	17
Stal Gruz-MMBL	₩	Laguna		5 4911	3377	3180	6557	67.85	63 89	13
Mag-asawang Tubig	W	Mindero Or.	1	1700	400	665	1065	23 53	39.12	6
Subtotal			3			27789	62457	66 38	53.21	13
Region 5		• • • • • • • • • • • • • • • • • • • •			V-000	2,103				
Bant-Buhi-Lato	v	Camarines Sur	,	2 9720	4994	4404	6315	40.63	AE 00	
						4491	9315	49.63	45.20	9
Cagaycay	٧	Camarines Sur		1 1755	506	1400	1906	28 83	79 77	1
Daet-Talisay-Matogoon	V	Carnarines Norte		2 2746	2580	2526	5106	93 95	91.99	18
inanhan Tigman-Hinagyama	n V	Camarines Sur		1 3542		2778	5551	78 35	78 37	15
-						2770	3331	1000	1001	13
Libinanan-Cabusao	V	Camarines Sur			No Operation					
MNOH	V	Albay		4 1946	1343	1941	3884	99 85		19
PileBulan-San Francisco	٧	Sorsogon		3 1200		800	1750	79.17		14
Subtotal	-			4 23412		13934	27512	58.00	59 52	11
Region 6										
		n. t-								
Aganan-Stal Barbara	VI	Borla		2 8262		3485	10547	85.48	42.18	12
Aklan-Panakuyan	٧l	Aklan	;	2 4816	4216	4216	8432	87.54	87.54	17
8ago	Vi	Negros Occ.		1 12700		8093	17815	76.56	63.72	14
Barotac-Viejo	Vi	flicilo								
•				1 1774		983	2383		55.41	1.
Jalaur-Susgue	Vi	liado		3 14400	11556	8550	20106	80 25	59.38	\$.
Mambusao	Vt	Capiz		1 1423	990	878	1868	69 57	61.70	33
Pangiplan	VI.	Negros Occ.		1 1775		940	1897		52 96	1(
• •	VI	Antique		1 5065			7413		59 94	
		A:NRH:P		165	43/5	3036	7417			1.
Sibalom-San Jose										
Sibalom-San Jose Sibalom-Tigbeuan Subtotal	V!	Noilo		1 2020 3 52235	1624	550 30731	2174 72634	80.40	27.23 58.83	10

Table 3-12 LIST OF NATIONAL IRRIGATION SYSTEMS AS OF 1996 (2/2)

		Province	No 61	Service		irrigaled Arca			g Intensity (ъ1
SYSTEM	WRB.	Served	Systems	Area (ha)	Wel	Dry	Total	Wet	Dry	Total
Region 7 & 8										
B30	Viil	Northarn Leyte	1	1917	1802	1795	3597	94.00	93 €4	187 6
Binahaan-Toak	Viii	Northern Leyle	4	6041	4116	4122	8239	68 13	68 23	136 37
Mainil Pongso	VIII	Northam Leyle	5	2184	1760	1478	3238	80 59	67.67	1 19 26
Daguitan-Guinarona	VIII	Northern Leyte	2	1436	750	883	1633	50 13	59 02	109 16
Bilo	Asi	Northern teyla	1	1411	1332	1313	2645	94.40	93.05	187.46
Balire Ibawon-Gibuga	V01	Northern Leyla	4	1715	1383	1273	2661	80 93	74 23	155.16
Hindang-Hilongos-Oas ay	VIII	No. So. Leyte	2	1078	1078	1078	2156	100.00	100 00	200
Subtotal			16	15842	12226	11942	24168	77.17	75 39	152 50
Region 9	,,,,	Ma O								
Dipole	DK DC	Misamis Occ.	1	1600	923	821	1750	58 06	51 31	109 3
Labangan Cab	DX AU	Zamboanga Sur	1	3195	2500	1966	4466	78 25	61.53	133 7
Salug	(X	Zamboanga Sur	1	7224	5905	5600	11595	82 93	77 52	160.5
Sibuguey Valley	/X	Zamboanga Sur	1	3143	2390	2310	4610	73.18	73 50	146.6
Subtotal Basins 10	~		4	15162	11724	10637	22421	77.32	70 55	147 8
Region 10	Χil	Bukidnon	1	4205		•637	2022			
Manupali Muleta	XiI	Bukidnon	1		1311	1627	2938	29 83	37 02	€6 8:
Pulangui	Xii	Bukidnon	,	4062 8547	1326 8263	1272 8336	2598	32 64	3131	63 9
Roxas-Kuya	Xő	Bukidnon	,	753	763	784	16599 1547	96 68	97 53	1342
Regnan	X8	tango del Sur	1	2500	207			101 33	104.12	205.4
Sublicial	V14	Ca::30 Ocs Oct	5		11870	154 12173	361 24043	828	616	14.4
Region 11				20232	11610	12173	24093	58 60	60.09	118 0
Afah I	XH	South Colabato	1	10539	11970	6075	18045	113 58	57.64	1712
Batutu	×	Davag del Narte	ì	3263	3197	3135	6332	97.83	95 90	193
Buayan	XI	South Cotabato	. 1	710	587	530	1117	82.68	74 65	157.3
Lasang	Χŧ	Davao del Node	1	4150	4373	4432	8805	98 27	9960	197.8
Lupon	XI	Davao Oriental	1	2131	2245	2245	4490	105 35	105 35	210
Padada	X3	Davao del Sur	,	3512	3529	3393	6922	100.43	96.61	197.
Saug	X)	Davao del Norte	,	2941	3003	2625	5628	102.11	8926	191.3
Siluay	ΧI	South Cotabato	1	1406	1246	1225	2471	88 62	87.13	175.7
Banga-Martel	Χū	South Celabate	3		5315	4428	9743	103.06	85 86	189.9
Libuganon	Χŧ	Davag del Norte	1	7093	10726	8338	19064	151 22	117.55	2687
Saug-Libuganon	XI	Ogvag del Node	1	479	469	500	969	97.91	104 38	202
Cumaguit	XII	South Cotabato	1	2300	1361	1300	2661	59.17	56 52	115
Lambayong	ХII	South Cotahato	1	11033	10139	4033	14172	91.90	35 55	128.4
Kipaliku	XI	Davao del Norte	1	1500	2359	1797	4156	157.27	119 80	271.0
Mat	ΧI	Davao del Sur	1	2509	2568	2584	5152	102 35	102 99	205 3
Subjetat			17		63087	46640	109727	106 87	79 01	185 8
Region 12										
Allah 2 - Lambayong	XiI	South Colabato	1							
Kabacan-Pagalungan	XiI	No Cota -Magdindanao	2	5018	4400	4395	8795	87.68	87 58	175.2
Libungan	ХH	No. Cota -Maguindanac	. 1	9360	8799	5596	14395	9401	59.79	153.7
Matasita	XII	North Cotabato	1	4906	3360	3193	6553	83.87	7971	163 5
Miang	XII	North Cotaharo	1	2981	2100	1913	4013	70.45	64.17	1346
Telayan	X8	Maguindanao	1	700	35	358	393	5 00	51.14	56.1
Maranding	ΧII	Lanao del Norte	1	4500	3466	3437	6903	77.02	76 38	153.
Atp	ΧĐ	Magdindanao	ŧ	2300	2233	1865	4088	97.09	80 65	177.7
Subtotal			9	28865	24393	20747	45140	84.51	71.83	1563
CARAGA										
Andanan	×	Agusan del sur	3		3096	3106	6202	90 63	90 93	1815
Cabadbaran	x	Agusan del Norte	5		2100	1932	4032	65 38	60 15	125.5
Cantilan	Χı	Surigaç del Sur	1		1496	1500	2936	83 76	83 93	167.7
Gloong	X.	Agusan del Sur	1	2156	2116	2156	4272	98.14	100 00	198.1
Simulao	X	Agusan del Sur	ţ	2119	2180	2207	4387	102.88	104.15	207.0
Tago	X 1	Surigao del Sur	t	5505	2345	2104	4449	106.49	95 55	505 (
Sublolal			7	14891	13333	13006	26338	89 54	87.33	176 8
TOTAL			173	651812	474436	497612	832043	72 79	62 54	135

'Water Resources Region

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Data Source: National Irrigation Administration

Table 3-13 EXISTING COMMUNAL IRRIGATION SYSTEMS AS OF 1996 (1/2)

				300000000		4.50	ACRE A OTHER	SA YORTA GOVT AGENCY ASST	/ASST		PRIVATE SYSTEMS	WSTEMS			TOTAL			PERCENTION IN LESS OF THE	77	
WATER			Popus	AMORT CINE STOCKED TO SEE	na (ha)		Service	impaind Area (ha)	((na)		Service	Impaind Area (ha)	(hd)		Service	tropated Area (43)	3 (43)	Wel	ર્ક	Total
S 25		A CANADA	Orea that	Var.		Number	Area (hai	Wat	Ory Nu	, sedui	Area (ha)	West	š	n inmit year	Ama (hg)	Wed	¥0.	c) or	80.08	145 70
	9000	7	3.651.00	1,660.00	90.0	æ	049.00	588.00	568.00	781	8,523.00	7,762.00	8,035,00	273	12,823.00	00.012.01	9,473.00	3 3	3 3	143.25
	Decouple	2	1.396.00	1,150,00	1,238.00	3	1544.00	1285.00	1264.00	210	3,549,00	2,981,00	360.00	80	6,479.00	00.381.00	0.568.00	67.42	31.63	50.62
-	Hoose Node	8	3,879,00	3,392.00	2,024,00	45	12111.00	11976.00	4134.00	614	8,121,8	13,916,00	3,350,00	2 1	30,120,00	0.00.00	00,200	9	3	8
-	locos Sur	ន	2,507.00	2,069.00	614.00	75	5664.00	4426.00	681.00	121	4,598,00	3,916,00	627.00	8 8	00.850.2F	8 75. 8	4 539 00	7.40	47.90	119.32
	La Umon	4	2,935.00	2,238.00	1,350.00	143	5076.00	4279.00	3116.00	52	1,462.00	247.00	3.00	8 9	7,705.00	000000	28,304.00	F.	39.47	176.06
	TOTAL	234	14,408.00	10,717,00	7,076.00	459	25044.00	22554.00	9785.00		37,713,00	20,000		٠	8	00.0	0.0	1.20	1,20	2.40
	Batanes	٠.	25.00	0.30	0.30	o	00.0	0.00	0.00	٠;		. 8	. 60.700	4 88	19071.00	12.581.00	10,257.00	65.97	53.78	119.75
	Çağayan	3	8,143.00	4,792.00	3,253.00	37	5384.00	2437.00	2197.00	8	0,544.00	789.00	00000	3 5	6432.00	3,685.00	3,542,00	82.55	29:95	113.91
	llugat	8	2,299,00	1,351,00	1,341,00	5	996.00	545.00	475.00	4:	3,33,00	00.007	2000	. 0	6111.00	2,670,00	1,445.00	43.69	23.65	7.79
=	sabola	92	3,500,00	1,795.00	1,100.00	vo	670.00	290.00	135.00	= ;	80,180	00,000	300	; <u>\$</u>	95,27,00	6254.00	5,158.00	3	53,56	118,48
	Kalinga-Apayao	3	2,636,00	1,226,00	1,102.00	17	481.00	146,00	377.00	148	6,313,00	4,384,00 6,386,00	0.8.00	<u> </u>	20,000	19,469,00	17.760.00	82.48	75.24	157.73
	Nueva Vocaya	52	6,093.00	5,226.00	4,958.00	35	2342.00	1847.00	1708,00	ج ج	00.891.61	00.0%5.2r	20.400	7	9135.00	1 777 00	1.815.00	42.97	43.89	59.87
	Oumno	24	2,357.00	891.00	887.00	āc	1336.00	515.00	004.00	ន	047.00	367.00	0,000	; §	7 902.00	7.531.00	7,532.00	8,8	8	190.62
	Mt. Province	117	2,948,00	2,745.00	2,578,00	5	636.00	627.00	636,00	16.5	2, 19,000 16,063,000	26230.00	26.258.00	1878	76.911.00	63,967,30	47,609.30	70.17	61.90	132,07
	TOTAL	321	28,203.00	18,026.30	15.219.30	2	11845.00	6711.00	5137.00	100	2000000	2 254 00	019423	5	11.058.00	5,430,00	4,672,00	49.10	42.25	91,35
	Aurora	61	4,314,90	2,086.00	1.956.00	^	1090.00	980.00	960.00	à :	5,654.00	2006.00	985.00	3	0.548.00	5,596.00	4,537.00	84.18	68.25	152.42
	Bataan	8	1,938.00	1,687.60	1,357.00	33	3253.00	2503.00	2345.00	·	00:784.0	00 870 3	038.00	į į	4 245 00	3.865.00	2,676.00	51.05	63.04	50.09
	Bengue!***	ຣ	977.00	798.00	714.00	5	00,5901	1099:00	936.00	2 0	8.57.7	80%	00	2	6.615.00	1,903.00	1,615,00	31.64	26.85	58.49
	Bulacen	16	1,245.00	345.00	468.00	43	4729.00	1523.00	00.2171	* (8 5 5	28.0	625.00	\$	24.336.00	17,670.00	7,290.00	72.61	29.86	102.56
=	Nueva Ecya	P.	11,505.00	8,315,00	4,620.00	ğ.	2480.00	1975.00	1145.00	7 7	00000	3,635	120.021	2	22.794.00	7,496.00	6,356,00	32,84	27.86	60.73
	Pampanga	â	5,486,00	1.824,00	1,332.00	87	16909,00	5412.00	90,906	٠,	00.555.05	8 249 00	2.837.00	Ž	69,432,00	52,213.00	22,155.00	75.20	31,91	107.11
	Pangasinan	23	13,743.00	5,721.00	4.363.00	217	45328.00	D0.58/45	14955.00		90.00	3.288.00	1,521,00	8	14,585.00	7,376,00	3,836.00	25,03	26.30	76.87
	Tarlac	5	5,966.00	3,136.00	1,550.00	no e	3718.00	930.00	90.00	3 1	243.00	198,20	114.00	83	7.277.00	2,696.00	1,726.00	39.00	22.22	34.03
	Zambales	8	2,651.00	1,362.00	951.00	ä	90000	20000	00 Lary C	9	36 187.00	25 148 00	9,799.00	1331	166,390.00	104,435,00	54,863,00	62.77	32.97	%. %
	TOTAL	265	47,825.00	28,776,00	17.261.00	3	87383.00	00.1 reac	3		00 00	6690	00.697	3	2,724,00	2,217,00	2,109.00	81,39	77.42	156.81
	Balangas	37	1,516,00	1,147.00	1,039.00	z, '	539.00	401.00	90.6	2 6	3			S	310.00	292.00	232.00	94.79	74.84	169.03
	Cavite	ra	128,00	116.00	20.00	~ 5	182.00	30.761	63.59	, 5	2 078.00	2,078,00	2,076,00	ē	4,574,00	4,375.00	4,449,00	35.65	97.27	35.35
	Lagura	8 9	1,867.00	1,765.00	00.868,1	2 6	8 88	0000	000	9 6	83.00			×	993.00	275.00	207.00	27.69	33,85	2 2.
2	Mandeque	8	914.00	275.00	60.007	, ;	28/00/00	00 9501	817.00		627.00	189.00	169.00	8	11,109.00	3,674,00	2,434.00	33.07	21.91	8
	Palawan	3 :	7,642,00	2,120,00	2,77,00	¥ \$	1757 00	1374.00	2096.00	129	5,146.00	4,934.00	3,861.00	233	9,632.00	8,600.00	7,114,00	8	2.68	5 2
	Oreign	20 5	7,729,00	2.658.00	2 307 00	3 00	4169.00	00.0	80	45	5,200.00	5,150.00	2,567.00	0,	14,299.00	8,708.00	4.964.00	8	34.02	8 1
	Mingord Chemical	- 6	200000	00.020.0	1 215.00	40	172.00	140.00	30.00	ಸ	4,325.00	2,218.00	1,660.00	S	8,225.00	5,330.00	3,465,00	8	2 ;	3
	MindoroCocidental	3 2	0,027,0	100900	704.00	. 25	00'96'51	1199.00	948.00	0	٠	,		35	3,192.00	2,268.00	1.652.00	71.05	51.75	19.5
	- Delivery of the Control of the Con	; ;	1.358.00	854.9	674.00	6	288.00	212.00	241.00	m	72.00	72.00	25.00	ୟ	1,718.00	88	8.78	8	C# /6	113.63
	TOTAL	8	26,468.00	16,168.00	12,120.00	â	12138.00	5399.00	4307.00	294	18 170.00	16,310.00	11,086.00	737	64,776.00	36.877.00	27,313,00	8 8	8 8	
	Albay	, ex	5,724,00	3,394,00	3,161.00	313	25982.00	19048.00	14676,00	8	287.00	•		ž	31,393,00	22,442,00	80'28'	6 7	77 49	48.87
	Camarines Norte	72	1,964.00	647.00	616.00	83	00:090	65.00	35.90	9	342.00	90'76	80.79	5	00 995 FC	21.846.00	00.191.41	87 85 87 85	3,98	8
	Camannos Sur	109	15,101.00	6,085,00	5,342.00	5.	5451.00	3090.00	2054.00	5 5 6	16,817.00	D. 149,51	Or 12,70	3 4	165.00	00 00 0	90 1	33.87	2	54.57
>	Catanduanes	5	1,197.00	556.00	334.00	7 .	465.90	8. %	90.02	9	23.700	310.00	181,00	147	3,972.00	871.00	613.00	21.93	15,43	37.36
	Masbale	5	1,304.00	516.00	402,00	ۍ .	8 66	00024	8 6	5	2 947 00			178	9,560,00	3,129.00	2,519,00	36.55	29.43	95.98
	Sorsogon	4 :	00,168,0	2,597.00	27.00	2 2	24811.00	22787 00	16805.00	39,	22,710.00	13,648.00	7,075.00	1123	86.142.00	00'069'67	36,254.00	57.61	800	g
	JAID!	3 8	07 876 7	1512.00	1.355.00	٥	00.0	0:00	0.00	٥				58	2,249.00	1,512.00	1,355.00	67.26	3 1	7 5
	Akian	2 2	4 763 00	0.817.00	3.469.00	7	1118.00	755.09	567.00	2	3,102,00	2,860.00	2,572.00	8	8,983.00	7,432.00	6,608.00	2.29	8 8	8 8
	- Contraction of the contraction		2.413.00	1.099.00	826.00	0	00'0	0.00	0.00	0		٠	•	29	2.413.00	00.860,1	30.00	# 50 00 40	3 3	
ž	Hodo & Gumanas	. \$	4,692.00	2,485.00	1,743,00	16	679.00	269.00	269.00	5	2,397,00	117.00	117.00	\$;	7,768.00	2.871.00	80.62	R S	3	12.67
:	Neoros Occ.	52	2,174,00	1,225.00	1,231.00	0	8.0	0.00	0.00	0				23	00.475,0	8000	00 050	3 6	73.03	8.0
	Nagros Or	0	٠		•	4	90.068	810.00	650.00	۰ ,	. 60	, 440 ¢	2 485 00	4 65	24 4 75.00	14 949.00	17 799.00	95	82.63	113.37
	TOTAL	167	16,290.00	10,138.00	A,624.00	75	2487.00	1834.00	1486.00	ŝ	0.000	20.16	CAN BURN							
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Table 3-13 EXISTING COMMUNAL IRRIGATION SYSTEMS AS OF 1996 (22)

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Option Statement Statement Amonth off Applicate Applicate Applicate Applicate Applicate Applicate Applicate Application Applicati	WATER	ER		AMORTIZA	AMORTIZING SYSTEMS		A-Sick	LAMORT A OTHER GOVT AGENCY ASS	A GOVT AGENC	YASST		PRIVATE	PRIVATE SYSTEMS			TC	TOTAL		HAIGA	HAIGATION INTENSITY (*	1 (4.1)
	P.E.			Service	L Defregani	(Mail (Ma)		Service	Imgaled Are	is (ha)		Service	Ingaind A	(PA) 60.		Service	impated Are.	a (h.a)	ΜĠ	Š	Total
Comparison A. Santon Comparison A. San	HFG!	NO	Number	_1		λo	Number	Area ina)	Wet		mher	Area (ng)	Wet	Š	Number	Area (ha)	Wer	Ě			
Secondary Seco		Bohol	48	5,179.00	2,999.00	2,831.00	22	3249.00	1573.00	718,00	108	2,098.00	1,746,00	880.00	228	9,526.00	6,318,00	4.429.00	 	46.49	112,62
		Cobe	47	3,346.00	00,105,1	1,389.00	60	98.00	000	0.00	m	81.00		83.58	8	3,525,00	1,391.00	1,430.00	39.46	40.57	80.03
weigning (γ γ.	<u>=</u>	Nogros Occ."	۲.	597.00	86.88	88	0	0.00	0.00	90.0	0			٠	~	597.00	66.00	50.0g	8	8.38	19.43
Sequent (1974) 15 3 3,300 (1) 10 20 10 10 10 10 10 10 10 10 10 10 10 10 10		NEGros Or,	26	4 390 00	2,825.00	2,798,00	92	710.00	565.00	400.00	2	346.00	320.00	280.00	\$	5,440.00	3,710,00	3,478.00	68.20	63,93	132.13
		Srdmjør	5	335.00	97.00	90.06	22	130.00	98.00	72.00	0	,			8	465.00	195.00	162.00	3	34.84	76.77
Suppose Supp	!	TOTAL	124	13, 847.00	7,378,00	2,158,00	109	3187.00	2236.00	1190.00	121	2,519,00	2.066.00	1,201.00	355	19,553.00	11,680.00	9 549.00	59.74	48.84	108.57
Statistical control		Northern Leyte & Bilitan	3.5	8,116.00	2,833,00	2,529,00	8	10243.00	4721,00	00,7580	47	4,312.00	2,204.00	1,539.00	147	22,571.30	9,756.00	8,355.00	43.04	36.65	75.90
Note that start		Southern Leyfe	4	2,771,00	2,045,00	2,005.00	33	1211.00	669.00	00'.789	34	619.00	403.00	330.00	123	4,601.00	5,337.00	3,022,00	33	65,68	136.21
Monther Same 75 24,000 30/100 1 45,000 9 9 1 24,000 9 1 24,000 9 1 24,000 9 1 1 24,000 9 1 1 24,000 1	€	Edstern Samar	23	1,260.00	89.89	365.00	×	839.60	212.00	85,00	ø	٠			3	2,099.00	911.00	450.00	43.40	21,44	3
Most Start 177. A. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.		Northern Samer	8	2,434.00	90,700	248.00	2	455.00	145.00	20.00	0			•	45	2,689,00	453.00	266.00	15.68	928	24.96
Total		Western Seman	23	1,633.00	337.00	327.00	o	0.0	0.00	00:0	0		,	•	23	1,633.00	331.00	321.00	20.23	19.66	29,93
State black		TOTAL	157	16.214.00	6,215.00	5,468.00	151	12748.00	5938.00	4649.00	66	4.931.00	2,637.00	2,799.00	401	33,893,50	14,790.00	12,416.00	43.64	36.63	80.27
Submand-Ope, Submand	ı	Basilan ·	2	186.00	130.00	130.00	٥	0.00	00:0	00:0	G				2	186.00	130.00	130.00	69.83	60'69	139.78
Suppose Comparison Compar		Missims Oct.	S	3,558.00	3,010.00	2,993.00	20	1443,00	1443.00	1443.00	\$0	115.00	115,00	115.00	\$	6,116,00	4,568.00	4,551.00	89.29	96,96	178.24
Teachology by Part Section Sec		Sulu	0		,	•	0	00:0	0.00	00:0	•	,	•	,	သ	1	·			•	•
Chantologie Never 51 Galactic Scalactic Scalactic <t< td=""><td>J</td><td>Taw-Taw</td><td>ت</td><td>,</td><td></td><td>٠</td><td>0</td><td>000</td><td>00:0</td><td>000</td><td>O</td><td>·</td><td></td><td>ţ</td><td>0</td><td></td><td>•</td><td>•</td><td>٠</td><td></td><td>•</td></t<>	J	Taw-Taw	ت	,		٠	0	000	00:0	000	O	·		ţ	0		•	•	٠		•
Approximate Surface		Zambbanga Norte	ę.	5,344,00	3,833,00	2,981.00	0	0.0	0.00	000	0				5	5,344.00	3,633,00	2,981,90	7.7	55.78	127,51
Posterior 170		Zamboanga Sur	Ā	9, 180,00	5,854.80	5,027,00	54	1738.00	1014.00	915.00	8	1,972.00	1,832,00	1,349.00	126	12,850.00	8.700.00	7,291,00	67.49	3	124.06
Agenthy New Profit 12 States of 1,895.00 150.00 <td>ı</td> <td>TOTAL</td> <td>139</td> <td>18,268.00</td> <td>12,627.00</td> <td>11, 131,00</td> <td>8</td> <td>3181.00</td> <td>2457.00</td> <td>2358.00</td> <td>35</td> <td>2,097,00</td> <td>1.947.00</td> <td>1,464.00</td> <td>224</td> <td>23.536.00</td> <td>17,731.60</td> <td>14,953.00</td> <td>73.7</td> <td>62.53</td> <td>136.74</td>	ı	TOTAL	139	18,268.00	12,627.00	11, 131,00	8	3181.00	2457.00	2358.00	35	2,097,00	1.947.00	1,464.00	224	23.536.00	17,731.60	14,953.00	73.7	62.53	136.74
Anisation Start 17 2 Applion 66 Applion 66 Applion 67 Applion		Agusan.Norte	24	2,688.00	1,505.00	516.00	જ	1922.00	00:0	00:0	4	960.00			7.4	5,570.00	1,505.00	916,00	20.72	16.45	43,46
Byte-property 7 2010.00 10.20 0.00		Agusan Sur	2	2,490,00	661.00	00900	52	1510,00	448.00	307.00	4	1,615.00	467.00		6	5,615.00	1,576.00	976.00	78.07	17.38	45,45
Christian 3 -373.00 140.00 1 150.00 150.00 150.00 130.00		Butadhon"	7	2,010.00	452,00	370.00	č×.	35.00	0.00	85.08	0			٠	6	2,105.00	452.00	422.00	21.47	20.02	41.53
Oberside Newsitt 15 2.49 (1).00 1.46 (2).00 0 0 0 4 (25.00) 680 (0) 19 377 (4) 0 195 (2) 0<		Campton	æ	373.00	160.00	161.00	es	125.00	0.00	0.00	-	10.00	10.00	10.00	13	908.00	170.00	171.00	33.46	33.66	67,13
Meanmail Committed 24 1,279 to 0 1,791 to 0 895 to 0 1,299 to 0 1,791 to 0 895 to 0 1,995 to 0		Davas None	35	2,491,00	1,488.00	1,447,00	0	0.00	0.00	0.00	4	765.00	690.00	680.00	ē,	3,276.00	2,168.90	2,127.00	66.18	66.93	131,11
Surgian Name 1 1 2 2 28 20 0 1 475 0 1 475 0 1 775 0		Musamis Omental	24	1,228,00	781.00	893.00	۲.	483.00	23.00	23.00		80.00	80.00	40.00	35	1,791.00	984.00	955.00	49.36	53.38	102.74
TOTAL 115 14,0470 6,579,00 155,0 10,000 157,0 10,000 157,0 10,00		Sungaro Norte	ĸ	2,987.00	1,472,00	1,426.00	33	2073.00	1702.00	1050.00	23	554.00	397.00	20.00	103	5,614.00	3,571.00	2,4%,00	63,61	44.06	108.07
Obvision Principal III 8 1/028-00 681.00 671.00 775.00 2051.00 275.00 2.435.00 40 7,468-00 5,743.00 5,743.00 7,495.00 7,000 5,743.00 7,000 </td <td>Į</td> <td>TOTAL</td> <td>118</td> <td>14,267,00</td> <td>6,519 00</td> <td>5,882.00</td> <td>133</td> <td>6208.00</td> <td>2173.00</td> <td>1437.00</td> <td>2</td> <td>4,004.00</td> <td>1,634,00</td> <td>750.00</td> <td>437</td> <td>24.479.00</td> <td>10,376.00</td> <td>8,064.00</td> <td>47.18</td> <td>37.94</td> <td>73.13</td>	Į	TOTAL	118	14,267,00	6,519 00	5,882.00	133	6208.00	2173.00	1437.00	2	4,004.00	1,634,00	750.00	437	24.479.00	10,376.00	8,064.00	47.18	37.94	73.13
David Channel II 1,405,00 (0500 55630 II) 775,00 (050 00 0 0 0 0 0 II) 200 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		Ourad None	93	1,028.00	661.00	671.00	12	3130.00	2007.00	2027.00	20	2,311,00	2,512.00	2,435,00	40	7,469.00	5,260.00	5,133.00	70.62	58.72	139,15
Daviso Sur 24 6/7500 5.483.00 258.00 21 1755.00 65.90 1,60.00 1,100.00 61 12.018.00 7227.00 7237.00 </td <td></td> <td>Davao Onental</td> <td>Ξ</td> <td>1,405.00</td> <td>\$09.00</td> <td>563,00</td> <td>õ</td> <td>735.00</td> <td>00:0</td> <td>0.0</td> <td>-</td> <td>20.00</td> <td>20.00</td> <td>20.00</td> <td>22</td> <td>7,160,00</td> <td>629.00</td> <td>583.00</td> <td>25.12</td> <td>26.9g</td> <td>3</td>		Davao Onental	Ξ	1,405.00	\$09.00	563,00	õ	735.00	00:0	0.0	-	20.00	20.00	20.00	22	7,160,00	629.00	583.00	25.12	26.9g	3
Sungao şir 25 2,912.00 657.00 657.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00		Davao Sur	34	6,715,00	5,483,00	5,289,00	21	1756.00	804.00	629.00	9	4,407.00	1,180,00	1,100.00	ş	12,678.00	7,527,00	7,218,00	58.45	80.08	37.7
South Control Control Countrol 24 4/872 00 2118 00 2 6/20 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		Surigao sur	25	2,912,00	00:250	697.00	٥	0.00	0.00	3.00	0	,			23	2,912.00	852.00	697.00	29.26	3	53.19
TOTAL 97 16 97200 10 743.00 5.0 10 743.00 10 7		South Cotabato***	₹	4,872.00	3,118,00	2,628.00	0	0:00	0:00	000	0	,			7.	4,872.00	3,113.00	2,528,00	8,8	53.94	117.96
Disjughood 1.1 4/405/00 3,14/400 3,14/400 145,100 1,11/100 64 7,14/400 3,233/200 4,152/200 4,153/200 5,270/200 4,153/200 5,270/200 4,153/200 5,270/200 4,153/200 5,270/200 4,153/200 5,270/200 4,153/200 5,270/200 4,153/		TOTAL	6	16.932.00	10,743.00	9,848,00	43	5621.00	2931.00	28,500	37	7,738.00	3,752.00	3,555.00	123	30,791.00	17.346.00	16,259.00	52.40	53.68	111 07
Lanadel Sa		Sukidoon	21	4,495.00	3,142.00	3,050,00	13	674.00	145.00	635.00	33	2,547,00		1,517,00	3	7,316.00	3,297,00	5,202,00	41.52	65.72	107.24
Luna del Sur 9 1,297,00 647,00 402,00 0 0.00 0.00 0.00 0.00 0.00 0 0 0.00 0 0 0.00 0 0 0.00 0 0 0.00 0 0 0.00 0 0.		Lenao del Norte	92	7,274.00	5.190.00	3,373,00	14	933.00	463,00	334.00	જ	1,168.00	926.00	814.00	92	9,375.00	6,579.00	4,521.00	70.18	48.22	18,40
Maguindanes 47 8 559 00 3,557 00 2,450 00 8 460 00 115,00 20,00 4 255 00 3,752 00 2,470,00 4,273 00 2,470,00 4,273 00 2,470,00 4,273 00 3,772 00 2,470,00 4,273 00 3,773 00 3,773 00 3,773 00 4,273 00		Lando del Sur	¢.	1,237,00	647.00	402.00	a	000	00:0	0.00	0		,		Os	1,237.00	097,00	402,00	85.38	32.56	80
Cobbbie 45 585500 4,223.00 3,673.00 15 1777.00 0.00 14 2,094.00 590.00 72 9,744.00 5.269.00 4,028.00 54.01 Kudarat 39 9,784.00 6,994.00 5,904.00 1 15 1517.00 0.00 190.00 1,45.00 1,055.00 1,053.00 6,94.00 6,94.00 6,94.00 6,94.00 0.00 Chabust 17 17 17 17 17 17 17 17 17 17 17 17 17	=	Magundanao	43	9,690.00	3,557.00	2,450.00	e 3	460.00	115.00	20:00	4	225.00	ŀ	•	\$	9,375,00	3,772.00	2,470.00	46.23	26.35	95.58
Kudarat 30 9,788.00 6,994.00 5,096.00 15 1511.00 0.00 190.00 1,506.00 1,200.00 1,095.00 50 17,838.00 8,194.00 6,194.00 6,194.00 6,194.00 6,194.00 6,194.00 6,194.00 6,194.00 6,194.00 6,194.00 1,995.00		North Cotabata	ęş	5,895.00	4,323,00	3,673.00	15	1771,00	0.00	90:0	7	2,074,00	940,00	903:00	72	9,744.00	5,263.00	4,528,00	2	46.47	100.48
Corradit 17 2,743.00 1,993.00 1,446.00 12 1660.00 722.00 564.60 14 2,008.00 1,145.00 558.00 43 6,411.00 3,960.00 7,446.00 60,21 TOTAL 153 40,127.00 25546.00 15,446.00 15 7206.00 1445.00 1683.00 104 9,560.00 4,211.00 4,859.00 373 56,960,00 13,027.00 25,566.00 55.54 TOTAL 153 40,127.00 25546.00 15,266.30 15,566.30 12676.50 8046.50 4278 182.516.50 130,744.00 87.10.48.00 424.962.30 754.560.30 63.33		Sulten Kudarat	8	9,789.00	6,994,00	5,060.00	₽	151.00	00:0	190.00	ø	1,538.00	200.00	1,065,00	R	12,838.00	8 194 00	6,315,00	63.83	49.19	20.57
TOTAL 193 40.127.00 23.546.00 19.046.00 76 7266.00 1745.00 1665.00 104 9.550.00 4271.00 4.559.00 37.740.00 19.17.07.00 37.048.00 47.259.00 75.556.00 120.776.00 104.74.00 107.740.00 107.243.00 107.243.00 75.566.00 120.776.00 120.741.00 107.740.00 107.245.00 120.350.00 120.776.00 120.741.00 107.741.00 107.748.00 107.245.00 75.650.00 120.756.00 107.741.00 107.748.00 107.245.	,	South Cotabato"	<u>:</u>	2,743.00	1,993.00	1,446.00	5	1660.00	722.00	964.00	켳.	2,008.00	145.00	508.00	43	6411.00	3,860.00	2,496.00	60.23	58.63 5	8
TOTA). 236: 281,470 00 167,243,30 151,586,30 2552 207062,00 126576,00 80466,00 4278 182,516,50 130,744,00 87,486,00 9111 671,048,00 454,963,30 794,509,30 63,33	I	TOTAL	28	40.127.90	25.946.00	19,404.00	£	7209.00	1445.00	1683.00	ş	9.500.00	4.711.00	4,639.00	373	96,896,00		75.928,00	X S	45.57	5
	Ġ		2361	281,470.00	167.2 43.30	131,585,30	2522	207062.00	120376.00	80465.00	422B	182,516,00	130,744,00	62,458.00	9111	671,048.00		794,509,30	63.33	43.89	107.22

"Phowade dwisod by water resources region irrigated Area (Wet + Dry) / Total Service Area x 100 Data (or not workele individue) pumb.

Source: National irrigation Administration

Table 3-14 STATUS OF IRRIGATION DEVELOPMENT BY PROVINCE AS OF DECEMBER 1996 (1/3)

Number Service			5	76.3	ζ	75.3	S W I W F	4	Diversio	Diversion Dam 5/	Shallow	Shallow Tube Well		
WRED (Physine) Control of Light Co	Water Resources	Potential		96		r c	/ dl/MS	SKIP					Total	Irrigation
Above States Above States<	Ourism (MDD) / Drowings	irricable	Number	Service	Number	Service	Number	Service	Number	Service	Number	Service	Service	Developm.
Pergentive 16,740 1,532	NESION (***) IN CONTRACTOR	Area (ha)1/		Arça (ha)		Area (ha)		Area (ha)		Area (ha)		Area (ha)	Area (ha)	(₆ %)
According to the control of the cont						\$ \$ 7 \$ 1		,	۲۰	9	•	•	12,933	7
Bearsest*** \$004 \$ (1)7 703 9040 15 700 18 575 35 19 19 10 10 10 10 10 10	Abra	6,740	•	•	0/7	620.21	•	•		•	,	•	6.480	125
locaes Norre	Benguer**	5,004	•		80.5	0.440	٠ ٠	, 5	· >	YES	35	61;	37.63	76
Balaness 1,0004	Hocos Norte	49,660	×	6.175	798	30,051	Ċ.	3	<u> </u>	2.6	: 8	2	0.00	Š
Total	llocos Sur	30,034	ĸ.	3.840	45.5	12.869			:	<u>.</u>	83	₹ :	No.	. 8
Balances 118,624 13 15,020 180 7,706 19 942 50 19 71 Copysian 118,229 12 200 13 20 38 121 Copysian 19,410 12 200 183 42 411 18 415 11 Lope 10,410 12 200 183 42 411 18 415 11 Lope 25,270 1 11,598 42 6111 18 41 18 28 11 Name 25,000 1 10,916 19 9,622 40 10 39 20 10 Name Vice 1 10,916 19 9,622 40 10 30 10 Opinino 25,000 1 10,916 10 30 2 12 30 30 10 Auroca 1 10,01 10 10 10 10 1	La Union	16,986	Cŧ	v 00 v	569	9,473	-3	S	2	510	2	5	188.61	≤ i
Billiames 197280 12 29,023 183 19,071 18 931 5 239 38 121 Isigas 197280 12 29,023 183 19,071 18 931 5 239 38 121 Isigas 252,570 113,055 23 24,111 16 74 1 18 28 119 Name Articopa 45,250 1 19,016 199 9,612 2 40 10 396 29 108 Name Vizequa 45,250 1 19,016 199 9,612 2 40 10 396 29 108 Ourino 547,210 2,52,570 1 2,54,671 1 389 2 123 Ourino 547,210 2 15,4504 1878 4,244 1 389 2 123 Ourino 11,520 1 27,770 10 6,018 1 39 347 Ourino 11,520 1 27,770 1 6,018 1 39 347 Ourino 2,47,210 2 2,47,770 2 2,436 1 39 347 Ourino 2,47,210 2 2,47,770 2 2,436 1 34 34 Ourino 2,47,70 2 2,47,70 3 2,47,70 3 3,47 Ourino 2,47,70 3 2,47,70 3 3,47 Ourino 2,47,70 3 2,47,70 3 4,474 3 4,74 Ourino 2,47,70 3 3,47 3 3 3 Ourino 2,47,70 3 3,47 3 3 Ourino 2,47,70 3 3,47 3 3 Ourino 2,47,70 3 3,47 3 Ourino 2,47,70 3 3,47 3 Ourino 2,47,70 4 1,45 3 Ourino 2,47,70 4 4,45 4,45 4,45 Ourino 2,47,70 4,44 Ourino 2,47,70 4 4,45 Ourino 2,47,70 4 Ourino 2,47,70 4 Ourino 2,47,	Total	118,424	<u></u>	15,020	1.850	71,706	61	942	53	1.927	¥	310	\$9.905	76
Batanes 177260 12 2002 187 1971 8 121 Gogyann 197260 12 2002 187 1971 18 29 18 121 Kushab 19400 1 1306 2 171 6432 4 42 4 18 18 18 18 Kashab 17500 1 1306 19 10 10 6432 4 42 4 11 18 1													č	
Cognon 147,250 12 20,029 187 19071 18 91 5 249 58 121 Islanda 22,370 7 13,035 171 64,111 16 714 1 18 28 191 Islanda 22,370 7 13,035 22 6,111 16 714 1 18 28 191 Num-Povince 7,000 945 23,603 11 389 2 135 10 Num-Povince 7,000 945 23,603 11 389 2 135 10 Num-Povince 7,000 945 23,603 11 389 2 135 10 Num-Povince 7,000 945 23,603 11 389 2 135 Num-Povince 7,000 945 23,603 11 389 2 135 Num-Povince 7,000 945 94,035 11 349 11 349 340 Num-Povince 7,000 1 24,504 187 24,146 1 10 10 24 Num-Povince 7,000 1 24,504 187 24,146 1 10 24 24 Num-Povince 7,000 1 24,504 1 24,504 1 24,504 24,146 1 24,504 Num-Povince 7,000 1 27,707 27,744 2 27,504 2 24,04 2 Num-Povince 7,000 1 27,707 27,744 2 2 24,04 2 Num-Povince 7,000 1 24,504 2 24,746 2 24,04 2 Num-Povince 7,000 1 24,504 2 24,04 2 2 24,04 2 Num-Povince 7,000 1 24,504 2 2 2 2 2 2 Num-Povince 7,000 1 24,504 2 2 2 2 2 2 Num-Povince 7,000 1 24,504 2 2 2 2 2 2 Num-Povince 7,000 1 2,000 2 2 2 2 2 Num-Povince 7,000 1 2,000 2 2 2 2 2 Num-Povince 7,000 1 2,000 2 2 2 2 2 Num-Povince 7,000 1 2,000 2 2 2 2 2 Num-Povince 7,000 2 2,000 2 2 2 2 2 2 Num-Povince 7,000 2 2,000 2 2 2 2 2 2 2 Num-Povince 7,000 2 2,000 2 2 2 2 2 2 2 2 Num-Povince 2,000 2 2,000 2 2 2 2 2 2 2 2 2		,	•	•	C4	អ	•		•	•	•	•	A (•
Figure F	Cogavan	147,280	<u></u>	29,029	183	19.071	<u>35</u>	931	v.	249	æ.	121	49,401	34
Sankish	Managara	19.410		\$28	171	6,432	ಶ	£3	*3	115	•	•	7.117	ie.
Kalingas Approp Trigon 1 (19716) 199 9,6872 2 4 10 399 29 10K Nawey Vicespa 45,500 1 1,916 1,945 7,902 1 1 4,99 2 1 4 40 30 1 1 40 30 1 1 40 30 1 1 40 30 1 1 40 30 1 1 40 30 1 1 40 30 1 1 40 30 1 1 40 30 1 1 40 30 1 1 40 30 1 1 40 30 1 1 40 30 1 1 40 30 2 1 40 30 3<		05x c2c	,	113.955	42	6.111	16	<u>t-</u>	-	<u>×</u>	5%	<u>ଟା ।</u>	120,917	7
Authorized Approach	Indicated in the second	077 67		91001	8	0.632	c t	9	10	306	2	<u>%</u>	20,02	4
Nutrationing Augustus 45,500 1 25, 25,603 11 489 2 125 Quinno Quinno 23,970 1 76 81 4,135 11 300 2 15 Aurora 45,370 1 45 81 4,135 11 30 2 125 95 347 Aurora 1 46,50 1 44,50 1 30 27,4 95 377 Burgustus 3,356 1 27,70 61 60,13 8 15,81 9 377 Burgustus 51,970 1 27,70 61 60,13 8 15,81 9 377 Burgustus 51,970 1 27,70 61 60,13 8 15,81 9 377 Nucva Enja 51,070 1 27,70 61 60,13 8 15,81 9 37 Purpatan 11,14,50 2 2,173 4,2	Kalinga Apayao	000.14	•		970	7.00.7	, ,		4	Q.		٠	7,942	<u>\$</u>
Owings 23,970 76 81 4,135 11 310 1 15 Optimize S4,920 76 81 4,135 11 310 1 15 87 34 34 Aurora Aurora 11,520 1 42,504 1 43,50 1 30 6 274 8 34 Banana 11,520 1 22,13 4 6648 - 19 613 16 36 34 Banana 11,520 1 27,36 1 30 6 274 95 34 Banana 11,520 1 27,36 6 6,43 - 1,51 2 27 95 34 Banana 11,450 2 2,44 3 2,44 3 2,44 3 2,44 3 3 Cambales 1 1 1 1 2 2 2 2 3 3	Mit. Province	90,00	1	•	Š	23.603	=	087	2	\$2		•	24.217	γ.
Quinno Jackson 154,500 1,88 1,68	Nueva Vizcaya	48.520	•	Ť	3	36.1.5	: 5	310	-	· ·	•	,	4,536	5;
Autora 16,630 1 445 137 10,531 0 5 274 7 Autora 16,630 1 445 83 11,038 1 30 6 274 7 Bantam 11,520 1 221 84 6,648 - 19 613 16 36 Bunguet*** 3,336 1 27,707 61 6,015 8 1,531 9 40 82 Newtys Ecjip 20,403 9,403 9,403 9,403 10 1,451 9 30 20 Pampanga 57,370 2 19,178 133 22,734 10 1,453 24,476 10 14,42 9 40 Pampanga 18,250 3 24,476 45 6,472 10 42 9 11 22 30 10 Tarriar 11,450 3 24,476 5 51,247 4 42 93 11	Quirino	0/657	' ;	2	ē ģ		: 5	700	í.	300	00	78.5	235 246	43
Automa 16650 1 485 83 11,058 1 30 6 274 - Bantan 11,520 1 521 84 6648 - - 19 613 16 36 Bunguel*** \$1,356 - 275 4,244 - - 19 613 16 36 Bulkean \$1,370 1 2776 61 6015 8 1,531 9 340 20 57 Bulkean \$1,370 1 2776 61 61 19 61 19 61 19 61 19 61 19 61 19 61 19 61 19 61 19 61 19 61 19 613 16 36 61 19 61 19 61 19 61 19 61 19 61 61 61 61 61 61 61 61 61	Total	547.210	25	54,504	8/8	1869/	70	07.67	7	0.7				
Autoria Hobord 1,0004		•	-	ų.	Ş	200	_	S	4	27.4	•	•	11.847	7,
Bananh 11,520 1 \$21 84 60-88 1 7 01.5 10 Burguet*** \$1,336 1 277,07 277 4244 1 7 67 10 <	Aurora	16,6,50	_	G :	ે કે	0.00	-	?	, (213	2	75	21.27	ž
Bengueters 3.336 - 275 4,244 - 57 Bultaran 51,376 1 27,767 61 6,015 8 1,531 9 340 20 52 Bultaran 51,376 1 27,767 61 6,015 8 1,531 9 340 20 52 Pampanana 57,640 2 10,178 137 22,794 2 216 19 728 50 131 Pampanana 18,650 8 27,478 454 69,432 10 1,454 20 37 47	Bataan	11,520	-	22	Z	6.648	,	•	<u> </u>	e (2	?	1010	. F
Bulacan \$(1)70 1 27,767 61 6,015 8 1,531 9 340 20 32 Nueva Ecija 208,640 5 94,028 95 24,336 10 1454 2 240 47 94 Pampanga 57,370 2 19,178 133 22,794 2 246 19 728 50 121 Pampanga 180,500 8 27,478 454 60,142 10 24 938 51 142 97 142 98 141 24 98 142 93 142 99 142 99 142 99 142 142 99 142 142 99 142	Bengue"**	3,336	•	•	27.5	4,144		•	-1	<u>`</u>	• ;	, ;	100,4	
Nucva Ecija 208,640 \$ 94,028 95 24,376 10 1454 2 240 47 94 Pampanga \$7,370 2 19,178 137 22,794 2 216 19 728 50 121 Pampanga \$7,370 2 19,178 137 22,794 2 216 19 728 50 121 Pampasinan 14530 3 24,476 54 60,432 10 14 57 42 50 121 Zambaics 38,200 4 6,919 87 727 1 50 114 26 50 Total 38,200 4 6,919 87 1,27 1 15 50 15 Cavite 20,266 1 1,308 5 310 1 18 4,766 100 3,851 2 2 2 2 100 10 4,574 1 1 1 1	Bulacan	51.970		27,767	19	6.015	œ	1.53.	6	9	O.	7.	en/es	8
Pampanga S7,370 2 19,178 133 22,794 2 216 19 728 50 121 Pampanga Pampanga 114,530 3 21,478 454 60,432 10 410 24 938 51 142 Tarkac Tarkac 114,530 3 21,476 55 13,555 6 1075 14 50 42 938 51 142 80	Nueva Ecija	208,640	w	94.028	<u>5</u>	24,336	0	454.	۲1	240	47	25	120,152	<u>κ</u>
Paragasinan 180580 8 27,478 454 69,432 10 24 938 51 142 Turbac 2ambales 38,200 4 6,919 87 7,277 1 50 5114 57 42 90 Zambales 38,200 4 6,919 87 7,277 1 50 5 114 26 50 Total 682,606 25 200,852 1,277 165,359 38 4,756 10 5 5 5 Barungas 92,600 1 18,66 64 2,724 4 256 10 9 15 Cavite 23,700 1 13,086 5 310 1 13 1 15 1 15 Maindugue 21,00 3 10,000 101 4,574 - 9 342 5 32 Mindoro Ocidental 56,170 3 8,030 70 14,289	Pampanga	57,370	2	19,17x	133	22,794	7	516	<u>6</u>	728	50	. ;21	43,037	Υ.
Tunisation 114530 3 24,476 55 13,555 6 1,075 14 547 42 80 Zambales 38,200 4 6,919 87 7,277 1 50 5 114 26 59 Total 682,666 25 200,852 1,327 165,359 38 4,766 100 3,451 26 59 Cavite 23,760 1 13,686 5 310 1 18 6 1,252 8,52 8 1 18 6 1,527 1 1,327 1	Paracitati	180,500	20	27,478	454	69,432	2	014	24	938	Š	ă	98,400	55
Zambales 38,200 4 6,919 87 7277 1 50 5 114 26 59 Total 682,696 25 200,852 1,327 1,65,359 38 4,756 100 3,851 252 582 Barangas 9,260 1 886 64 2,724 4 23 9 106 9 15 Cavite 23,700 1 13,086 5 310 1 18 - 9 15 Laguna 27,150 13 10,000 101 4,574 - 9 342 - 15 Mindoro Occidental 56,170 4 11,857 59 8,225 - 2 45 - 45 - Mindoro Occidental 56,170 4 11,857 59 8,225 - 2 45 - 45 - - - - - - - - - <	Parlac	114.530	•	24,476	\$:	13,555	9	1.075	**	547	댴	80	39,733	38
Total 682,696 25 200,852 1,327 166,359 38 4,766 100 3,851 252 572 37 Bartangas 9,260 1 886 64 2,724 4 23 9 106 9 15 Lagunia 23,760 1 13,086 5 310 1 18 - 9 34 Lagunia 27,510 1,3 10,000 101 4,574 - 9 342 Mindoro Occidental 56,170 5 8,030 70 14,299 - 2 45 - Mindoro Occidental 56,170 5 8,030 70 14,299 - 2 45 - Mindoro Occidental 56,170 4 11,857 59 8,225 - 45 - 45 - Palawan 27,850 4 4,428 229 9,632 - 2 48 - - - </td <td>20led mc2</td> <td>38,200</td> <td>4</td> <td>6.919</td> <td>87</td> <td>77.277</td> <td>-</td> <td>8</td> <td>5</td> <td>-</td> <td>56</td> <td>89</td> <td>14,419</td> <td>Ř</td>	20led mc2	38,200	4	6.919	87	77.277	-	8	5	-	56	89	14,419	Ř
Burtangas 9,260 1 886 64 2,724 4 23 9 106 9 15 Cavite 23,760 1 13,086 5 310 1 18 . . 9 342 Laguna 27,510 13 10,000 101 4,574 . . 9 342 Maindoro Occidental 56,170 5 8,030 70 14,299 . . 2 45 Mindoro Occidental 56,170 5 8,030 70 14,299 . . 2 45 Mindoro Occidental 56,170 4 11,857 59 8,225 . 2 45 Palawan 28,610 4 4,428 220 66 11,109 . 2 48 Quevon 27,850 4 4,428 229 9,632 . 2 2 48 Rizal 9,330 1 26 <	Total	682.696	83	200.852	1,327	165.359	38	4,766	3	3,851	252	582	375.410	3.5
9,266 1 886 64 2,724 4 23 9 100 9 13 23,766 1 13,086 5 310 1 18 - 9 342 27,510 13 10,000 101 4,574 - 9 342 Occidental 56,170 5 8,030 70 14,299 - 2 45 Oriental 56,170 4 11,857 59 8,225 - 4 145 45 80 27,850 4 4,428 229 9,632 - 2 48 9,330 - 256 50 1,718 2 22	İ								,		•	•	4	-
23.760 1 13.086 5 310 1 18	Barangas	9.260	-	988	Z	2,724	77	23	6	8	>	Ċ.	97.04	Ŧ ;
que 2,190 13 10,000 101 4,574 - 9 342 Occidental 56,170 5 8,030 70 14,299 - 2 45 - Oriental 56,710 4 11,857 59 8,225 - 2 45 - Oriental 28,610 2 3,200 66 11,109 - 2 48 - 27,850 4 4,428 229 9,632 - 2 48 - 9,330 - 59 3,192 2 80 1 40 n 5,570 1 256 50 1,718 2 222	Cavite	23,760		13,086	v.	310	-	35	٠	٠	•	•	3,414	S
que 2,190 . 34 993 1 12 1 15 Occidental \$6,170 5 8,030 70 14,299 . 2 45 . 2 45 Oriental \$6,110 4 11,857 59 8,225 . 2 45 . 2 48 . 2 48 . 14,59 . . 2 48 . <th< td=""><td>1.084103</td><td>27,510</td><td><u>~:</u></td><td>10,000</td><td>0</td><td>4.574</td><td>•</td><td>•</td><td>6</td><td>342</td><td>•</td><td>•</td><td>14,916</td><td>\$2</td></th<>	1.084103	27,510	<u>~:</u>	10,000	0	4.574	•	•	6	342	•	•	14,916	\$2
Occidental 56,170 5 8,030 70 14,299 2 45 45 80 Oriental 56,710 4 11,857 59 8,225 3,235 4 45 80 23,610 2 3,200 66 11,109 2 48 48 27,850 4 4,428 229 9,632 2 683 3,192 2 9,330 3 3,192 2 80 1 40 n 5,570 1 256 50 1,718 2 22	Marindons	81.5	•	٠	34	1.00	-	<u></u>	_	<u></u>		ı	1.020	7,7
Oriental 56,710 4 11,857 59 8,225 4 145 45 80 Oriental 28,610 2 3,200 66 11,109 2 48 45 80 27,850 4 4,228 229 9,632 2 20 683 3 9,330 59 3,192 2 80 1 40 40 n 5,570 1 256 50 1,718 2 22	Mindoro Occidental	56.170	٧.	8,030	8	14,299	•	•	r-ı	Ą	٠	•	22,374	ş
28,610 2 3,200 66 11,109 - 2 48 27,850 4 4,428 229 9,632 - 20 683 9,330 - 59 3,192 2 80 1 40 - 5,570 1 256 50 1,718 2 22 -	Mindon Oriental	56.710	4	11,857	\$	8,225	•	٠	-2	<u></u>	\$4	0%	20,307	*
27,850 4 4,428 229 0,632 - 20 683 - 1 9,330 - 59 3,192 2 80 1 40 - 5,570 1 256 50 1,718 2 22	ocmeled.	28.610	63	3,200	%	1,109		•	C \$	3		•	14,357	S
9,330 . 59 3,192 2 80 1 40	Commo	27.850	4	4,428	229	0.632	,	•	23	683		•	14,743	Š
m 5,570 (256 50 1,718 2 22	ion o	ዕኔኒ ዕ	•		\$3	3.192	11	92	-	07		,	3,312	35
	Alcai Sembles	0.5%	-	356	; Ç	218	64	22	٠	٠	٠	,	1.996	%
777 62776 10 155 28 1,274 54 95	Komotom	0.00	· ē	3 6	ָרָנָרָ בּינָרָ	4CF 42	· <u>c</u>	¥	37	20%	7.4	ŏ	110:03	57

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Table 3-14 STATUS OF IRRIGATION DEVELOPMENT BY PROVINCE AS OF DECEMBER 1996 (2/3)

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			Z	7281	IJ	C183/	3.6	A MINA	Diversio	Diversion Dam 5/	Shallow	Shallow Tube Well		יי סטופע
Water Resources	sao	Potential					SWIP	SWIPTSRIP					Total	Irrigation
Region /Province	JCC	Irrigable	Number	Service	Number	Service	Number	Service	Number	Service	Number	Service	Service	Developm.
		Area (ha) 1/		Area (ha)		Area (ha)		Area (ha)		Arva (ha)		Area (ha)	Area (ha)	్ట
WRR V														
	Albay	54,620	4	1,946	364	31,393	_	<u>.</u>	×	499	•	1	33,853	ઉ
	Camarines Norte	22.590	64	2,746	101	3,186		33	Ş	119	•	•	6.084	τ.
	Camarines Sur	123,700	9	17,520	288	37,369	۳,	263	**	750	3	151	56.057	5.7
	Catanduanes	3,770	•	٠	\$7	1,662	•	•	6	30 71 71	•	•	068'1	50
	Masbate	19,880	•	•	147	3,972	7	45.9	•	•	•	•	¢,626	સ
	Sorsogon	15,100	14	1,200	178	8.560	L4	\$9	6	214	==	39	10.078	29
-	Total	239.660	7	23,412	1,123	86.142	7	1,030	416	1.810	8	190	112,584	4
WRR VI				! ! !					: : :					
	Aklan	10,510	c 1	4,816	28	2,248	-	9	10	335	•	٠	7,439	7.1
	Antique	24,020		5,065	136	8,983	-	%	~	<u>š</u>	Fi	93	14,306	3
	Capiz	13,670	-	1,423	25	2,413	-	ος.	<u>~.</u>	307	ς.	Α.	7,20%	Σ.
	Guimaras &	031.25	•	•	•	•		,	c4	5;7	٠	1	ς;·	37
	lloilo	2014.7	7	26,456	<u>8</u>	7,768	25	1.278	7	22	47	139	35 733	ř
	Negros Occ.***	71,000	£4	14,475	ři	2.174	-	\$	er.	[2	2.	8	16,916	24
	Negros Or. * **	829	•	į	ব	237	•	•		ς.	•	•	287	€ }
ł	Total	195,038	=	\$2,235	330	23,823	24	1,446	8	1,110	102	8	78,932	0.
WRR VII					į	4	;		•	Š	•	;		ř
٠	Bohol	060,05	•	•	×77	075.0	;	680.1	7	8 6	<u>o</u>	75.	40.0	or.
	Cebu	0.880	•	•	<u> </u>	355		۰ :	4	9 ;	•	•	5.000	8
	Negros Occ. ***	2,890	•	•	L4 ·	597	-	90		20		•	417	£.
	Negros Or.***	14,112	•		¥.	6,093	~	8	7	ž	•	•	7,338	£
	Siquijor		•	•	ន	465	•	•	7	16	•	•	955	
5.	Total	\$2.952			355	20.206	÷	00°:	2	738	9;	33	176,52	Ş
WRR VIII	- :									Š			:	
	Sairtan & Northern Lands	55,620	. <u>F</u>	15.456	· 9	, 179 00	د	, 5	۳. ۳	8 \$	٠ .	. 4	500 %	જ
,	Southern Loste	2 690	· -	386	<u> </u>	(9)7	: 41	25.	; t-	3 2		' '	5.360	20
	Fastern Samar	000 5		•	: 3	2 000	4	GF.	· v	ž	•	•	7331	7.7
	Northern Samar	10,860	•	•	· 53	2,889	. 21	67		9			3,060	:
	Western Samar	971.×	•		23	1.633	•	•	٧,	Œ,		٠	1.686	33
ĭ	Total	84,380	9]	15,842	40	33,893	<u>~</u>	602	ဥ	473	•	77	50.834	8
WRR IX														
7	Basilan	420		٠	64	186	r	•	•	•	á	1	987	1
	Missimis Occ.	6,440	•	880	ž.	5,116	C 4	£	ý	띂	1	ı	6.130	3%
-,	Sulu		•		ă)	•	æ.	95.1	•	٠	•	•	150	
•-	Tawi-Tawi		•	ţ	,	•	C-I	1.		•	ı	ı	=	
•	Zamboanga None	32,310		•	. <u>s</u>	5,344	-	01	2	449		1	5,803	<u> </u>
••	Zamboanga Sur	43,770	4	14,282	126	12,890	7	514	91	564	39	151	28.401	\$6
		00000	•	671 31	2000	2000	•	-						

Table 3-14 STATUS OF IRRIGATION DEVELOPMENT BY PROVINCE AS OF DECEMBER 1996 (3/3)

	·	Z	N180	ู้ เ	21.8%	GWID / CRIP	WIP / CRIP	26.5	CIVEL STORY CALLS OF			Total	Irrigation
Vater Resources	Potential	2	Service	Number	Service	Number	Service	Number	Service	Number	Service	Service	Developm.
egion triovince	Area (ha)1/		Area (ha)		Area (ha)		Area (ha)		Area (ha)		Area (ha)	Area (ha)	(9)
WRRX							ţ	?	200		•	6.657	<u>%</u>
Agusan Norte	52,490	C 4	3,212	4.	5.570	- -	7	≥ ¹	C 10	•		865 1.	•
THN GENERAL	56,450	65	7,691	ř.,	5,615		49	0	N N	•	• ;	67.00	, ,
### > 5 T.C. 22	7.718	•	•	Ľ\$	2.381	•	٠	m	ò	72	375	6877	٠,
ionione.		•	•	~	808	•		9	146	•	•	654	20
Camigun	14,000	,		ွေ	701			×	305	۴۰,	×	2.104	
Misamis Oriental		• ,	, ,	ŧ :	,,,,,		•	2	120	¥7.	91	5.629	22
Davao del None***			4.20%	<u>u</u> :		• .		, ;	073	•	•	6.530	95
Surigao del Norte	020'81	•	•	103	5,614	-	ò	1	600	5	102	40.800	
Total	161,312	9	14.172	333	23.703	er.;	Z!	6	200	2		2	
WRRXI						,	•	•	Š	Ψ,	2	05.630	
Day to del Norre	80,976	ν .	16,463	7	8,521	۲.1	0.71	0	en.	,	3	133.1	्र १
Interior July Sound	12.770		2,131	23	2,160	•	•	C-1		•	•		* '
210 22 2110		•	4.021	3	12,878	L1	804		\$. \$	-	٠٠.	20.401	Š
The tab or vic	33,280	•		;	i								
Saranggani				•					•	-1	CA CA	6.046	36
South Cotabato***		F 1	2,116	20	2,888	•		•	3		•	XC0 7	71
Surigae del Sur	40,290	(1	3,988	25	11.67	•	•	r.	6	• (;	767 67	Ć,
Total	195,451	2	30,719	175	921,05	4	924	ሂ	1,771	6	50	0.4.0	
WRR XII			i				ì	2	È		•	298.96	15
Bukidnon***	79,982	च	17,757	61	7,040	7	Ŝ,	9.	7 4	1		1.4.266	-
Lanao dei Norie	12,560		4,500	76	9,375	•	•	<u>o</u>	084	•	•	0000 E	
Lanao dei Sur	77.190	-	2.500	6	1237	•	• ;	e v	2 6	. (' ?	A50 K1	
Magnindahao	011'601	ε.	4,233	49	9,375	C 1	90	'n	05.7	8	ç ;	0/0**	. 6
North Colabato	141,360	T.I	20,132	13	9,744	2	25	ij.	1.077	<u>%</u>	8	166,18	
を表するがあるかり エニ・ウン		-3	12.995	47	7,395	-	40	₹3	265	•	•	20,695	
South Colabora		4	16,034	05	12,838	,	•	=	930	7	ţ	29,864	
TAIN AUGUM	216,017	· <u>6-</u>	78.151	374	57.604	6	820	\$	3.886	172	47.5	140.634	27
			0.00	6	310 027	356	692.51	645	21.233	984	2.878	1,361,703	777
Grand Total	3,126,340	-	3.00	2.7	0.000	1	-0.11						

1.; ***; Province divided by the Water Resources Region

2. 1/ ; Estimated Potential Irrigable Area by NIA, which is based on the 3% slope criteria

3.27 ; Based on NIA Inventory of NIS (1996 Report)

4. 3/4; Based on NIA Inventory of CIS (1996/Report)

5. 4/; Based on Inventory of completed and Operational Projects of BSWM, DPWH and NIA (1996 Report) 6. 5/; Based on Inventory of Complete Projects of BSWM (1996 Reports)

(9)

Table 3-15 LIST OF PROPOSED HYDROELECTRIC PROJECT BY NPC (1/8)

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Negan (Lucan Hydro Bleerne Project) (Cordillers Automanan Negani (CAR) Existing 1. Ambusho 2. Singa HEP 3.			Daniellan in man				(Mallione)	2		Agreement of
utomanav Regua (CAR)		Kivet	Severobuscut		redi:	(E	Callingals	5		
(NCA) and an analysis of the state of the st										
* ·	Ambuklao, Bokod.	Agno River	Kewercon	900,000,144		ξ	P 131,745	400 CM	Power Generation	Completed
- ·	Benguet						(Ongunal Capitat		& Flood Control	
•	Binga, Itogon, Benguer	Aprilo River	Reservoir	000 000 NF	6,36,000	99	17004	516 Chuh	Power Generalien	Completed
•									& Plead Control	
	Tales Redding	A sees Missis	Kowingon			0,1	P 1,449.35	520 Gwb	Fower Centration	Pre-Feasibility
							(1984 Price Level)		& Flood Control	Study completed
Homonest Help	San Juan, Albea	Biognaph River	жильтан		24,500	ē	00,000	4 × 0 × 1+	Power Generation	Frasibility
		Tines kwer			24,500		(1984 Price Level)		A Flood Control	Study completed
							1 US \$ + P26.00			
S. Agbulu Hill?	Kalinga Apayao	Apayao River	Reactiven	2.164,000,000	000,101	Ş	202	1479 CM	Power Generation	Feasibility
							(1993 Prior Level)		A: Flood Control	Niewy complicated
C Tanalan O Street	Kolinea America	Translate Break	Restriction	0.000.000	00010	7.	8. F.	7.7 Cwb	Power Generalia	Peasificati
L					:		(1993 Price Level)		A: Flood Control	Study completed
							1 US N + 128,00			
7, Pavi 0 SRMP 2	Kalinga Apayao	Pasil Kngr	Kundiener		90m*15	21	05.65×	65.8 Guth	Power Generation	Feasibility
							(1993 Price Level)			Study completed
							1 US N = P2X,00			
R. Casal B SHYP	Kalinga Apayao	Pasal Kirer	Kun-of-river		16,030	<i>0</i> :	\$27.50	78.9 Cwh	Power Generation	Frasibitas
							closes brice target			Study completed
- AX13.1974 0	Kalenda Albasas	Page 5 lead	Monaghana		0.00	ţ	Str 60	28 er Gar h	Person General and	Measibility
•						÷	(1991 Print (1991)			Study completed
							1 US % = P28.00			
10, Salkan A SHYP	Kalinga Apayao	Sagan River	Run-of-riser		3,000	01	31X.20		Pewer Centeration	Feasibility
							(1993) Proce Level) 7 US 4 = 128.00	24.6 Gwh		Study completed
ri, Sattan B SRPP 2	Kalinga Apasao	Saltan River	Kun-of-river	,	00611	z	\$30.90	LIGG GWh	Power Generaliza	Frashildy
							(1993) Price Level)			Study completed
							1.05 % - P28.00			
12. Lamor A SHYP	Kalinga Apayao	Saltan River	Kun-of-ener		000'1	77	61.10	32.76 Gwh	Power Generation	Frankhily
							(1993) Price Level)			paradosos spars
The contraction and delivery	Kodon America	A selected Manager	D. m. C.			F	1 (5 % + 1/2×00	4 1 1 6 1 4	Bron. or Circust House	Percentification
							(1993) Price Levels			Study Completed
							FUS N # P28,00			
14. Amhurayan A SafYP 6	بردعالباشر	Kithunpan	Run-yl-rwpr	-		X.6.4.	57.75	CAn Gah	Hower Centeralian	Feasibility
							(1903 Prior Love)			Ands completed

Table 3-15 LIST OF PROPOSED HYDROELECTRIC PROJECT BY NPC (2/8)

1	Water	accient I	John of), se of	Active Storage	Water	Capacity	Project Cost	Project	Purpose	Status
170	Kegion		Kiver	Development	Valune	(this)	(MW)	(Mallions)	Output		Kemathy
and the second		0	Management Management	Recordings		3,400	24.5	×5'()***	90).5 Gwn	Power Generation	Feasibility
IS. Amburayan C. Strv P	-	30Aux	TANK REGIONS					(1993 Price Level) 1 (1) % = P28 (0)			study completed
:		:				One	5.65	08.55	490 S.C.	Power Generation	Feasibility
to, Nalatang A SHYP	_	וזייולאיינו	DAIN MODELLAN			<u>.</u>		COOL PROCE LOVED			Study completed
								1 US \$ + P28,00			
17 Nalatana B. SigVP	-	Benruet	Nalatang River	Run-of faret		17,400	म इंग	\$61.0 5	207.6	Power Generation	Persibility
IX Anaxao-Abulos HEP		Pudrol, Kalinga	Apayao-Almiog	Keverour	L.200 MCM	\$62,000	000	P. M. 95 M. RIS	1632 Gwh	Power Generalion	Feasibility
		A poyag	Kner					closes Proce Levels			Study completed
!	,	1	0 40 40	S. C. Control	X 25 25 7	66.100	(9) _x	35 1/45 74	MY CWI	Hower Generation	Feasibility
19, Chico IV HEP	۲,	ได้เกเลสซอน, พ.สเทลิต	CHRO RIVER	TO ALKAY				(1995) Price Level)			Study completed
		Aprilate						1 USS = P11.00			
	-	Randun	Amburayan Kives	Kun-of-river	•	26,800	£.7	112.77	354,7 Gwti	Power Generation	Feasibility
			Kibungan Rayy			9,100		(1992 Price Level) 1 US % • P26,00			study completed
Region 1											
DESCRIPTION OF THE PROPERTY OF		Therefore Cont	total and	Runafenser	•	7,800	<u>*</u>	37'T'	25.9 Gwli	Power Generation	Feasibility
I. Gakun C. SHITP								(1992) Price Level)			Study completed
							;	20.04	A C. P.	Manufact Comercial and	Secrethality
2. Bakun AB SHYP	-	ileados Sur ^o	Buken River	Rumofraver		OOM'?	ş	No Long			Conference
		Benguet						LCS N = P28.00			The second second
			3 - 7 - 7	U.m. of America		2,600	7	\$6.0%	67.6 Cwn	Power Opperation	Feasibility
3. Bakun A SHYP	-	เอกสินจะเ	10 mg					(1993 Price Level) 1 (15 % = P28 00			Study completed
									0		7
4. Bakun B SHYP	-	Hocos Sur/	Bakun Kiver	Run-of-mer		N.400	19.3	140.77	190 e co	Power (Jeneralion	reasibility trust generalists.
		Benguei						(1995 PREPLEMEN)			a video i onu
:			or see to di	Managar January	,	1,500	7.0	21.10	24.6 CWH	Power Generation	Feasibility
S. Bakun S.SHYP		Hocos Sur	A chie D chief	Personal Property	000 000 009	00, 70	St.	P 60.921	Power,	Power Ceneration.	Construction was
6. San Roque	- .	Non-Manuel.	Agid River	ACMINGR	220000000000000000000000000000000000000	•			\$P192509-70,500 Hay.	Hood contret	defented
Multipurpose Project		Panyasman							Flood Control-Panya-	and Irrigation	
									Cuel Plan		
									Water Quality Inhabi-		
									tants of the area		
		Sec. Manage	Ayno River	Keyerour	930,000,000	83,600	SPE.	5769.50	Power.	Power Generation,	Upgrading of
		Panyasinan	•					(1994 Price Level)	(mgatton-70,500 Has.	Flood Control,	Fearabhing Study
		Conditional Software in						1 US N = P2N,00	Flood Control Panga-	Irrigation and	completed last
		consideration of July 6.							sman Plain	Water Quality	AUX-94
		1990 carthauake)							Water Quality Inhabi-		
									tasts of the area		
7 Ratinacaguin Mine	-	Mathril.	Balingcagum	Run-of-river	•	3,380	109	P 132.58	12.45 Gwh	Power Generation	Pre-Feasibility
		: : : : : : : : : : : : : : : : : : : :						(1893) Price Lavet)			York Completed

Table 3-15 LIST OF PROPOSED HYDROELECTRIC PROJECT BY NPC (3/8)

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Project								,			
	Resources	* Location	Name of River	Type of Development	Active Storage Volume	Withdraw	Capacity (MW)	Project Cost (Multions)	onthro Onthro	Purpowe	Status Remarks
8. Dupalo Mini-Hydro	Α.	San Quintin.	Depails River	Run-of-river		0	4 ,62	P. P. C.	15 S S S	Power Generation	Pre-Prescipility
Project		Pankasinan					;	(1993) Price Level)		,	study Compared
9. Baracbac Mini-	۸.	Mangalarem	Baracbac Kives	Kun-Of-river	·	Design	SS.	68'161	10:01	Power Generation	Pre-Prescipality
Hydro Project		Vangasman				;		(1993 Priete Level)	:		Steps Completes
IO, Pila Mini-Hydro	е.	Mangatarem.	Pila Kiver	Rumofrance		3,000	2,10	美工品	#35 TO %	Power Ceneration	Pre-Peaninhay
Project		Pangasman						(byt) Price Level)			Study Completed
Region 2											
Existing											
I. Magat River	2	Agunaklo, Ramon,	Magai Kiver	Keservair	LZS billion cum.		360	P2,879	1237 Gwh	Power Cemeration	Completed
Multipurpose Project		Santiago, Isabela									
Copysed											
2. Addelam A SHYP		Quirmo	Addalam River	Reservoir	NO MCM	39,500	ş	07:19	102.2 Gwh	Power Centration	Fraschilly Sludy
								(1993 Price Level)			Completed
								1 US \$ ~ P 28.00			
3. Damen B.NKVP	r	93697	dagage River	Krownoir	N WCW	49.500	2	06517	304 4 Cash	Paner Caneratan	Persentition Study
								(1993) Price Level)	•		Controleted
								1 US \$ ~ P 28.00			
4, Diduyon HEP	r.	Kasibu, Nueva	Diduyon River	Kesmor	154 MCM	30,800	335	P. 7,050.39	987 Gwb	Power Generation	Peasibility Study
		Vicosia									Completed
5. Casvenan Transtasin	C1	Nagtipunan, Ouifino	Casecnan River	Kesenoir	LISSMOM	66,420	San Jose NI? 156	P.8.132,35	1379 Gwh	pur boilegin;	Construction
Diversion Project		Puntabangan, Nucva Coja					Puntahanyan 100	(1988) Price Level)	92,300 has.	Power Ceneration	deferred
							Massens: 12	1 USS \$4 P 24.00			
6. Casechan Pure	c	Nagripunan, Quiring	Caseenaa River	Reservair	474.9 MCM	66,420	Main Plant : 540	OF 109%	729 Guh	Power Generalion	Prasability Study
Power Schene					25, 23, MCM	89.000	D.S Plant 22				Completed
Project											
7. Caseenan Phased	FI	Castaneda, Nueva Viz.	Abuga River	Reservoir	58.2 MCM	37.N90	Manablen: 270	3.523.1 1st Stage	23Kik Gwb	Power oriented or	Feasibility Study
Transhasin Pproject		Pantabangan, Nueva Ecija			360.6 MCM	96.400	Pantabangan: 50	NAMES OF STREET	4.77, 1 GwB	וויייים שטינהליבו	Completed
							Massway: 12			SC herme	
8. Sinabbagan 8 SHYP	rı	Nagtipunan.	Sinabbagan River	Kun-of-river		068'4	5.16	P 256.9K	PLAN CARE	Power Generation	Teasability Study
	,	Curino				;	!		:	i	Completed
9. Sinubbagan E.S.HYP	r,	Nagithunan. Ourmo	Amadbagan Kuer	Kun-ol-truet	•	8	4.33	1243.34	23.00.08/1	Power Generation	Feasabildy Study Countered
10. Mateno Multipurpose	٠,	Nueva Vizcaya	Matuno River	Keschoir	97 MCM	37,400	ž	P 4,783,14	A.M. Carlo	Power Generation	Feasibility Study
Project		_			•			(1988 Prine Level)			Camplefed
11. Abyan Hydropower	۲,	Hagan, Ingeria	Abuse River	Reservoir	159 MCM	36.000	介	00,500	277 Gwb	Power Centeralion	Feasibility Study
Project								(1995 Prige Level)			OR-POHI2
12. Bungi (Curon) Mini-	c	Sta. Pravedes, Cagasan	Bynot Kiver	Kun-of-river		0.6.1	3.76	35.48	MX3 Own	Power Generation	Feasibility Study
Hydro Project								(1994 Price Level)			Completed
13, Sigul Palls Mini-	rı	Sta. Praxedes, Cagayan	Steat Falls	Runiofinier		670	0.46	P 25.89	LNS CMD	Power Generation	Pre-Peasibility
Hydro Project								(1964 Price Level)			Study Completed
Region 3											
Livistims											
J. Angai HEP	۳.	Norzagaray, Bulacan	Auga River	Reservoir	850 MCM	75.800	Main: 200	P.315,344	Power	Municipal Water Sup - Completed	Completed
							Aut : 40		Muler supply:	Irregulation	
									S00 MGD	Power Generation	
									Imigation, 10,000 nov	Flood Connol	

Table 3-15 LIST OF PROPOSED HYDROELECTRIC PROJECT BY NPC (4/8)

Project	Water	noneori	Name of	jo adšji	Active Storage	Water	Capacity	Project Cost	Project	Purpose	Status Kemarks
	Keguan		River	Development	Volume	(8d)	(A)				
4. 54. 5. 5. 5. 5. 5. 5. 5. 5.	-	Over shorten	Pagnana River	Run-of-river		43,600	13	P 132.67	Power-Luzon Grid	Power Generation	Completed
and de		Nueva Ecipa	L	(Atherbay)		;	3	power phase only	Power Lugar Greet	Octivities	Completed
3. Pamabangan HEP	ج.	Pantabangan, Kuma Pelin	Pampanga Rwer	Revenue	(1,753, MCM)	97,000	<u> </u>		Impution 106,400 has.	Power Generation	
		[..] # 6.10.									4
Copposite	~	Balos-Balos.	The page	Resevoir	325 MCM	000'00	¥	P 2,316.43	95.5 CM	eorogini	reasonalists story
double training	:	Jelaci.	Bulsa Kiner							Power Generation	Compactor
A second bisse of the	-	Haraan	Monony River	Run-of-river	•	2,550	2972	2118112	S.SR Gwh	Power Campracion	Frencasionaly French Compilered
I vdro Project								(1994 Price Level)			S Company
(Noneme A)											
Regun 4											
Existing			:		CHAR	1,500	2	P 18,238	Power Luzon Grid	Power Generalish	Completed
1. Calirasa HEP	7	Lumban, Layuna	Califaya Kiner	Kesenos	E 16.97	200,000	9	10.12	Power Luzon Grid	Power Generation	Completed
3. Kalayaan Pumped	7	Kaluyaan, Lagana	Luyuna Lake	Pumped Morage		And tone					
Storage HEP (Stage D)											
Proposed			:				17		54,32 Gwh	Power Generation	Completed
3. Bolocan HEP	7	Majakjay, Laguna	Rolocan Kingr	Kun-O-raci		900	9611	\$105.02	460 Gwh	Power Generalian	Feasibility Study
4, Kanan Bi	4	Infanta, Quezon	Ayos River	Krenor		2		(1993) Price Level)			Completed
								1 US N = P 28.00			
		Option ()	A son River	Reservoir	570 MCM	108,200	QF]	PA781.11	623 Gwh	Power Generation	Feasibility Study
y, Agos Katiwa Hist	7	trap man Nav Con									Completed
	-	() () () () () () () () () ()	Lumor Roser	Diversion Dant	T W CM	3,400	¥	8.5	Power Luzon Grid	Power Ceneration	Completed
G, Lumot Kiver Dam		Carloni, Lagure	America Maren	Received	430 MCM	71,100	3	Pt. 426,383	258 Gwh	Inigation	Feasibility Study
7. Amnay MP HEP	7	Sablayan, animooro ext.	One Course					(1983) Price Level)		Power Generation	Completed
								1.08 % # P.11.00			
	•	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	E show of Rivers	Reserved.		25,200	0.	Power only =	153 GM	Water Supply	Deliner Design
8. Manifa Water Supply	•	Landy, Michael						PR07.13		Power Generation	Completed
Hi Project								(1988 Price Level) 1 US 4 = P21,00			
(Luzon Hydaro Electric Proyect)	£					,	Ş	14.84.13	Carco Octo	Power Generation	Peasibility Study
9, Kalayawi Pumped	7	Kulayaan, Laguna	Layuna Lake	Puniped Storage		0.710	3	Chica Bears Level)		A: Plood Control	Completed
Storage Project			Calmy a Luke					1 US 3 + P28.00			
(Stage 2)			A of otherway Manager	No.	CH S MCM)		<u>*</u>	97(2)	Ju Cwh	Power Generation	Feasibility Study
io, Agrubang shyp		ON CHARTEL OF HISTORY	,					(19%2 poice Level) (1)(5.5 = 0.28.00)		A: Flood Comrol	Completed
			3				11	\$11.72	12.03 Gwh	Power Generation	Feasibility Study
11. Buraboy SHYP	4	Occidental Mindoro	ilumboy Krief	Kurolistika				(1992 price Level)		& Flood Control	Completed
							;	2000 T = 2 00 T	ž		
12. Dulangan SHYP	7	Apco. Onental	Dulangan Kiser	Kun-gi-river			τ,	. 1000 second seed	2062	Power Generation	Frasibility Study
		Mindord						CONTRACTOR OF STATE O		As filtered Company	Completed
							;	1 CN 4 8 P 28 00	7V 3V	Power Generation	Feacibility Study
11. Abs ClayP	4	San Teodoro.	Alug Kiner	Runoferver			39.5	15.00	194.0	FOWER DESIGNATION	Controlled Silvery
								(1905 price Level)		2 TEST COMED	

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Table 3-15 LIST OF PROPOSED HYDROELECTRIC PROJECT BY NPC (5/8)

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12. Consistent SATVP 4 Nough, 12. Langugan SATVP 4 Region 13. Langugan SATVP 4 Region 14. Langugan SATVP 4 Region 15. Langugan SATVP 4 Region 16. Langugan SATVP 4 Region 17. Lahusan SATVP 4 Puerto Princesa 17. Lahusan SATVP 4 Puerto Princesa 17. Lahusan SATVP 4 Puerto Princesa 18. Canaligon, Septembri 18. Canaligon, Septembri 19. Laher Bulist Languan 19. Laher Bulist Languan 19. Laher Bulist Languan 19. Laher Bulist Languan 19. Laher Bulist Languan 19. Laher Bulist Languan 19. Laher Bulist Languan 19. Saturanian River Churinn Kwee Bangabong Kiwu Langalan Kewe	Development	Administration of the second	30	(atala)		on the contract of	1		
4 4 4 6 6	Caustan Koet Bangabong Kiwu Lawydan Kewa		Volume	1011	6.2.2	(Substitute)	2000		Kemarks
1 ⁴	Canuiran Kwee Bongabong Kiver Laireogan Kreer								
* * * * * *	Benedder Kiver Lindeur Kver	Kun-ol-roet	,		ž	624.00	82.23 Gwh	Power Ceneration	Frasibility Study
T T T S S	Bongadong Kiver Languran Keer					(1992) price Level)		& Flood Control	Completed
पै व क रू रू	Hongadong Kiver Langagan Rever					W. 6. 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1			:
4 4 6 6	Lating Data Rever	Runairmer			2	6.73	1300s	Power Generation	Peasibility Nicov
T T W X	Linguan Kouer					(1992 price Level)		& Flood Coningl	Completed
		Man de la contra	٠		9	N 15 62	27.13 Gwa	Power Generation	Feasibility Study
4 A A					-	(poor leave)		& Flood Compot	Completed
4 A A						1 US \$ = P 28:00			
	Baltan an Korer	Run-ol-facer			¥ S	97.73		Power Generation	Peasibility Study
.						(1992 price Level) 1 US > = P 26.00	24.18 Gwh	A Flood Connol	Completed
er er									
* *									
.	Cawayan River	Runger		059	70	P 0,505	Power Luzon Grid	Power Generation & Flood County	Completed
	Table Buth	and decorate		905	4	*VL \$ 61	Paramet Lyde Court	Power Centeration	Completed
	***	HG 1, July 1		3	-	-		& Plood Control	
(Visayas Hydro Electric Project) Rogiem 6									
1, Rayo HEP 6 Municia	Bayo River	Reservoir	(164 MCM)	35,130	iķi	9 (19.39	497 Gwdi	Power Generation	Definite Design
	•					(1993 Price Level)		& Flood Control	Completed
•						1 US N+ P11.00			
3. Jahaar Mahipurpose 6 Jalaar, 11040	Jalaur River	Reservoir	336.8 MCM	7,040	ę,	75,405 q	58,18 Gwh	Power Generation	Definite Design
they proper						(1988 Price Level)		& Ploon Control	Completed
	11 B		74377 500	300	ŕ	0.607.01	Sec. Cont.	Bon as Canara tata	Pea Sammbainn
>	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	io existe	140 334 2000		<u> </u>	(1988 Price Genet) 1 (3 % = P21,00		A Flood Control	Study Completed
4. Tunbahan 6 Wadalan, Aklan	Tumbakari Kozer	Run-of-ruer	,		165	85.05%	125 Gwh	Power Generation	Peasibility
						:		A Pload Control	Study Completed
S, Vella Sign. 6 Vella Sign, Amique	Palsuan River	Run-of-fiver			32.5	©1 9€/	1.25.1 Gwh	Power General on	Feasibility
								& Plood Control	Study Completed
•		:		į	:		0		{
1. CORNECTION Annual Manual Changes	LONGE KINGS	Kull-Ornayer		76.	* *	\$25. d	Partie New Co.	Part of Center and	Completes
				•					<u>.</u>
3. Upper Lobok HEP 7 Calmparan Sevalu.	Labor Kiver	Kewittar		07.070	ũ	¥4.06.3%	92,060.8 Gwite	POWER GREATMENDE	Franthum Study
Bahel						00'01 June 1966)			Completed
4 Secondary	Succession Process	Kunadistant	,		471	V30.14	30.62 CMB	Power Ceneration	Frasibility Study
•					1	(1992 Price Level)	•		Campleted

Table 3-15 LIST OF PROPOSED HYDROELECTRIC PROJECT BY NPC (6/8)

į	rate.≰	**************************************	Juneary A	The second	Action Mineral	Withdrawal	Callegate	Poke Cos	Project	Purpose	Vialle
Hopert	Kepton	S.CA. SPINKE	River	Dyselopmen	Volume	(xli)	(A)	(Mullions)	Output		Remarks
3. Oke)	-	Patempinon, Negros Orental	Okny River	Run-uf-river			<u>x</u>	N 14 13 (1992 Princ Exect)	24.91 Gwh	Power Generalian	Feasibility Study Completed
6. Salen	۲	S aron, Negros Oriental	Station River	Kun-ef-river	·		3	N.6.67 (1992 Price Lewel) F.US N. P.28.60	21.59/Gwfi	Power Generatum	Feavibility Study Completed
Keyjan K											
Proprosed 1. Carubig Valley Comprehensive Devi	×	Catubig Northern Samac	Catulity River	Reservan	923 MCM	32,900	Ş.	P (666,08 (1988 Price Javel) (1988 Price Javel)	21.99.Gwh	Power Generation	Feasibility Study Completed
rroport 2. Tafi	×	Taft, Eastern Samar	Taff River	Rup-of-river	,		×	P-521.42	101 90 Gwh	Power Generation	Feasibalay Study Completed
A. Babig	×	Balangiga Bastern Samar	Band River	Runafriker			17.21	P305.33	73,53 Gwb	Power Ceneralion	Feanibility Mudy Completed
4. Bulasso		Llorente, Castern Sanor	Hulasso Kiver	Ren-of-river			10.8\$	P 183.07	40.74 Gwn	Power Generation	Feasibility Study Completed
Kephon 9 <u>Proposed</u> 1. Polandok Scheme 2	÷	Lobuno. L.B. Postro,	Polandok River	Kun-of-river	·	6 01.7	0.85	P.229.87	37,44 Gwh	Power (Jeneralon	Pre-Fess-delity Study Completed
2. Polandok Scheme A	\$	Zamboanya del Norre Labano. L.B. Postigo.	Polandok Kiner	Kesswor	,	8.500	J.	97.77≟ 4	\$5.93 GWh	Popker Generalium	Pre-Peasibility Study Completed
3. Dikayu Dantas ta	>	Zamboanga del Norte Katipunan Zamboanga del Norte	Duayu River	Reservoir			26.21	PROBLE	33.93 Gwn	Power Generation	Pre-Franching Nody Gompleted
Chaing I. Agusan Hill	ő	Damilag, Manolo Fortich,	Agusan Kiver	Runofiner		00%1	977	P 3,215	10.5 Cwh	Power Generation	Completed
2. Pulangi 1V	ភ	Bukadnon Maramag, Bukudnon	Pulangui River	Kunoferver				P.2,003,7 (1984 Prox Level) (US N = P14,00	1,012 Cwh	Power Generation	Completed:
Proposed 3. Pulangui III	2	Lumbayao, Vakoncia Bukidnan	Polangoi River	Reservoir		07,320	8	P.S.745.30 Gaeluding IDC)	N2 Gwh	Impation Hower Generalion Hourd Control	Feasibility Study Completed
4. Pulangui ?!	9	Malaybalay. Bukudnon	Polangui Kiver	Kewron	SSS MCM	38,650	92	P. 3,105,974 (1984 Prige Level) 1 US 8 = P14,00	257 Gwb	Puss er Generalion	Pre-Heastbridg Study Completed
5. Pulangui V	다	Pres. Ronas. North Colabato	Polangui Kiver		·		96 ₂ .	5997 (1992 Price Level)	1386 Gwh	Power Ceneration	Pre-feasibility Visity Completed

Table 3-15 LIST OF PROPOSED HYDROELECTRIC PROJECT BY NPC (7/8)

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	N. mark					Water	Pollogui				
Project	Kesources	Location	Name of	Type of	Active Stonge	Withdrawal	Саросия	Project Cost	Project	Purpose:	Natas
•	Kepan		River	Desitioniven	Volume	(lps)	(MW)	(Mollons)	Output		Kemarks
6. Pulangui 1	OI.	Mundle forugh Bukkanon	Pulangui Kiver	Reservoir	1715 MCM	15,740	Z.	P Should Programme (1984)	105 Cub	Power Generation	Pre-Frankling Study Completed
7, Bulangy Balang	9	Talakag, Bukidnon	Cayayan Kiser	Reservoir		34,500	95	P 5.202 (2	590 Gwb	Power Generation	Feanbility Study
K. Cagayan IN	93	Talakag, Bukidnon	Cagaian River	Kewmoir		99,600		असंबद्धांच त	st; Gun	Power Generation	Completed Pre-Fets-Witty
9. Tagolosan II	õ	impasugung. Bakadaan	Tayoloan River	Kunofiner	,	26,000	3	(wath IDC) P.3,071.6	336 Gwh	Power Generation	Study Completed Ecosbitis Study
10. Uguiaban	9	Talakag, Bukadaon	Cayayan Kwer	Kumofenser	,	01.500	992	1 (3 % P28.00	237 Gwh	How or Generation	ўвахфару Study
11. Amesig	ē	Talakag, Buhadnon	Amusig River	Kunofriver		00 I ST	ÿ	(excluding 10C))* 1.856,78 (1988 Price Level)	376 Gwb	Power Generation	Pre-Feasibilis Study Completed
12. Odiongan A	O.	Gingroop City Misable comment	Odiongon Kiver	Run-of-river		7,430	10.17	1 US N = P23,000 P 210,81	34.18 Gwh	Power Generation	Pre-Feavibility Names Commissed
13, Odiongan E	9	Gingoog City Misamis Oriental	Odiongan Kiner	Kunofiner		000%	3.33	8751 d	20.04 Gwh	Pawer Generation	Pre-Feasibility Study Completed
A buga A	ō	Jabonga & Kacharo, Agusan sel None	Pugu River	Kun-pl-river		001.55	F x1	P 1,011,304 US N + P2X,00	s2.9 Gwh	Power Generation	Feasibility Study Completed
15. Pugu 8	2	Jakonga A. Kiicharo, Agusan dei None	Pugu River	Run-ol-thet		26,650	ŝ	P713.916 (US N + P25.00	71 Cmh	Power Generalion	Feanibility Stady Completed
16. Pugu D	ō.	Jakonya K. Kitalaro, Agusan del None	Pugu Kiver	Kun-of-river		00%01	<u>T.</u>	N18,64 1 USSN= P28,00	51.6 Gwh	Hower Generalian	Feasibility Study Completed
17. Pugu E 18. Asiga	<u>o</u> o	Jabonga & Kitcharo. Agusan del Norte Samiago	Pugu River Asigu River	Kun-of-river Kun-of-river		000°0)	6.8	N,5,43 1 UN N + P28,50 822.29	M.I. Gwdi 46 o Gwn	Pewer Generation Power Generation	Feanblay Study Completed Feasblay Study
Region 11		Agustin del Norio						1 CS N # 128/00			Completed
I. Carrel	=	Careel, Davuo Oriessal	Carel River	Kyn-of-en er		904.11	17.	836.36 00.35 % # 8.35.00	28,2 Owh	Power Generation	Frasspanis Study Compered
2. Sumakan	=	Suwawan, Oawao Chy	Suwawan River	Run-of-ther	-	N.100	18.3	\$2973 1 05 5 × 9 28,00	45.6 Gwh	Power Generation	Peasibility Mody Compared
3. Tamuzan	=	Tamugan, Davao Clis	Tampan River	Run-of-river		8.800	15.9	N31X2 1 US N # P 2X:00	th I Gab	Peuer Ceneration	Peasibility Study Completed
4. Signil	=	Maasim, South Cotabalo	Sipusi River	Runofener	,	7,200	<u>=</u>	070% 070% 070%	59.8 CM B	Power Generalion	Peasibility Mudy Completed
S. Lastnon	27	Laste Sebs & Surratah , South Cotabato	Lahon Race	Nun-of-river		3,100	- -	108 N 4 P 28.00	26.3 Gwh	Hower Ceneralism	Feasibility Mudy Completed

Table 3-15 LIST OF PROPOSED HYDROELECTRIC PROJECT BY NPC (8/8)

Рюкс	Water Resources Region	bersebert	Name Of River	Type of Development	Açtıve Mofuge Veitime	withdrawal	Capacity	Panjett Cov (Malhons)	Project	Purpose	Status Kemerks
Region 12 Saving 1. Agus 1	2	Marawi City Lando del Nor	Ayıs Kave	101		44,700,000	ĝ.	P 1,352/\$2 (1963 Pproje tuvo) 1 US 8 # P 14/00	ተነው ርነቀ ከ	મું છે. ૧૧ (સમાર્થિક) માં	Completed
? Agus II	ä	Saguintan Lanan del Sur	Azus Kivet	,,00,	·	140,000	<u>\$</u>	00 Pt d = x 5.7 t (paxer abdot 8861) (paxer abdot 577)	736 Gwh	Power Generation	Completed
A. Agus 1V	:	Buton, Lanas akel Sur	Agus Knor	ror_		115,000	<u>.£</u>	00'at0'1 d	702 Gwh	мун Семпия	Completed
A, Agus V. S. Agus VI	현안	Rator, Lambo del Sur Fuenco, Digan City	Agus Kiser Agus Kiser			17.500	500	P 620 00 P 448 274 Revaluated Cost	265 Gwh 1016 Gwh	Pawer Generation Pawer Generation	Cempleted
6. Agus VII	3	Fuentrs, Bigan City	Apus Kwer			000'001	Z	1982 9 654,32 1 GN N # P 7 50	274 Over	Power Generalion	Completed
<u>Proposed</u> 7. Agus III	~	Paiot, fanao del Norte	Apun Rince			95,000,000	ži	(1985) Price (Livel)	Ions Gwh	Newer Generation	Feastbility Study Completed
8. Trou AC	2	Letak, Maguindanao	Tran River	Runoferver	·	21,700	300	1 US 4 - P 1820 84773 1 UN 5 - P28.00	xs Gwh	Power Generation	Feasibility Study Completed
9, โมมกุลก	ä	Bacolod.	Langun Kivet	ያስክ-ዕና-የክ e r	·		911	813.29 1 CS S # P25.00	72.89	Fower Generation	Feasibility Study Completed Feasibility Study
10. Pulangui V	2	North Combato	Pulangus Kiser	Keservoir			Š	1.US N = P28.00	EMO COST	Goder Canada Company	Completed Feasibility Medy
11. Pulangur VI	2	Oato Samilia Pres. Roxas.	Pulangui Kiver	Kun-of-race		233,000	5. 5	P 1,001,07 (1984 Price Level) + US 5 = P14,00	5000 E		Completed
(2. Maęano)	혛	Magaundanao k Najian Kudarai	Maganey River	Run-of-river			ક	P 543.21 (1984 Price Level) 1 US 5 = P 2 U00	A S O C S I	STITLE STANDARD	Study Completed
13, Kabacan Scheme AB	Ħ	Magret, North	Nabacan River	Kunofener	,	3,470	96'0	P 250.34	31,29 Owh	Power Generation	Pre-Feantbday Study Completed Pre-Feacibility
I. Kabacan Scheme D.	랖	Magpet, North	Kabacan River	Kun-pt-ruer		8	PC *	P172.3	(4.4.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1	101181711	Study Completed

()

Table 3-16 SHORT-TERM AND MID-TERM POWER AND ENERGY DEMAND FORECAST

(1) Power Demand

()

Year		Sales by Grid (GWh/year)	•	Whole Pi	hilippines
	Luzon	Visayas	Mindanao	Total	Increase Ratio (%)
1995	3,877	585	837	5,299	-
1996	4,239	657	959	5,855	10.5
1997	4,744	739	1,130	6,613	12.9
1998	5,397	832	1,359	7,588	14.7
1999	6,079	955	1,587	8,621	13.6
2000	6,779	080,1	1,822	9,681	12.3
2001	7,484	1,254	2,059	10,797	11.5
2002	8,266	1,405	2,321	11,992	11.1
2003	9,135	1,556	2,610	13,301	10.9
2004	10,102	1,676	2,930	14,708	10.6
2005	11,177	1,796	3,283	16,256	10.5
Average Annual Growth Ration (%)					
i) between 1996 and 2000	11.8	13.0	16.8	12.8	
ii) between 2001 and 2005	10.5	10.7	12.5	10.9	
iii) between 1996 and 2005	11.2	11.9	14.6	11.9	

Data Source: 1996 PDP by NPC

(2) Energy Demand

Year		Sales by Grid (GWh/year)	-	Whole P	hilippines
	Luzon	Visayas	Mindanao	Total	Increase Ratio (%)
1995	23,161	3,024	4,251	30,436	-
1996	24,415	3,482	5,635	33,532	10.2
1997	27,331	3,918	6,641	37,890	13.0
1998	31,088	4,406	7,989	43,483	14.8
1999	35,019	5,062	9,330	49,411	13.6
2000	39,054	5,794	10,711	55,559	12.4
2001	43,111	6,727	12,102	61,940	11.5
2002	47,616	7,536	13,640	68,792	1.11
2003	52,623	8,348	15,339	76,310	10.9
2004	58,191	8,995	17,219	84,405	10.6
2005	64,383	9,636	19,294	93,313	10.6
Average Annual Growth Ration (%)					
i) between 1996 and 2000	- 11.0	13.9	20.3	12.8	
ii) between 2001 and 2005	10.5	10.7	12.5	10.9	
iii) between 1996 and 2005	10.8	12.3	16.3	11.9	

Data Source: 1996 PDP by NPC

Table 3-17 HYDROPOWER POTENTIALS IN THE PHILAPPINES

Grid System	Status of Scheme	Installe	d Capacity	Energy	Output
		(MW)	(Share)	(GWh)	(Share)
(1) Luzon	Existing	1,273	15 (%)	3,818	12 (%)
	Prefeasibility	3,444	40 (%)	14,895	47 (%)
	Feasibility	1,922	22 (%)	6,907	22 (%)
	Definite Design	1,950	23 (%)	6,185	19 (%)
	Subtotal (1)	8,589	100 (%)	31,805	100 (%)
(2) Visayas	Existing	13	3 (%)	51	3 (%)
	Prefeasibility	95	22 (%)	403	27 (%)
	Feasibility	226	53 (%)	833	55 (%)
	Definite Design	96	22 (%)	229	15 (%)
(3) Mindanao	Subtotal (1)	430	100 (%)	1,516	100 (%)
	Existing	992	30 (%)	4,571	32 (%)
	Prefeasibility	1,193	36 (%)	4,799	34 (%)
	Feasibility	1,104	34 (%)	4,768	34 (%)
	Definite Design	-	-	-	-
	Subtotal (1)	3,289	100 (%)	14,138	100 (%)
Whole Philippines	Existing	2,278	19 (%)	8,440	18 (%)
- •	Prefeasibility	4,732	38 (%)	20,097	42 (%)
	Feasibility	3,252	26 (%)	12,508	26 (%)
	Definite Design	2,046	17 (%)	6,414	14 (%)
	Subtotal (1)	12,308	100 (%)	47,459	100 (%)

Data source: 1996 Power Development Program by NPC

Table 3-18 POWER CAPACITY NEEDED TO BE ADDED BETWEEN 1996 AND 2025

(3)

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Hydoro NRE/SM.HY (1)+(2) Geo- Coal Natural Subtocal Coal O (1) (2) thermal Gas 0	Year			Indigenous	is Energy Resources	urces			fw.	ported Ener	Imported Enery Resources		Total
0 0 0 0 0 0 0 0 220 0 220 0 140 0 480 0 480 300 140 0 140 80 0 220 1550 140 0 140 80 0 220 1550 140 0 0 0 220 1550 120 0 0 0 0 1550 23 0 250 600 918 0 68 0 250 600 918 0 68 0 250 600 918 0 68 0 250 600 918 0 569 120 0 689 0 569 120 600 3.572 0 443 569 1.650 600 3.572 0 584 975 40 <	'	Hydoro (1)	NRE/SM.HY (2)	(1)+(2)	Geo- thermal	Coal	Natural Gas	Subtotal	Coal	lio	Other fuels	Subtotal	
0 0 0 220 0 220 0 0 0 0 480 0 0 480 300 140 0 140 80 0 0 480 300 140 0 140 80 0 0 480 300 140 0 140 (780) (0) (0) (1850) (1850) 29 0 22 40 0 900 969 0 68 0 32 0 900 918 0 68 0 250 600 918 0 68 0 250 600 918 0 68 0 250 600 918 0 569 0 250 600 918 0 600 1,648 (160) (600) (5,000) (5,208) (300) 473 548 975	1996	0	0	0	0	0	0	0	0	80	0	20	20
0 0 480 0 480 300 140 0 140 80 0 480 300 140 0 140 80 0 220 1550 (140) (140) (780) (0) (920) (1,850) 29 0 29 0 969 0 32 0 250 900 932 300 68 0 250 600 918 0 68 0 250 600 918 0 750 0 0 250 600 918 0 750 0 0 250 600 918 0 569 120 0 689 0 689 0 473 579 1,652 720 600 3,672 0 261 460 1,500 3,615 0 27145 (1,670) (1,210) <t< td=""><td>1997</td><td>0</td><td>0</td><td>0</td><td>220</td><td>0</td><td>0</td><td>220</td><td>0</td><td>100</td><td>0</td><td>001</td><td>320</td></t<>	1997	0	0	0	220	0	0	220	0	100	0	001	320
140 0 140 80 0 220 1550 (140) (140) (780) (0) (0) (020) (1.850) 29 0 29 40 0 900 969 0 32 0 32 0 0 900 932 300 68 0 250 600 918 0 68 0 250 600 918 0 750 0 0 900 932 300 68 0 0 900 932 300 569 0 0 0 850 918 0 569 120 0 0 880 120 880 0 689 0 1,448 1,650 1,600 (3,000) (5,208) (300) 1,500 2,684 0 247 548 975 40 0 2,000 3,015 0 <	1998	0	0	0	480	0	0	480	300	550	0	850	1330
29 (140) (150) (780) (780) (0) (1400)	1999	146	0	140	80	0	0	220	1550	0	0	1550	1770
29 0 90 900 969 960 960 960 978 90 960 960 978 90 960 960 978 90 968 90 968 90 968 90 90 968 90 90 968 90 968 90 90 968 90 90 968 90 90 968 90 90 968 90 90 968 90 90 968 90 9	Sub-total-1	(140)	_	(140)	(780)	0)	0)	(920)	(1,850)	(700)	0)	(2,550)	(3.470)
32 0 32 0 900 932 300 68 0 68 0 250 600 918 0 0 0 0 0 250 600 918 0 750 0 0 250 600 850 0 569 120 0 880 0 880 0 (1,448) (160) (600) (3,000) (5.208) (300) 473 579 1,052 720 600 1,500 3,872 0 984 860 1,844 230 610 0 2,684 0 261 460 721 80 0 2,684 0 251 460 721 80 0 801 0 2,145 (2,447) (4,592) (1,070) (1,210) (3,500) 16,500 2,150 3,733 2,447 6,180 2,016 6,500	2000	29	0	33	40	0	006	696	0	0	0	٥	696
68 0 250 600 918 0 0 0 0 250 600 918 0 750 0 0 250 600 850 0 569 120 0 689 0 569 120 0 689 0 473 579 1,052 720 600 1,500 3,872 0 984 860 1,844 230 610 0 2,684 0 261 460 721 80 0 2,000 3,872 0 261 460 721 80 0 2,684 0 261 460 721 80 0 2,000 3,015 0 261 460 721 80 0 0 801 0 2145 (2,447) (4,592) (1,070) (1,210) (3,500) 16,500 2,150 3,733	2001	32	0	32	0	0	006	932	300	0	150	450	1382
0 0 0 0 600 850 0 750 0 750 0 100 0 850 0 569 0 569 120 0 689 0 (1,448) (160) (600) (3,000) (5,208) 0 473 579 1,052 720 600 1,500 3,872 0 984 860 1,844 230 610 0 2,684 0 261 460 721 80 0 2,000 3,872 0 251 460 721 80 0 2,684 0 261 460 721 80 0 801 0 25145) (2,447) (4,592) (1,070) (1,210) (3,500) (10,372) (0) 3,733 2,447 6,180 2,010 1,810 6,500 16,500 2,150	2002	88	0	88	0	250	909	918	0	0	950	950	1868
750 0 750 0 100 0 850 0 569 0 569 120 0 689 0 (1,448) (160) (600) (3,000) (5,208) (300) 473 579 1,052 720 600 1,500 3,872 0 984 860 1,844 230 610 0 2,684 0 427 548 975 40 0 2,000 3,015 0 261 460 721 80 0 801 0 (2,145) (2,447) (4,592) (1,070) (1,210) (3,500) (10,372) (0) 3,733 2,447 6,180 2,010 1,810 6,500 16,500 2,150	2003	0	0	0	0	250	009	850	0	0	450	450	1300
\$69 0 \$69 120 0 689 0 (1,448) (160) (600) (3,000) (5,208) (300) 473 \$79 1,052 720 600 1,500 3,872 0 984 \$60 1,844 230 610 0 2,684 0 427 \$48 975 40 0 2,000 3,015 0 261 460 721 80 0 801 0 (2,145) (2,447) (4,592) (1,070) (1,210) (3,500) (10,372) (0) 3,733 2,447 6,180 2,010 1,810 6,500 16,500 2,150	2004	750	0	750	0	100	0	850	0	0	950	950	1800
(1,448) (0) (1,448) (160) (600) (3,000) (5,208) (300) 473 579 1,052 720 600 1,500 3,872 0 984 860 1,844 230 610 0 2,684 0 427 548 975 40 0 2,600 3,015 0 261 460 721 80 0 801 0 (2,145) (2,447) (4,592) (1,070) (1,210) (3,500) (10,372) (0) 3,733 2,447 6,180 2,010 1,810 6,500 16,500 2,150	2005	569	0	569	120	0	0	689	0	0	1350	1350	2039
473 579 1,052 720 600 1,500 3,872 0 984 860 1,844 230 610 0 2,684 0 427 548 975 40 0 2,000 3,015 0 261 460 721 80 0 801 0 (2,145) (2,447) (4,592) (1,070) (1,210) (3,500) (10,372) (0) 3,733 2,447 6,180 2,010 1,810 6,500 16,500 2,150	Subtotal-2)	(1,448)		(1,448)	(160)	(009)	(3,000)	(5.208)	(300)	(o)	(3.850)	(4,150)	(9.358)
984 860 1,844 230 610 0 2,684 0 427 548 975 40 0 2,000 3,015 0 261 460 721 80 0 0 801 0 (2,145) (2,447) (4,592) (1,070) (1,210) (3,500) (10,372) (0) 3,733 2,447 6,180 2,010 1,810 6,500 16,500 2,150	2006-2010	473		1,052	720	009	1,500	3,872	0	0	9.701	9,701	13.573
427 548 975 40 0 2,000 3,015 0 261 460 721 80 0 0 801 0 (2,145) (2,447) (4,592) (1,070) (1,210) (3,500) (10,372) (0) 3,733 2,447 6,180 2,010 1,810 6,500 16,500 2,150	2011-2015	584		1,844	230	610	0	2,684	0	0	16.549	16,549	19,233
261 460 721 80 0 0 801 0 (2,145) (2,447) (4,592) (1,070) (1,210) (3,500) (10,372) (0) 3,733 2,447 6,180 2,010 1,810 6,500 16,500 2,150	2016-2020	427		975	40	0	2,000	3.015	٥	0	19,485	19,485	22,500
(2.145) (2,447) (4,592) (1,070) (1,210) (3,500) (10,372) (0) 3,733 2,447 6,180 2,010 1,810 6,500 16,500 2,150	2021-2025	261		721	80	0	0	801	0	0	23,199	23,199	24,000
3,733 2,447 6,180 2,010 1,810 6,500 16,500 2,150	Subtotal-3)	(2,145)		(4,592)	(0/0,1)	(1,210)	(3,500)	(10.372)	(0)	6)	(68.934)	(68,934)	(79.306)
	Total (1996-2025)	3,733		6,180	2.010	1,810	6.500	16,500	2,150	700	72,784	75,634	92,134

Data Source: 1996 PDP by NPC Note: Short-term: 1996 • 1999, Medium term: 2000 - 2005, Long-term: 2006 - 2025

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Table 3-19 PRODUCTION RECORDS OF MWSS IN 1995

Province	N	funicipality	Production	Number	Capacity
			(MCM/year)	(Nos.)	(MCM/year)
Metro Manila	Ī	Valenzuela	0.0		0.02
	2	Navotas	0.1	1	0.07
	3	Malabon	0.2	1	0.16
	4	Quezon (C)	3.0	12	0.25
	5	Caloocan (C)	-	-	-
	6	Marikina		-	
	7	Manila (C)	-		-
	8	San Juan	-	-	-
	9	Mandaluyon	-	•	-
	10	Pasig	0.0	1	0.03
	11	Makati	3.0	13	0.2.
	12	Pasay (C)	0.7	3	0.2
	13	Pateros	-		
	14	Taguig	0.1	1	0.1
	15	Paranaque	0.5	3	0.1
	16	Las Pinas	0.3	1	0.2
	17	Muntinlupa	1.0	6	0.1
	Sub	total	8.9	43	0.2
Rizal	1	Montalban	1.2	4	0.3
	2	San Mateo	1.5	5	0.3
	3	Antipolo	4.7	17	0.2
	4	Cainta	0.7	3	0.2
	5	Taytay	2.1	7	0.3
	Sub	ototal	10.3	36	0.2
Cavite	1	Bacoor	1.1	6	0.1
	2	lmus	0.6	2	0.3
	3	Kawit	1.1	4	0.2
	4	Cavite (C)	2.1	11	0.2
	5	Noveleta	1.8	5	0.3
	6	Rosario	0.8	2	0.4
	_Sut	ototal	7.7	30	0.2
	Tot	al	26.9	109	0.2

Data Source: Operational Report of 1st, 2nd, 3rd and 4th Quarter, 1995 (MWSS)

Table 3-20 PRODUCTION AND FACILITIES OF WATER DISTRICS (LWUA)

(Unit: MCM'year)

Water Resources	P	acilitic	:s		Water Supp	ly Index	
Region (WRR)	DW	SP	SW	Production	Popul. Served	Pop.'95	Coverage
WRR I	106	32	4	26.18	440,160	1,227,180	35.9%
WRR II	48	3	-	7.24	128,920	956,460	13.5%
WRR III	337	8	3	136.89	1,865,560	6,258,060	29.8%
WRR IV	383	69	11	106.26	1,153,980	4,664,170	24.7%
WRR V	62	63	7	35.33	489,310	2,351,140	20.8%
WRR VI	87	29	7	48.24	695,740	3,617,330	19.2%
WRR VII	128	17	1	74.06	516,330	2,097,800	24.6%
WRR VIII	18	11	5	17.44	328,750	1,429,280	23.0%
WRR IX	28	8	2	39.32	488,270	1,372,940	35.6%
WRR X	48	23	3	47.69	716,550	1,944,090	36.9%
WRR XI	- 51	8	3	58.73	1,028,500	2,139,650	48.1%
WRR XII	31	6	-	15.58	251,540	1,906,570	13.2%
Total	1,327	277	46	612.95	8,103,610	29,964,670	27.0%

Data Sources:

List of Water Districts, as of January 1997 and Annual Reports of Water Districts as of 1995 & 1996 (LWUA)

Table 3-21 ESTIMATION OF PRODUCTION FOR L-H WATER SUPPLY SYSTEMS

1

(Unit: MCM/year) Water Resources Category **Population** Service Population Level-II (Urban/Rural) Region (WRR) in 1995 Coverage Served Production WRR I Total 2,362,180 5.2% 122,931 2.7 Urban 470,258 1.6% 7,524 Rural 1,891,922 6.1% 115,407 WRR II Total 3,054,225 5.2% 3.5 159.788 Urban 589,329 1.6% 9,429 Rural 2,464,896 6.1%150,359 WRR III Total 9,111,124 7.0 3.5% 321,529 Urban 5,205,546 1.6% 83,289 Rural 3,905,578 6.1% 238,240 WRR IV Total 19,395,047 2.6% 513,829 11.3 Urban 14,872,647 1.6% 237,962 Rural 4,522,400 6.1% 275,866 WRR V Total 4,325,368 4.5% 195,188 4.3 Urban 1,525,763 1.6% 24,412 2,799,605 Rural 6.1% 170,776 WRR VI Total 5.4 5,777,016 4.2% 245,158 Urban 2,383,120 1.6% 38,130 3,393,896 Rural 6.1% 207,028 WRR VII Total 5,014,652 4.5 4.1% 203,507 Urban 2,275,267 36,404 1.6%Rural 2,739,385 6.1%167,102 WRR VIII Total 3.8 3,366,953 5.1% 172.602 Urban 728,494 1.6% 11,656 Rural 2,638,459 160,946 6.1% WRR IX 3.7 Total 3,581,617 4.8% 170,136 Urban 1,074,282 1.6% 17,189 Rural 2,507,335 6.1% 152,947 WRR X Total 3,954,742 4.3% 170,737 3.7 Urban 1,566,713 1.6% 25,067 Roral 2,388,029 6.1% 145,670 WRR XI Total 3,760,145 3.7% 139,135 3.0 Urban 2,005,198 1.6% 32,083 Rural 1,754,947 6.1% 107,052 WRR XII Total 4,909,195 4.5 4.2% 205,770 Urban 2,082,018 33,312 1.6% Rural 2,827,177 6.1% 172,458 Total Total 68,612,264 3.8% 2,620,310 57.4 Urban 34,778,635 1.6% 556,458 Rural 33,833,629 6.1% 2,063,851

Notes: 1. The population in 1995 is quoted from the 1995 census provided from the NEDA.

^{2.} The service coverage for each category of urban and rural population are quoted from the average estimated in the Provincial Water Supply and Sanitation Sector Plan, as of 1995 (DH.G).

^{3.} The unit consumption for Level-II domestic water is limited to 60 Lpcd. in the National Sector Plan.

Table 3-22 ACTUAL WELL CONSTRUCTION FOR LEVEL-I (DPWII)

poa	Pievesce					Nos. of Wells Compl	letion		Talka din		Total	Operational Wells	Production	Ropulario Served
ir i		used 1957 0	1558	1989	364	1991	1992 542	1993	1994 165	1995	Wells 2.259	(Nos.) 2,259	(MCM year) 165	(Persons 2253
	Benguer	0	91	182	56.1	233	512	19	165	662	2.259	2,259	1.65	225.
	Horos None	6,728	90	372	376	677	6	0	0	0	8.44)	6.767	2 10	288.
	Hocos Sur	45,378	76	100	215	527	10	0	0	0	46,313	34,971	6.41	877.
	Tallnich	1 261	. 56 405	1.153	1,450	1,975	123			27	2.098	1,783	0.77	105.
RH	Tetal Batanes	53.367	407	2	54	1.975	1.724	39.		1.351	61,381	43,039 156	12.58	1,723.
	Cagayan	7,054	117	499	258	171	0	0	87	150	8.336	6.573	1.83	250.
	Mugao	0	91	192	364	233	542	19	165	662	2.259	2.259	1.65	225.
	Ivations	8,946	73	328	675	410	0	0	(09	148	(0.689	8,453	2.40	328
	Kalinga Apayao	0	91	152	364	233	542	19	165	663	2 259	2,259	F.65	225,
	Mountain Province	Ō	91	182	.364	233	540	19	165	662	2.259	2 259	1.65	225,
	Nucva Vazcaya	2.510	59	151	255	62	Q	0	0	0	3,637	2.410	0.70	96.
	Quirino	915 9539			253 2.587		1,631	0		32	1,349	1,120	0.43	59.
R 101	Total Bathier	13.696	54		160	1.422	1,0,1	6)	123	2,321	30.383 14.465	23,499 10,98)	10.18	307
K 311	Bulacan	43,420	35		192	408	650	0	314	173	46,348	35.213	2 24 6.99	957
	Nucsa Ecija	41,464	153		431	365	507	ō	301	398	41,347	33,981	7.33	1.004
	Pampanga	47,101	129	101	451	241	639	0	389	418	50,126	38,351	8.15	1,116
	Pangasinan	76.019	121	214	548	531	11	0	228	83	77,755	58,750	10.85	1.485
	Tailac	26.135	(19		346	38	149	0	168	2.10	27,551	21,017	4,33	593
	Zambales	17.738			137	21	62	0	0	0	15,104	13.670	2.50	342
÷	Total	206.573	672		2 29 1	1.769	2.155	0	1,514	1,455	278.606	211,963	42.40	5,807
RIV	Asirona Butangus	9;9 9,198	29		170 615	97 155	92 309	0	23 388	93 239	1,488 11,422	1.258 9,123	0.53 2.79	72 381
	Cavite	6.730	62		378	338	325	0	48	28	8,067	6,385	1.82	249
	Lagana	8.145	45		743	537	595	0	175	149	10,572	8,536	2.80	393
	Marinduque	12.692	132		279	105	13	ŏ	48	61	13,466	10,293	2.17	296
	Metro Marola (NCR)	0	13	26	52	3.3	77	3	24	95	323	323	0.24	37
	Occidental Mindoro	17.165	63		417	23	6	0	0	0	17.866	13.575	2.68	366
	Oriental Mindoro	34.507	80		295	76	0	0	0	0	33,417	26,715	4.83	663
	Palawan	30.481	210		381	20	0	0	139	145	31,794	24,164	4.79	656
	Quezen Rizal	9,029 4,823	120		1.053 572	1.111 86	568 75	321	343 0	295 0	13.628 5.663	11,37i 4,457	4.50 1.22	615 151
	Rizai Rombion	4.823 13,671	139		265	415	93	321	116	70	15,239	4,457 11,821	2.87	. 393
	Total	117.660	1.035		3.249		2,147	645	1,304	1.175	164.933	128,020	31.23	4.277
RV	Albay	2,215	99	568	523	4)2	411	0	194	120	4.533	4,023	2.00	27:
	Camarines None	.508	43	207	247	173	79	Ü	141	106	1,504	1,377	0.79	108
	Camazines Sur	738	177		832		140	0	451	671	4,516	4,332	2.85	390
	Catandounes	1.300			639		31	230	127	60	2.956	2,631	1.37	188
	Mashare	750 768			383 659		269 133	.309 0	247 209	45	3.183	2,993	1.87	255
	Sorsogon Total	6,219	-11- 599		7,275		1.036		1,369	365 1387	2,914	<u>2.737</u> 18.002	1.70	230 1,450
RVI		1,124			225		164		45	15	2.371	2.000		
	Artique	1,205			266		107	27	19	28	2,119	1,519	0.82	113
	Capiz	1,739	R	251	396	(-61	125	139	34	19	3,445	3.010		200
	Guimaras	0			152		45		6!	0	621	621	0.45	6
	Pollo	4.929			455		121	44	16	352	7,329	6.097	2,37	32:
	Negros Occidental Fotal	6,793			843 2.351		956		1,073		14,166	12,467	624	85
D 2 4 (1)	Bohol	10,169			28.5		178		1,2,70		30,051	25.103 9,431	12.40 2.60	1.691
	Cebu	13,250			481		524		273		16,123	17.811	3.77	530 510
	Negros Onental	21,052			595		105		98		23,176	17.913		57
	Significan	1.320		5 49	69		27		23		1,560	1,230		
	Total	45,790			1,4%		829		542		52.832	41.385		1.49
RR VII	I Biliran	6.5	1	5 49	300	26	61	30	2.3	10	585	570	0.39	5
	Eastern Samar	555			177		24		13		1.213	1,067		7
	Leyle Nagham Samir	2,371			46:		51		29		4,641	4,048		26
	Northern Samur Southern Leyte	412 682			230 200		94 28		23 5		1.062 1.480	959		3
	Western Samar	423			450		337		36 36		1,694	1,310 1,588		9
	Total	4.539					375				10.576	9,542		60
KR IX	Basilan	6.			190	130	37	27			910	894		8
	Sula	0		0 0			0				0	C		
	Taxi-Tawi	(0 0		0 0	. 0				0	C		
	Zambourga del Nore						305				2,351	2.308		22
	Zambounga del Sur Total	1,540					1,094				5,295 8,556	4,969 8,170		42
RŘ X	Agusan del Norte	1,42									2.012	1,655		72 8
	Agusan del Sor	1,06.		0 82							1,850	1,584		. 9
	Bukidnes	4,753									5,492	4.303		
	Camiguin	24	4 3	3 52	5	1 35	20					379		,
	Misamis Occidental	53		2 113							1,221	1,088	0.57	7
	Misamis Oriental	7.68										2,689		Į.
	Surigno del None	1,423		11 86								1,600		<u>`</u> 7
RR XI	Total	12.63										13,305		62
r.s. Al	Davao del Norte Davao del Sur	5 <u>.3</u> 7 8.7#										5,649		
	Davao Oriental	2.55		17 103								7,971 2,51-		29 10
	Surigao del Sur	2.53										3,04		13
	Total	19.55										19,18		
RR XI	Lanao del Norte	19		and the second of the second								1,36		
	1 anao del Sur	4	0 9	182	: 36		541	2 19				2,259		
	Maguindunao			192								2.25		2
	North Cotabata	58										1,87		1
	Sarangani		-	0 0		D 0		0 0		_	_)	
	South Cotabato	5,82 6,47		16 145 29 171										
	Suban Kudarat Total	13.05								9 5 30 1,477		<u></u> 5,50 18,64		
												10.0%		1.14

Data Source: Well Construction Report, as of January 1997 (DEWH DILG)

Table 3-23 IRRIGATION SYSTEMS AND WATER RIGHTS (NIA & NWRB)

unit Amount; MCM/year

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	Potential	Į,	rrigation System			Typeso	Types of Source				Registered Water Rights	ater Rights		
WRR	Arable-area		Total	Coverage		SW	O	σw	S	MS	MO	\ \	dS	
	(ha.)	Facilities	Area (ha.)	₽°	Facilities	Area (ha.)	Facilities	Area (ha.)	Facilities	Amount	Pacilities	Amount	Facilities	Amount
-	121,760	2,301	94,206	77%	2,218	93,896	83	910	0%6	3,310	30	ы	135	58
=	547,210	2,0%2	235,246	43%	1,987	234,899	95	347	3862	12,396	452	187	7.	9:
≅	662,730	1,374	359,262	54%	1,122	358,680	252	582	1.207	6,503	160	š	4	7.7
2	263,590	146	122,040	46°	216	(21,945	54	50	602	2,693	G r	-	\$1	12
>	239,660	1.257	112,584	47%	1,197	112,394	8	8	724	4.636	\$3	t y	18	3.
; ,	197,250	513	79,362	40%	\$\$	79,044	107	<u>8</u> 1.	900	1.588	50	¢.	201	65
:i>	50,740	437	22,541	કુ. <u>1</u>	421	22,504	16	3.7	roe:	2,062	07	7	ä	×
VIII	84,380	467	50,824	%09	097	50.810	7	1	<u> </u>	1,038	•	ı	۳.	¢r.
×	76,500	263	34,551	45%	224	34,400	39	151	336	4,091	*1	_	77	ខ្ព
×	230,150	615	67,739	29%	540	67.473	75	286	\$\$	3,460	07	ý	F.1	36
Ñ	189,900	218	63,019	33%	20%	62,982	03	37	365	5.41.3	×3	23	16	74
XII	462,470	165	120,312	26%	405	: 19,798	186	514	7.573	55,314	956	355	T94	346
Nation	3,126,340	11,089	1,361,703	4.2%	10.105	1,358.825	984	2.878	13,892	102.506	608.1	869	868	677
No.	1 Raymer on the	30 clans acto	Social all My and Section of the Sec	NIA Inventory										

Notes

Based on the 3% slope criteria, estimated by NIA Inventory
 Based on Inventory of completed and Operational Projects of BNWM, DPWH and NIA (1996 Report)
 Based on Database of Water Rights Registration, as of 31 March 1997 (NWRB)

Table 3-24 PRODUCTION FOR IRRIGATION (NWRB)

	-				Types of Sources	SS)I.	Total
WRR		MS			MΩ			SP			
	Facilities	Capacity	Amount	Facilities	Capacity	Amount	Facilities	Capacity	Amount	Facilities	Amount
	No.	(MCM/year,f)	(MCMyear)	No.	(MCM/year.f) (MCM/year)	(MCM/year)	No.	(MCM/year.f)	(MCM/vear)	Š.	(MCM/year)
-	2.218		7,490.5	83	80.0	6,4	135	0,44	57.6	2,4,6	7,554.5
==	1,987		12,869.5	56	81.0	17,4	56	0.2	8,11	2,138	12.898.7
Ξ	1,122	14,38	16,135.4	252	0,41	104.5	7.	0.92	15.6	1.391	6,255.5
≥.	917		4,940,8	\$4	0.36	. 5.61	₹	0.65	26.6	1,012	4,987.0
>	1,197		5,354.6	3	0.23	13.6	36	0.75	12.0	1,273	5,380.2
>	\$ 9		2.599.9	107	0.85	4,16	<u>æ</u>	1,07	161	531	2.710.5
lιν	421		1,688.7	91	0.29	4.7	501	0.56	1.63	242	1,752.7
VIII	097		2,407.4	7	0.25	1.7	12	0.37	7.7	488	2,416.8
X	757		1,874,3	39	0.38	14.8	er,	1.71	5.1	300	1,894.2
×	\$. 04.		6,575,6	27	0.2%	20.8	7,	0.94	19.8	636	6,616.2
×	208	10.52	2,187.7	10	0.55	5.5	13	2.74	35.6	231	2,228.8
ПX	405		6,006.7	186	0.27	80.9	91	1,64	74.2	6 9	6.131.9
1,1	10,105	6.94	70,131.3	5X4	0.16	351,1	797	57.0	344.6	11.551	70.827.0

Pable 3-25 DAMAGES CAUSED BY MAJOR NATURAL DISASTERS BETWEEN 1980 and 1995 (177)

ear Type of	Date of	Areas Affected	Population	Affected		Casualties		Houses	Damaged	Value of Damages
Disaster	Occurrence		Families	Persons		Injured M	issing	Totally	Partially	(billion pesos)
)80 Flooding	Jan. 04 1	Davão del Norte	5,196	•	2				,	0.0150
TS Biring		Region 8	565	2,825		4		520	6	0.0030 0.0020
T Ditang	•	Regions 1&3	2,535	1,554				528	3,168	0.0020
T. Gloring	•	Region 3								0.0010
f Lusing		Regions 1,2, & 4	50.331	264116						0.1020
T Nitang/		Regions Ito 5	58,731	264,116						0.1020
T Osang	Jul. 22-27	Davisas 245 6								0.0020
TS Yoning		Regions 2 to 6 Regions 1 to 6 & 8	24,564	138,453	13			5,431	2,954	1,3560
T Aring TD Basian		Allan	24,504	120,427	•••			.,	-•	0.0010
Flooding		Regions 10 & 11	121,332	73,679	336	14,298				0.3460
981 Lanslide	May 29	Hoita city			5	2				
TS Dating	•	Regions 4 & 5	1,286	58,651	21	36	19	3,356	1,551	0.0620
TS Elang		Regions 2 to 4	1,2.0	,	8		27			0.0080
T Rubing		Regions 1 to 2	8,526	47,575	5			1,195	7,125	0.1060
Landslide	~	Benguet		•						0.0030
Tornado		Davao del Norte	38							0.0040
T Unsing	Oct. 12-14	Cebu			1					0.0040
T Yeyeng	Nov. 17-21	Regions 4 & 5	5,663	3,633	4	6		67	9	0,0010
T Anding	Nov. 22-27	Regions 1 to 4	111,411	655,269	68	42		4,911	98,324	0.5050
T Dinang	Dec. 23-27	Regions 4, 5, 8	112,639	674,619	188	£,838		4,237	52,161	0.5870
1982 Flooding	Jan. 25-30	Regions 9, 10, 12	81,328	436,687	27	ŧ		45		0.0990
T Akang	Mar. 12-15	Regions 10 & 11	23,911	11,292	25	8	48	188		0.0480
T Bising	Mar. 23-28	Regions 7, 8, 10	1,324	657,274	112			58,244	18,233	0.5880
Flooding	Jun. Ol	Maguindanao & Sultan Kedarat			2					0.0010
Tomado	Jun. 02	Tailac				29				0.0010
Tsunami	Jun. 23	Davao del Norte, Sur, & Oriental	818							0.0010
T Emang	Jul. 12-16	Regions I & 3	11,883	6,597	1	5	2	431	573	0.0910
•	g Aug. 20-27/ Sep. 02-04	Regions 1, 3, 4, & 6	31,522	185,827	29	4	23	5,365	14,895	0.0830
T Ruping	Sep. 05-11	Regions 3 to 7	44,383	2,484	65	26	29	5,599		0.1990
T Weling	Oct. 12-15	Regions 1, 2	1,532	31,431	96	183		12,464		0.6320
T Aning	Dec. 02-08	Eastern Luzon, Batanes Group & Eastern & Central Visayas	41	246				40	1 4	0.0010
T Bidang	Dec. 08-11	Regions 1, 3, & 5				•				0.0145
1983 Drought	Jan, to Mar.	Regions 1 to 12	422,765							0.7630
Tsunami	Jun. 02	Tarlac								0.0010
Tsunami	Jun. 16	Davao del Sur				2 5				0.0010
T Auring		Region 4	62	193				3		0.0026
T Beben		Regions 3 to 5 & 8	12,811	628,985	11:			2,95	4 76,346	0.4670
	ke Aug. 18	Bocos Norte			i					0.0010
T Hermi	-	Regions 1& 2	1,489	8,935		3	15	19	5 69	0.009
Tsunami	Sep. 16	Bohol	1			2				
Hooding	•	Lango del Sur	1,835		1	1				0.001
Flooding		Bohol Bohol								0.003 0.001
Flooding	Nov. 30	DONO								
1984 TS Mari	ng Aug. 27-30	Regions I to 4, 6 to 8, 10 & 11	92,271				26	67	1	0.041
T Nitang		p. Regions 4, 6, 7, 8, 10 & 1				9 443			9 142,653	3.914
		p. Regions 1, 3, 4, & 4-A	1,954			3	18		4 891	0.004
TS UnJ	ing Nov. 03-06	Regions 4-A to 8	373,491	1,936,732	89	5 272	2,526	2,11	4 16,356	0.002

Table 3-25 DAMAGES CAUSED BY MAJOR NATURAL DISASTERS BETWEEN 1980 and 1995 (277)

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Year	Type of	Date of	Areas Affected	Populati	on Affected		Casualtic	es	Houses	Damaged	Value of Damages
	Disaster	Occurrence		Families	Persons	Dead	Injured :	Missing	Totally	Partially	(billion pesos)
	T Kuring	Jun. 20-24	Regions 1 to 3	13,581	77,542	53	6	69	1,789	7,985	0.2280
	T Dating	Jun. 25-29	Regions 3, 4, & 4-A	94,661	511,067	65	-1	-	253	1,854	0.3520
	T Miling	Sep. 01-04	Regions 1 & 4	85	70	5		7	26	49	0.0130
	T Saling	Oct. 15-20	Regions 1 to 5	209,842	1,054,063	88	7		63,136	201,263	2.1320
	Flooding Flooding &	Jan. 08	Surigao del Norte			1					0.0080
	Landslide	Jun. 28	Davao Oriental	612		3	3				0.0010
	T Gading	July, 6-10	Regions I to 4 & NCR	142,052	730,357	106	16		2,689	13,896	0.6790
	T Miding	Aug. 17- Sep. 04	Regions 1, 3, 4, 6 & NCR	96,540	538,386	17	4		473	699	0.2630
	TD Oyang	Oct. 06-07	Regions 3, 4, 4-A & NCR	22,538	125,669	26	27	21			0.0540
	T Pasing	Oct. 10-14	Regions 4-A & 8	3,082	18,492	4	21	21	52	414	0.0340
	TS Ruping	Oct. 17-20	Regions 5 & 8	259	1,248	2			.12 49	136	
	T Aning	Dec. 20-23	Regions 6, 7 & 11	22,771	110,113	13	108	10	3,843	21,212	0.7340 0.0820
1987	Drought	Jan. to Apr.	Regions 1 to 12								0.7030
	*-	Aug. 08-13	Regions 4, 5 & 8	228,286	1,253,398	85	414		(1.250		0.7070
	Tising	Aug. 13-19	Regions 2 & 3	13,247	55,563		414		61,758	114,922	2.0650
	Storm Surgi		Aparri, Cagayan	27	33,363	5			89	954	0.1150
	T Neneng	Sep. 04-10	Regions 1 & 2	32	127						0.0450
	T Pepang	Oct. 21-25	Regions 1 & 2	60,504	177		2.3				0.0920
	T Sisang	Nov. 23-27	Regions 4, 5 & 8		310,214	100	79	(3	18,396	31,557	0.5190
	T Trining	Dec. 14-18	Regions 4, 5 & 8	318,968 47,591	2,019,385 243,797	100 22	79 35	20	153,339 8,754	175,449 22,488	1.1190 0.1730
1000	Landslide	Apr. 04	Day of the st					-1.	0,75	12,100	0.1750
1700		•	Davao Oriental	12010	45.000	24	_				
	T Biring	May 30- Jun. 03	Regions 3, 4 & NCR	13,010	65,000	8	2	1	93	169	0.0270
	Tomado	Jun. 13	Masantol, Pampanga				2				0.0030
	Earthquake		Mindoro Occidental								0.8350
		Jul. 16-19	Regions I & 2	19,224	102,169	6			3,560	15,116	0.2400
	T Unsang	Oct. 21-26	Regions 1 to 11	537,152	2,742,666	157	316		38,932	146,781	5.6360
	TS Welprin	s Nov. 01-05	Regions 4, 6, 8, 9, 10	28,826	144,136	41	ŀ	1	86	516	0.0240
	T Youing	Nov. 05-08	Regions 4 to 9	575,782	3,027,601	217	149	133	91,673	192,877	2.7480
	Earthquqak	c Nov. 17	Northern Samar								0.0070
	Earthquqak	e Nov. 17	Sorsogon								0.0100
	Earthquqak	e Nov. 17	Western Samar								0.0080
	Earthquqak	e Nov. 17	Masbate								0.0030
1989	Flooding	Jan. 15-20	Regions 5 & 8	81,152	459,730	101	79		1,826	22,355	0.3920
	Landstide	Jan. 16	Dayao del Norte			5	14			•	0.0010
	TS Biring	May 15-19	Regions 2 to 5 & NCR	12,282	73,184	13	3	40	652	4,392	0.0740
•	Flooding	Jun. 08	South Cotabato								0.0010
	T Goring	Jul. 14-17	Regions 1 to 4, 6, 9 & 10	95,269	488,757	90	386		8,845	46,269	1.3630
	T Openg	Sep. 07-12	Regions 1, 2 & NCR, & CAR	97,911	503,756	44	21	3	1,157	24,638	0.5800
	T Rubing	Oct. 02-07	Regions 1, 2 & CAR	39.095	219,178	119	192	28	14,064	19,245	0.1910
	T Saling	Oct. 09-10	Regions 1, 3, 4, 5,	135,245	682,699	58		e O	12,273	37.699	1.3940
	T Tasing	Oct. 14-20	8 & NCR Regions 1 to 3, NCR & CAR	109,961	551,043	47	363		19.270	48,940	0.8830
	Landstide	Oct. 16	Muntinjupa	67		14	10				
	TS Unsing		Regions 2, 3, 4, 8 & NC	12,837	62,205	• •	4.17				

Table 3-25 DAMAGES CAUSED BY MAJOR NATURAL DISASTERS BETWEEN 1980 and 1995 (3/7)

ear	Type of	Date of	Areas Affected	Populatio	on Affected		Casualt		Houses	Damaged	Value of Damages (billion
	Disaster	Occurrence		Families	Persons	Dead	Injured	Missing	Totally	Pactially	pesos)
990	Drought	Jan. to Apr.	Regions 1 to 12	220,269	1,189,309						3.3860
	Earthquake -	Feb. 0 8	Region 7 (Bohol)	10,931	54,059	10	273		199	2,949	0.1220
	Elashflood	Jun. 12	Regions 9	1,534	8,108	36			168	163	9,4000
	T Bising	Jan. 18-23	(Zambounga del Sur) Regions 1 to 4, 8,	42,193	227,269	64	17	8	306	2,684	0.2000
	T. P. business	Ins. 14.39	10, NCR & CAR	16,440	82,355	8			-40		0.0600
	T Klaring Earthquake	Jun. 24-28 Jul. 16	Regions I to 3 & 9 Regions I to 4, CAR & NCR	227,918	1,255,248	1,283	2,786		25,207	77,249	12.2000
	T Gading	Aug. 15-20	Regions 1, 3, 5 & NCR	6,697	32,974	2			3	591	0.0250
	-	Aug. 24-27	Regions 1 to 4 & CAR	52,171	213,431	36	42	3	456	513	0.0450
	'i Hiang	Aug. 28-30	Regions 1 to 4 CAR & NCR	130,219	568,675	50	53		684	1,961	1.5200
	T Loleng	Sep. 05-08	Regions 1 & 2	5,591	27,959						
	T Midng	Sep. 12-15	Regions I (Ilocos Sur. Norte, & Abra)	2,337	11,521	2	2	5	20	105	
	T Ruping	Nov. 10-14	Regions 4 to 12	1,010,004	5,493,290	508	1,278		22,026	630,885	10.8460
991	Drought	Jan. to Apr.	Regions 6, 9, 10, 11 & 12								1.6310
	TS Auring		Region 4 (Quezop)	123	\$58	14	6		143	6.3	
	Mc Finatube	Jun. 12-15	Region 3 (6 provinces)		1,380,132	850	184		40,867	67,862	10.4240
	T Diding	Jun. 13-15	Region 5 (Catanduanes)	2,037	10,185				2,013	24	
	Labar I	Jun. to Sep.	Region 3 (6 provinces)	33,479	161,545	16	9		2,378	444	0.494
	T Elang	Jul. 08-11	Region 4 (Bataan)				2				
	T Trining	Oct. 23-30	Regions 1, 2 & CAR	105,317	534,307	82			8,070		3.469
	TS Uring	Nov. 02-05	Regions 6 & 8	43,397	223,985	5,101	292		5,232	25,272	1.044
	(Ormoc city T Yayang) Nov. 14-18	Region 4			2					0.070
1992	2 Drought Earthquake	Jan. to Apr. Mar. 09	Regions 6, 9, 10, 11 & 12 Baguio City, Mt. Province, Kalinga	209,255	1,027,103	1	1				4.094 0.182
		_	Apayao, Abra								
	Red Tide		Regions 3, 4 & NCR		58,500	10			_		
	T Konsing		Regions 2 & 3	4,027	5,135	.3			5		0.02
	Flashflood		Region 3	144,476	707,870	22			1,569		0.68
	Mr. Pinatub Lahar II		Region 3	19,932	69,102	6			1,712		0.55
	T Ditang	Jul. 12-21	Regions 3 & NCR	27,902	134,417	36			478		0.47
	T Gloring	Aug. 16-19	~	148,049	725,956	22			1,428		1.34
	Tilsang Tilosing	Aug. 26-31 Aug. 31-	Regions 1, 2, & CAR Regions 1, 2, & CAR	23,671 31,787	114,084 171,603	19 10			214 393		0.17. 0.90
	•	Sep. 05 Sep. 18-23	Regions 1, 2, & CAR	113,686	•	27			785		2.15
	T Paring	Oct. 18-27	Regions 1, 2, 3 & CAR	618,6		1		·	13		0.00
	•	Dec. 28-30	Regions 11	11,430		17		•	27		0.13
199	3 Drought	Jan. to Mar.									0.01
	Mt. Mayon	Feb. 02	Region 5 (8 Mun. of	21,600	106,917	80	•)			0.07
	Volcano		Albay & Legaspi City)								
	Flooding	Feb. 05, Ma	, Mindanao, Regions er. 10 & 11 (6 prov. &	66,010	340,988	27	1		158	336	1.07
		01 & Apr. 1									
	Hood	Feb. 02-04	Southern Leyte	110		2		1		‡ 4	0.02
	Unusat Cold Spell	February (Last week)	Aparri, Cagayan	5,198	25,990	25	5 2	1			
	Fish Kill	Jan. to Feb.		2,500	15,000						
	Red Tide	Jan. to Jun.		24,598							
			Bulacan, & Pampanga);	- ,,-,-							
			Region 4 (Cavite);								
			Metro Manita (Navotas,								
			Paranaque, & Malabon)								

Table 3-25 DAMAGES CAUSED BY MAJOR NATURAL DISASTERS BETWEEN 1980 and 1995 (4/7)

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Year	Type of	Date of	Areas Affected	Populatio	on Affected		Casuahi	rs.	Houses	Dimaged	Value of Damages
	Disaster	Occurrence		Families	Persons	Dead	Injured	Missing	Totally	Partially	(billion pesos)
	T Goring	Jun. 23-27	Region 1 (4 provs. & 3 cities)	153,949	812,830	75	121	13	35,069	79,695	2,775
			CAR (5 prov. & 1 city) Region 2 (4 prov.) Region 3 (3 prov.) Region 4 (2 prov. % 1 city)								
			Region 4 (3 prov. & 1 city) NCR (2 muns. & 2 cities)								
	TS Huling	Jul. 07-09	Active LPS East of	180	548	2					0.003
	T Openg	Aug. 06-08	Surigao 1,300 km ENE of	83,026	455,170	21	7	5	1,838	12,841	1.585
	TS Rubing	Aug. 16-19	Catandoanes Region 3 (4 provs. &	57,427	269,396	5	ŀ		143	698	0.098
			1 city) NCR (Pasay City & Taguig) Region 1 (3provs, & 1 city)								
	TS Huling	Aug. 22-26	Region 6 (Capiz & Boilo)	3,830	22,308	4	1		243	361	0.157
	TS Walding		Region 2 (Batanes)	2,368	14,208	2		9			0.051
	T\$ Yeyeng	Sep. 13-16	Region 3 (Olongapo city) Region 1 (Hocos Norte & Pangasinan)	7,035	37,610						
	Flashfloods	Sep. 15	Davao Oriental (Mati)	45	215						0.001
		Sep. 17	Davao del Norte & Maguindanao	2,285	11,571	1					0.006
	Locust Infestation	Last part of August and early part of	Region 3 (Zambales & Subic Bay) Region 11 (Davao del Sur)								0.008
		September									
	T Kadiang	Sep. 30- Oct. 07	LPA east of Aurora	415,813	2,060,677	126	37	26	2,249	9,078	8.752
	T Husing	Oct. 28- Nov. 02	East of Virac, Catanduanes	83,026	455,170	21	7	5	1,838	12,841	1.585
	TS Luring		LPA over Catanduanes	7,065	45,327	8	i	4			0.028
	T Monong T Naning	Dec. 03-04 Dec. 11-12	840 kms east of Samar 700 kms ESE Casiguran,	259,738 98,799	1,334,251 463,925	272 93	607 579	90 10	60,299 30,013	158,801 54,918	2.340 1.329
	· ·		Aurora		40.4,923	9.7	317	10			
	T Puring	Dec. 24-29	1,100 kms east of Mindanao	340,081	1,877,921	157	276	52	34,154	127,204	2,732
1994	A T Akang		Region 4, 5	9,909	49,159	45	26	17	522	3,039	0.079
	Flooding	Jan. 16 Jan. 18-29	Davao Oriental Davao del Norte	3,017 4,008	16,430 17,61 0	7			31 9	47 28	0.004 0.035
		JAN. 10-23	Davao Orental Davao Del Sur	4,003	17,010	,			,	29	0.053
	Epidemic	Jan. 24	Davao Oriental	9	50						
	Outbreak	Feb. 3	Davao del Norte	3,978	19,184						0.002
	Landslide	Feb. 5	Region 11, Davao del N	10	60	4	3	ı			
		Feb. 18 Mar. 18-29	Region 11, Davao del Su Region 11, Davao del N Davao Oriental	3,966	66 19,320	12			3	8	0.007
	BTS Bising Tornado	Apr. 1-9 Apr. 13	Region 6, 7, 8 & 10 Reg 11, Zamboanga del	118,061 68	587,671 320	19	72 2	10	11,824 20	56,048 40	0.407
	Earthquake		Pagadian City	128	729	4	_		31		0.001
	Flooding	May 18-24	Davao del Norte, Davao del Sur, Davao Oriental,	10,751	49,494	4	3	1	52		0.047
			Davao City								

Table 3-25 DAMAGES CAUSED BY MAJOR NATURAL DISASTERS BETWEEN 1980 and 1995 (5/7)

r	Type of	Date of	Areas Affected	Populatio	n Affected		Casi	ualties		Houses	Dimaged	Value of Damages
•		Occurrence	,	Families	Persons	Dead	Inju	red Mi	ssing	Totally	Partially	(billion pesos)
	CTD Deling	Mar 21.26	Region 7	1,822	8,788	1				10	31	0.1453
		May 26-27	Region 12, Maguindana Lanao del Sur	20,828	98,094	·						0.1131
	Tomado	Jun. 4	Cotabato province Region 11 South Cotabato	9	47					2	9	0.0000
	DTD Gadinj	Inc. 21-24	Region 3, NCR	11,010	56,112	3						
	•	Jun. 30	Region 10 Cagayan de Oro City	1,040	4,520	5			5	91	147	0.0025
		Jun. 30	Maguindanao, Sulu Cotabato, Sultan Kudarat	1,993	11,958							0.0014
	Flooding	July 3	Region 11 South Cotabato	190	1,140	1						
			Sarangani Island	100	600						119	0.002
			Carmen	450	2,700							
			Kabacan	280	1,002							
			Alcosan	4,506	18.682							
	Red Tide	July 5	Bataan and Zamboanga del Sur	2,288	12,300							
	Earthquake	July 5	Southern Leyte					2				0.002
	Landslide	July 7-9	South Cotabato Davao Oriental	302	1,816							0.44
	ET Hiang & TS Loleng	July 10-11	Region 1, 2, 3	32,700	166,564	11		21	6	2,174	11,589	0.15
	Red Tide	July 8	Bulacan	1,355	6,220							
		July 15	Cavite	459	2,250	4		5				
	Epidemie Outbreak	July 16	Region 11, Davao City	8	(16.060	5		5 9	1	101	204	0.00
		i July 18-19	Region 1, 3	127,647	616,860	1.2	۷	9	,	101	204	0.00
	HTS Oyang	- July 25 g July 25-29 si July 31- Au	Lanao del Norte Region 1, 3, 4, 6, 7 ARM	60,129	336,069	48	8	9	2	505	689	0.13
	and TDPa	July 26	g.5 Lanao del Sur	1,833	11,000						2,500	0.00
	Monsoon Waves	July 26	Davao City	401	1,412		i	ì		144		
	Epidemic Oatbreak	July 27	South Cotabato	27	90	31	0					
		July 29	South Cotabato	130	280					119		0.00
	Tornado	July 29	Region 9 Zamboanga del Sur	12		ŧ	2					
	Drought	Aug. 1st w	ect North Cotabato Region 12	418						_		0.00
	T Ritang	Aug. 4-7	Region 1 and CAR	3,303			4			29		0.0
	Flooding	Aug. 8	Region 11 Davao Oriental	136			I			2	80	0.00
	Locusts	Aug. 2nd v	vec North Cotabato	353	1,765							0.00
	Infestation		Region 12 (Arakan)							٦.		0.0
	Flooding	Aug. 21	Region 12 North Cotabato Region 10, Bukidnon Lantapan	158	948							0.0
		Aug. 30	Region 10 Davao del Norte	535	2,615							
		Aug. 31	Region 10 & 12 North Cotabato (Midsaya	•	1 513		6					
			Carmen, Matalom, Pres.	Rotas 81	7 4,085							0.0
			Magpet & Kabacan)	01	, 4,000							5.0



Table 3-25 DAMAGES CAUSED BY MAJOR NATURAL DISASTERS BETWEEN 1980 and 1995 (6/7)

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'ear		Date of	Areas Affected	Populatio	n Affected		Casualties		Houses	Damaged	Value of Damage:
	Disaster	Occurrence		Families	Persons	Dead	Injured M	lissing	Totally	Partially	(billion pesos)
	JTS Weling Monsoon Waves	Sept. 7-11 Sept. 10	Region 1, 2 Region 11, Davao City	15,605 3	70,597 15	10		ł	28	60	0.183
	Flooding	Sept. 15	Region 12 Lanao del Norte						14		100.0
		Sept. 21	(Kapatagan) Region 9 Zamboanga del Sur	920	4,600				18		0.045
		Sept. 22	Region 12 Sarangani Province (Mansin & Kiamba) Dayao del Sur	24	144						0.003 0.001
		Sept. 22	Bohot	. 100	£ £00						
	Lahar III	Sept.	(Jagna & Valencia) Pampanga	3,190 11,805	5,590 55,951	20	1	2	1,648	37	0.003 0.010
	Epidemic	Oct. 12	(Bacofor and Porac) Davao Oriental	44	200	4					
	Outbreak	Oct. 15	Davao City	6	30	2					
	KT Katring		Region 3, 4 and NCR	59,097	287,737	45	24	6	14,596	44,472	9.001
	Monsoon	Nov. 3	Davao City	1	6	- (~-	Ū	2	79,472	0.00
	Waves	Dec. 7	Davao del Norte	959	4.203	2			_	5	0.00
		Dec. 8	Davao Oriental	65	309						.,,,,,
	KT Garding	Dec. 19-23	Region 4, 5, 6, 7, 8 & 10	177,945	857,837	44	86	5	28,778	107,158	0.64
995	Drought	Jan. 9	Lanao del Sur	13,103	65,515						0.10
	Flooding	Jan. 20	Agusan del Sur	9.928	49,640	5					0.02
	_	Jan. 5-17	Davao del Norte	19,377	84,377	6			31		0.12
			Davao Oriental	980	5,494				3		0.06
	Drought	Feb. 7	Cagayan Isabela	20,616	97,436						0.22 0.18
	~: *:	5. 6.0	Quirino								0.00
	Flooding	Feb. 8-9	Davao del Norte	24,993	99,588	4		l			0.09
			Surigao del Sur	530	2,429	ł					0.00
	Drought	Mar. 3	Davao Oriental Guimaras	4,412 33	23,834 198						0.03
	Flooding	Mar. 16-18	Antique Davao Norte	4 200	10.300						0.02
	racong	Mai. 10-15	Davao Oriental	4,800 20	19,200 120	! 1			3		9.60
	Red Tide	Apr May	Limay, Bataan	1,495	7,475	•			,		0.00
			Abucay, Bataan	4,200	21,000						
			Bulacan	1,355	6,220						
			Cavite	459	2,250						
	Ternado	Apr. 21	Pampanga	124	620						
		May 13	South Cotabato	10	48				5	5	0.00
	Flooding	May 30	South Cotabato	21,019	95,759						0.16
	IY Auring	-	. Regions 3, 4, & 5	427	2,118	6		2	151	337	0.06
	Flooding Ternado	Jan. 7 Jun. 10	Rembion Misamis Oricutal	.,	"	3		2			0.00
	Flooding	Jan. 30	Maguindanao	11	66						0.0
	ricomg	Jul. 4	Iligan City &	121	701				_		0.0
		Jul. 9	Lanao del Norte Davao City	131 350	791 250	1			5	126	
		Jul. 10	Sultan Kodarat	2,279	230 11,395	ı					0.01
	Red Tide	Jul. 13	Cavite City	4,431	19,292		6				0.03
	Flooding	Jul.15	Davao Oriental	231	1,386		J				0.00
		Jul. 16	Toril, Dayao City	2.14	1,,700	4		2			0,00
		Jul. 21-22	Jagna, Bohol			ĺ		-			0.00
		Jul. 22	Maguindanao	12,665	50,660						0.0
		Jul. 24	North Cotabato								0.0
			Sultan Kudarat	2,357	9,404						0.04

Table 3-25 DAMAGES CAUSED BY MAJOR NATURAL DISASTERS BETWEEN 1980 and 1995 (7/7)

ŧ Γ	Type of	Date of	Areas Affected	Populatio	n Affected	g	Casualtic	:s	Houses	Damaged	Value of Damages
	Disaster	Occurrence		Families .	Persons	Dead	Injured ?	Missing	Totally	Partially	(billion pesos)
	TS Karing	Jul. 27-31	Region 1, 2, 3								
			& CAR	12,734	68,186	2		2		251	0.163
	Landslide	Aug. 3	Kalilangan, Bukidnon	50	250	2					
]	Flooding	Aug. 16	Cotabato								0.002
			Sultan Kudarat	105	525						0.004
			Katatinga,								
			Bukidnon	422	1,900						0.009
	T Gening	Aug. 25-31	Regions 1, 2, 3, 4, 5	39,357	195,885	3	3		72	824	0.170
	T Helming	Sept. 2-5	Region 3	24,013	104,416	8			713	458	0.008
		Sept. 2	Gen. Santos City	14	70					14	
		Sept. 4	Palawan	20	100						0.000
				1,840	10,300				2		
		Sept. 10	Cagayan de Oro City	146	509						0.00.
		Sept. 11	Palawan	200	1,000						
		Sept. 13	Cotabato City	1,329	6,382						
	TD Ising	Sept. 14-17	Regions I & 3	6,432	34,590	1					0.17
	T Luding	Sept. 21-22		1,613	5,422	ļ	3		15	293	
	TS Mameng	Sept. 27-Oct.	Regions 1, 3, 4, 5,								
			6, 7, 8, 10, & NCR	241,430	1.240,668	133	308	130	13,234	21,852	3.17
	Flooding	Oct. 25	Kamalansig,								
			Bukidnon	1,121	5,605					63	0.19
	TS Pepang	Oct. 26-30	Regions 4, 6, 7 & 8	234,522	1,254,774	116	49	125	53,907	156,979	0.42
	Flooding	Oct. 27-28	Negros Occidental	9,139	155,475	12	ŧ	4	452	677	
	T Rosing	Oct. 31-Nov.	Regions 1, 2, 3, 4,								
			5, 7, NCR & CAR	960,777	4,683,618	916	2,860	376	225,872	530,908	10.81
	T Sendang	Dec. 2-4		735	4,055	31		3	8		0.00
	Flooding	Dec. 10	Siquijor								0.00
		Dec. 14	Davao del Norte	6,335	32,940	2					0.00
			Davao City			4	Į.	6	14		
		Dec. 17	Aklan	3,695	22,151	1			11	498	0.07
		Dec. 24	Aurora	3,211	13,108	8		3			
		Dec. 24-26	Cagayan	14,342	76,074	- 1					0.29
			Isabela	5,599	25,299			15			0.32
			Nueva Vizcaya								0.00
	T Trining	Dec. 25-30	Regions 7, 8, & 12	39,266	199,794	7	2	4	175	7,222	0.28

Table 3-26 CLASSIFICATION OF WATERS

Classification	Beneficial Use
Class AA	Public Water Supply Class I. Waters having watersheds
Citt so this	which are uninhavited and otherwise protected and which
	require only approved disinfection in order to meet the
	National Standards for Drinking Water (NSDW) of the
	Philippines.
Class A	Public Water Supply Class II. Sources of water supply
	that will require complete treatment (coagulation, sedimentation,
	filtration and disinfection) in order to meet the NSDW.
Class B	Recreational Water Class I. Waters for primary contact
	recreation such as bathing, swimming, skin diving, etc.
	particularly those designated for tourism purposes.
Class C	 Fishery Water for the propagation and growth of fish and other aquatic resources.
	2. Recreational Water Class II (Boating, etc.)
	3. Industrial Water Supply Class I (for manufacturing processes
	after treatment
Class D	1. For agriculture, irrigation, livestock watering, etc.
	2. Industrial Water Supply Class II (e.g. cooling, etc.)
	Other inland waters, by their quality, belong to this classification
OASTAL AND N	MARINE WATERS
Classification	Beneficial Use
Class SA	1) Waters suitable for the propagation, survival and harvesting of shell fish
	for commercial purposes.
	2) Tourist zones and national marine parks and reserves established under
	Presidential Proclamation No.1801 existing laws and/or declared as such
	by the appropriate government agency.
	 3) Coral reef parks and reserves designated by law and concerned authorities 1) Recreational Water Class I (Areas regularly used by the public for
Class SR	
Class SB	
Class SB	batuing, swimming, skinmdiving, etc.)
Class SB	batuing, swimming, skinmdiving, etc.) 2) Fishery Water Class I (Spawning areas for Chanos-chanos or "Bangus"
	batuing, swimming, skinmdiving, etc.) 2) Fishery Water Class I (Spawning areas for Chanos-chanos or "Bangus" and similar species.
Class SB	batuing, swimming, skinmdiving, etc.) 2) Fishery Water Class I (Spawning areas for Chanos-chanos or "Bangus" and similar species. 1) Recreational Water Class II (e.g. boating, etc.)
	 batuing, swimming, skinmdiving, etc.) 2) Fishery Water Class I (Spawning areas for Chanos-chanos or "Bangus" and similar species. 1) Recreational Water Class II (e.g. boating, etc.) 2) Fishery Water Class II (Commercial and sustenance fishing)
	 batuing, swimming, skinndiving, etc.) 2) Fishery Water Class I (Spawning areas for Chanos-chanos or "Bangus" and similar species. 1) Recreational Water Class II (e.g. boating, etc.) 2) Fishery Water Class II (Commercial and sustenance fishing) 3) Marshy and/or mangrove areas declared as fish and wildlife sanctuaries.
Class SC	 batuing, swimming, skinmdiving, etc.) 2) Fishery Water Class I (Spawning areas for Chanos-chanos or "Bangus" and similar species. 1) Recreational Water Class II (e.g. boating, etc.) 2) Fishery Water Class II (Commercial and sustenance fishing)

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Table 3-27 UPDATED LIST OF CLASSIFIED WATER BODIES OF MARCH 1997 (1/7)

	Name of River		WATER BODIES AS OF Location	Region	Class	Year
1 Al			Ilocos Sur	l	٨	1993
2 A ₂		Lower	Pangasinan	1	C	1993
	mburayao		Ilocos Sur-La Union	1	C	1993
	ringay		La Union	i	В	1993
	acarra-Vintar		Ilocos Norte	1	Α	1993
	alincaguing		Pangasinan	1	В	1993
	arroro		La Union	ì	Ä	1993
	auang	Lower	La Union	1	C	1993
	onga		Hocos Norte	i	Ã	1993
	uaya		Hocos Sur	i	Ä	1993
	lagupan	Upper	Pangasinan	i	Ä	1993
	agupan	Lower	Pangasinan	1	C	1993
12 L		170 1701	Hocos Norte	1	Ä	1993
	atalan		Pangasinan	i	C	1993
	bolug		Kalioga Apayao	CAR	Č	1993
15 A	•	Upper	Benguet	CAR	A	1993
	umburayan	Upper	Benguet	CAR	В	1994
	dimit	opper	Mt. Province	CAR	Č	1993
	Ambalanga		Benguet	CAR	č	1993
	Bokod		Benguet	CAR	Ä	1993
	Bued*		Benguet	CAR	Ċ	1995
	bulao		Mt. Province	CAR	Č	1993
	amut		Mt. Province	CAR	č	1993
	Vaguillan	Upper	Benguet	CAR	Ā	1975
	Vaguillan	Lower	La Union	1	C	1975
	Fanudan	1.0	Kalinga Apayao	CAR	Ä	1993
25 T			Abra	CAR	В	1993
	Galiano	Upper	Tuba Benguet	CAR	В	1993
	Chico	Upper	Mt. Province	CAR	В	1994
	Abuan		Isabela	2	C	1993
	Balasig		Isabela	2	Ď	1993
	Cabicungan	Upper	Cagayan	2	В	199-
	Cabicungan	Lower	Cagayan	2	C	199-
	Cagayan	Upper	Quezon	2	Λ	1993
	Cagayan	Lower	Cagayan	2	C	199.
	Diadi		Isabela	2	C	1993
	Disabungan		Isabela	2	Ċ	199.
	Ganano		Isabela	2	Ĉ	199.
	llagan		Isabela	2	č	199.
	Linao		Cagayan	2	Č	199.
	Magai		Isabela	$\frac{1}{2}$	č	199.
	Matuno		Nueva Vizcaya	2	č	199
	Palanan-Pinacanauan		Isabela	2	Ď	199
	Parred		Cagayan	2	Č	199
	Pinacanauan		Isabela	2	Ď	199

Table 3-27 UPDATED LIST OF CLASSIFIED WATER BODIES OF MARCH 1997 (277)

Name of Rive	Γ	Location	Region	Class	Year
12 Tangatan*		Cagayan	2	C	1995
43 Sta. Fe		Nueva Vizcaya	2	\mathbf{c}	1993
14 Siffu		Isabela	2	C	1993
45 Tamauni		Isabela	2	Ð	1993
46 Tuguegarao	Upper	Cagayan	2	В	1993
Tuguegarao	Lower	Cagayan	2	C	1993
47 Aguang		Nueva Ecija	2	Α	1993
48 Angat	Upper	Bulacan	3	В	1993
Angat	Lower	Bulacan	3	C	1993
49 Bagac Bay		Bataan	3	SB	1993
50 Balagtas		Bulacan	3	C	1975
51 Bamban		Tarlac	3	Α	1993
52 Bambang		Bulacan	3	c	1975
53 Bancal		Zambales	3	С	1993
54 Binuangan		Bulacan	3	C	1975
55 Bocaue	Upper	Bułacan	3	Λ	1975
Bocane	Lower	Bulacan	3	C	1975
56 Bucao		Zambales	3	В	1993
57 Bulacan		Bulacan	3	C	1975
58 Cabigo Point		Bataan	3	SC	1993
59 Calampit		Bolacan	3	\mathbf{c}	1975
60 Camiling		Tarlac	3	C	1993
61 Eguia		Zambales	3	D	1933
62 Guiguinto		Bulacan	3	C	1975
63 - La Paz		Tarlac	3	Λ	1993
64 Lawis		Zambales	3	В	1993
65 Looc Bay		Bataan	3	SB	1993
66 Mabayuan		Zambales	3	Α	1993
67 Marilao	Upper	Bulacan	3	Α	1975
Marilao	Lower	Bulacan	3	C	1975
68 Meycanayan		Bulacan	3	C	1975
69 Napot Point		Bataan	3	SC	1993
70 Nayom*	Upper	Zambales	3	В	1995
Nayom*	Lower	Zambales	3	C	1993
Cagayan	Lower	Cagayan	2	E	1993
71 O'Donnel		Tarlac	3	C	1993
72 Pamatawan	Upper	Zambales	3	В	199.
Pamatawan	Lower	Zambales	3	C	199-
73 Pampanga	Upper	Nueva Ecija	3	Α	197:
Pampanga	Lower	Pampanga	3	C	1975
74 Pantabangan		Nueva Ecija	3	C	1993
75 Pantal		Zambales	3	\boldsymbol{c}	199,
76 Parongking		Zambales	3	C	199.
77 Polo		Bulacan	3	C	197:
78 Porac	Upper	Pampanga	3	Α	1

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Table 3-27 UPDATED LIST OF CLASSIFIED WATER BODIES OF MARCH 1997 (3/7)

Name of River		WATER BODIES AS OF I Location	Region	Class	Year
78 Porac	Lower	Pampanga	3	C	199
79 Rio Chico		Tarlac	3	C	199
80 San Fernando		Pampanga	3	\mathbf{C}	197
81 San Juan		Bataan	3	C	197
82 Sinocalan		Zambales	3	\mathbf{c}	199
83 Sorabia		Tarlac	3	A	199
84 Sta. Rita	Upper	Zambales	3	Α	199
Sta. Rita	Lower	Zambales	3	C	199
85 Sto. Tomas		Zambales	3	Α	199
86 Tarlac		Tarlac	3	C	199
87 Banadero		Laguna	4	C	197
88 Balete		Oriental Mindoro	4	C	199
89 Bansud		Oriental Mindoro	4	C	199
90 Batangas Bay		Batangas	4	SC	199
91 Baroc		Oriental Mindoro	4	С	199
92 Binambang		Batangas	4	C	19
93 Boac		Marinduque	4	C	19
94 Bongabong		Oriental Mindoro	4	D	19
95 Bulalacao		Oriental Mindoro	4	C	19
96 Buso-buso		Rizal	4	C	19
97 Butas		Oriental Mindoro	4	Ċ	19
98 Caguray		Occidental Mindoro	4	Ã	19
99 Dacanlao		Batangas	4	Ċ	19
00 Dumacaa		Quezon	4	č	19
01 Iyam		Quezon	4	č	19
02 Kalumpang		Batangas	4	Č	19
03 Katubusan		Palawan	4	Č	19
04 Lagnas		Quezon	4	Č	19
105 Lumintao		Occidental Mindoro	4	Ã	19
106 Mag-asawang Tubig		Oriental Mindoro	4	Ā	19
107 Magbando		Occidental Mindoro	4	Ä	19
108 Malaking ilog		Tiaong, Quezon	4	c 	19
109 Malatgao		Palawan	4	Ã	19
110 Malaylay-Buco		Oriental Mindoro	4	Ā	19
111 Mamburao		Occidental Mindoro	4	A	19
112 Masin		Quezon	4	Ċ	19
113 Mogpog		Marinduque	4	č	19
114 Molino		Cavite	4	Č	19
115 Pagbahan		Occidental Mindoro	4	č	19
116 Pagsanjan		Laguna	4	В	19
117 Palico		Batangas	4	Č	19
118 Pandanan		Palawan	4	Ċ	19
119 Pansipit		Batangas	4	c	19
120 Puerto Galera (Mulle	Raul	Oriental Mindoro	4	SA	19
121 Pula	Day)	Oriental Mindoro	4	C	i:

Table 3-27 UPDATED LIST OF CLASSIFIED WATER BODIES OF MARCH 1997 (4/7)

Name of River		Location	Region	Class	Year
22 Pulang Tubig		Oriental Mindoro	4	٨	199
23 Rosario		Lobo, Batangas	4	Α	199
24 Sumagui		Oriental Mindoro	4	C	199
25 San Cristobal		Laguna	4	C	199
26 San Juan	Upper	Batangas	4	Α	199
San Juan	Lower	Lagona		C	199
27 San Pedro		Laguna	4	C	19
28 Sta. Cruz		Laguna	4	C	19
29 Sta. Rosa		Laguna	4	В	19
30 Sapang Baho		Quezon	4	C	19
31 Tayuman		Palawan	4	C	19
32 Teretian		Palawan	4	C	19
33 Tigas		Laguna	4	Α	19
34 Ylang-Ylang	Upper	Cavite	ئ	В	19
Ylang-Ylang	Lower	Cavite	4	С	19
35 Bicol		Camarines Sur	5	Α	19
36 Bombon		Albay	5	Α	19
37 Cawayan		Sorsogon	5	В	19
38 Daet	Upper	Camarines Norte	5	Λ	19
Daet	Lower	Camarines Norte	5	C	19
39 Gumaus		Camarines Norte	5	Ď	19
40 Labo	Upper	Camarines Norte	5	۸	19
Labo	Lower	Camarines Norte	5	C	19
41 Lagonoy		Camarines Sur	5	Ċ	19
42 Malaguit		Camarines Norte	5	C	19
43 Naga		Camarines Sur	5	C	19
44 Quinale		Albay	5	С	19
45 Pawili		Camarines Sur	5	\bar{c}	19
46 Salog River*	Upper	Sorsogon	5	В	19
Salog River*	Lower	Sorsogon	5	C	19
47 San Francisco		Albay	5	В	19
48 Tagas		Albay	5	С	19
49 Talisay	Upper	Camarines Norte	5	Α	19
Talisay	Lower	Camarines Norte	5	C	19
50 Tayli		Albay	5	Λ	19
51 Yawa		Albay	5	Α	19
52 Aklan	Upper	Aklan	6	Λ	19
Aklan	Lower	Aklan	6	В	19
53 Alacaygan		lloilo	6	Ĉ	19
54 Alugon		Capiz	6	Č	19
55 Bago		Negros Occidental	6	Ċ	19
56 Balantias		Hoilo	6	В	19
57 Barotac		lloilo	6	В	19
58 Batiano		lloilo	6	C	19
59 Caiman	Upper	Antique	6	A	19

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Table 3-27 UPDATED LIST OF CLASSIFIED WATER BODIES OF MARCH 1997 (5/7)

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UPDATED LIST OF C Name of River		Location	Region	Class	Year
59 Caiman	Lower	Antique	6	В	199.
60 Calajunan Creek		lloilo	6	C	199
61 Cangaranan		Antique	6	Α	199
62 Guimbal		lloilo	6	В	199
63 Himoga-an		Negros Occidental	6	C	199
64 llog	Upper	Negros Occidental	6	Α	197
llog	1.ower	Negros Occidental	6	C	197
65 Jalaur	Upper	Boilo	6	Α	197
Jalaur	Lower	Hoito	6	\mathbf{C}	197
66 Jaro - Agaman		lloilo	6	C	199
67 Jaro	Upper	lloito	6	Α	199
Jaro	Lower	lloilo	6	В	199
68 Malihao*	Upper	Negros Occidental	6	В	199
Malibao*	Lower	Negros Occidental	6	C	19
169 Palawan		Antique	6	٨	19
170 Panay		Capiz	6	٨	19
171 Pontevedra		Negros Occidental	6	C	19
172 Salamanca		Negros Occidental	6	C	19
173 Sicaba		Negros Occidental	6	C	19
174 Sibalom*		Iloilo - Antique	6	В	19
175 Sibalom	Upper	Antique	6	Α	19
176 Sipalay	Upper	Negros Occidental	6	Α	19
Sipalay	Lower	Negros Occidental	6	C	19
177 Tumagbok	Upper	Itoilo	6	Α	19
Tumagbok	Lower	Hoilo	6	C	19
178 Abatan*	Upper	Bohol	7	Λ	19
Abatan*	Middle	Bohol	7	В	19
Abatan*	Lower	Bohol	7	\mathbf{c}	19
179 Argao	Upper	Cebu	7	Λ	19
Argao	Lower	Cebu	7	В	19
180 Balamban	Upper	Cebu	7	Α	19
Balamban	Lower	Cebu	7	В	19
181 Banica*	Upper	Negros Oriental	7	Α	19
Banica*	Middle	Negros Oriental	7	В	19
Banica*	Lower	Negros Oriental	7	C	19
182 Danao*	Upper	Cebu	7	Λ	19
Danao*	Lower	Cebu	7	В	19
183 Guindarohan	Upper	Cebu	7	Α	19
Guindarohan	Lower	Cebu	7	C	i
184 Loboc*		Behol	7	В	11
185 Luyang	Upper	Cebu	7	Α	1
Luyang	Lower	Cebu	7	C	ŀ
186 Manaba*	Upper	Bohol	7	A	11
Manaba*	Middle	Bohol	7	В	19
Manaba*	Lower	Bohol	7	C	1

Note: Preliminary Classification

Table 3-27 UPDATED LIST OF CLASSIFIED WATER BODIES OF MARCH 1997 (677)

Name of River		Location	Region	Class	Year
187 Ocoy*	Upper	Negros Oriental	7	Λ	199
Ocoy*	Lower	Negros Oriental	7	B	199
188 Panamangan		Negros Oriental	7	C	199.
189 Sapang Daku	Upper	Cebu	7	٨	199
Sapang Daku	Lower	Cebu	7	C	199
190 Tanjay		Negros Oriental	7	B	199
191 Bao		Leyte	8	Α	199
192 Taft		Samar	8	C	199
193 Tigbao*		Leyte	8	C	199
194 Mercedes*	Upper	Zamboanga	9	В	199
Mercedes*	Lower	Zamboanga		C	199
195 Tumaga*	Upper	Zamboanga	9	Α	199
Tumaga*	Middle	Zamboanga	9	В	199
Tumaga*	Lower	Zamboanga	9	C	199
196 Adgawan		Agusan del Sur	10	Α	199
197 Agusan*	Upper	Misamis Oriental	10	A	199
Agusan*	Lower	Misamis Oriental	10	C	199
198 Agusan*		Agusan del Norte	10	C	199
199 Alae*	Upper	Bukidnon	10	Α	199
Alae*	Lower	Bukidnon	10	С	199
200 Balatocan		Misamis Oriental	10	۸	199
201 Bigaan*	Upper	Misamis Oriental	10	Λ	199
Bigaan*	Lower	Misamis Oriental	10	C	199
202 Cabadbaran		Agusan del Norte	10	Λ	199
203 Cagayan		Misamis Oriental	10	Λ	199
204 Clarin		Misamis Occidental	10	٨	199
205 Cabulig		Misamis Oriental	10	Α	199
206 Cugman	Upper	Misamis Oriental	10	Α	199
Cugman	Lower	Misamis Oriental	10	C	199
207 Gibong		Agusan del Sur	10	Α	199
208 Gingoog		Misamis Oriental	10	Α	199
209 Gingoog Bay		Misamis Occidental	10	SC	199
210 Ihawan		Misamis Oriental	10	Λ	19
211 Iponan		Misamis Oriental	10	Α	19
212 Odiongan		Misamis Oriental	10	Ä	19
211 Ojot		Agusan del Norte	10	Λ	19
214 Oroquieta		Misamis Occidental	10	A	199
215 Magallanes		Agusan del Norte	10	C	199
216 Magpayang		Misamis Oriental	10	Ā	199
217 Magsaysay		Misamis Oriental	10	A	199
218 Naawan		Misamis Oriental	10	Λ	199
219 Palilan*	Upper	Misamis Oriental	10	Λ	199
Palilan*	Lower	Misamis Oriental	10	Ċ	199
220 Polangi		Bukidnon	10	Ā	199
221 Sawaga		Bukidnon	10	A	199

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Table 3-27 UPDATED LIST OF CLASSIFIED WATER BODIES OF MARCH 1997 (7/7)

Name of River		Location	Region	Class	Year
222 Simulao		Agusan del Sur	10	Α	199
223 Solana		Misamis Oriental	10	۸	199
224 Surigao		Surigao del Norte	10	Λ	1 9 9
225 Tagolo-an		Misamis Oriental	10	Λ	199
226 Tubay		Agusan del Norte	10	Λ	199
227 Umalag*	Upper	Misamis Oriental	10	Λ	199
Umalag*	Lower	Misamis Oriental	10	C	199
228 Wawa		Agusan del Norte	10	Α	199
229 Davao*	Upper	Davao City	11	Α	199
Davao*	Lower	Davao City	11	В	199
230 Digos*	Upper	Davão del Sur	11	В	19
Digos*	Lower	Davao del Sur	11	С	19
?31 Hijo-Masara*		Davao del Norte	11	D	19
232 Lasang*		Davao City	13	В	19
233 Padada*		Davao del Sur	11	Ð	19
!34 Sibulan*	Upper	Davao del Sur	11	Α	19
Sibulan*	Lower	Davao del Sur	11	В	19
235 Talomo*		Davao City	11	B	19
236 Tagum*		Davao del Norte	11	D	19
237 Tuganay*		Davao del Norte	11	В	19
238 Agas		Lanao del Norte	12	C	19
239 Allah*		Sultan Kudarat	12	В	19
240 Libungan*		Cotabato	12	D	19
241 Marble	Upper	Cotabato	12	В	19
Marble	Lower	Cotabato	12	D	19
242 Matingao		Cotabato	12	В	19
243 Nuangan*		Cotabato	12	D	19
244 Panguil Bay*		Lanao del Norte	12	SC	19
245 Polangi*		Cotabato	12	D	19
246 Rio Grande de Mindan	30*	Cotabato	12	C	19
247 Marikina	Upper	Metro Manila	NCR	Α	19
Marikina	Lower	Metro Manila	NCR	C	19
248 Paranaque-Zapote		Metro Manila	NCR	С	19
249 Pasig		Metro Manila	NCR	Č	19
250 San Juan		Metro Manila	NCR	C	19
251 Tullahan-Tenejeros		Metro Manila	NCR	C	19