IRRIGATION PRICING AND MANAGEMENT

ANNEX 4

The Philippines

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The Philippines

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LIST OF ACRONYMS AND ABBREVIATIONS

ADCC	Agricultural Development Coordinating Council
BSIA	Bafting-Siclong Irrigators Association
CIS	Communal Irrigation System
FFIA	Federation of Farmer Irrigators Association
FIA	Farmer Irrigators Association
FIG	Farmer Irrigator Group
FSDC	Farm Systems Development Corporation
GNP	Gross National Product
HYV	High Yielding Variety
IA	Irrigator Association
IOMP	Input-Output Monitoring Program
IPC	Institute of Philippine Culture
NEDA	National Economic Development Agency
NFA	National Food Authority
NIA	National Irrigation Administration
NIS	National Irrigation System
NWRC	National Water Resources Council
O and M	Operations and Maintenance
OM	Operations Manager
PAC	Provincial Agricultural Committee
PDC	Provincial Development Council
PIA	Pinaburyuhan Irrigators Association
PIS	Pinaburyuhan Irrigation System
RUG	Rotalecuel Unit Group
SEC	Securities and Exchange Commission
UPRIIS	Upper Pampanga River Integrated Irrigation System
UPRP	Upper Pampanga River Project
WM	Water Manager
WMT	Water Management Technician

CURRENCY EQUIVALENTS

US$ 1.00 - ₱ (Philippine Pesos) 17.60

WEIGHTS AND MEASURES

1 hectare (ha)	=	10,000 m^2 2.471 acres
100 hectares (ha)	=	1 km^2
1 kilogram (kg)	=	2.204 pounds
1 metric ton (MT or t)	=	1,000 kg 2,204 pounds
1 kilometer (km)	=	0.621 miles
1 square kilometers (km^2)	=	100 ha
1 millimeter (mm)	=	0.04 inch
1 cubic meter (m^3)	=	1,000 liters
1 liter	=	1.066 quarts

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ANNEX 4

The Philippines

A. Background

1. Economic background

a. Macroeconomic conditions and policy

The Philippines is currently faced with a severe economic and financial crisis. Real GNP growth which averaged 6 percent per annum in the 1970s has declined during the past four years and was expected to be minus 6 percent in 1984. The investment-savings gap which was negligible in the early 1970s began to grow towards the end of the decade and stood at 8 percent of GNP by 1982-83. The current account deficit rose from 5 percent of GNP in 1979 to 8 percent by 1983. With rising real international interest rates, the Philippines' external debt ratio rose from 1.4 percent of GNP in 1979 to 4.7 percent of GNP in 1983. By August 1983, external credit lines were terminated, capital flight had accelerated and the government was compelled to declare a moratorium on debt repayments and to seek means for their rescheduling--the only country in Asia to do so.[1]

One of the factors contributing to the Philippine economic crisis was the international recession which started in 1979. The problems were compounded by the Government's continued expansion of public investments up to 1982 despite the growing current account deficit. Agricultural production growth slowed in the 1980s and actually declined in 1983. Contributing factors were a prolonged drought, unfavorable trading conditions and government marketing and price control policies which dampened production incentives. Manufacturers suffered because high protection for import substitution manufacturing led to inefficiencies and increased reliance on imported inputs and capital goods. The downturn in the economy resulted in excess capacity in manufactures for domestic consumption. Export manufacturing was similarly import intensive and had little impact on the growing unemployment problem. Exports of both agricultural and manufactured goods declined, having been effected by the deteriorating terms of trade and the drought that reduced the volume of agricultural exports.

The combined effect of structural weaknesses in the economy and government policies have resulted in increased under- and unemployment; a liquidity crisis among financial institutions (some of which are approaching insolvency); a slow-down in private investment; declining real wages; and accelerated inflation rates of 45-50 percent per

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[1]The World Bank, The Philippines: An Agenda for Adjustment and Growth (Washington, DC: The World Bank, November 30, 1984), pp. i-viii; 105 and 12-16.

annum. Since the Philippines and its Asian neighbors have been exposed to similar external shocks, economic analysts believe that present economic performance in the Philippines is largely explained by its internal political and economic policies.[2] For example, while neighboring countries like Korea, Taiwan, and Malaysia assumed an outward, export-oriented policy, the Philippines adopted an import substitution policy through a mixture of tariff and non-tariff interventions. For a while (1960-1970) this policy helped the country attain moderate economic growth rates but since domestic demand did not grow fast enough, growth in value added from these industries declined. It likewise became increasingly apparent that these industries were inefficient and therefore non-competitive in the world market. Furthermore, they were capital biased because of policies that artificially cheapened capital and hence labor absorption was low.

A related feature was the government's increasing involvement in economic activity as is shown in Table 4-1. Both the shares of government consumption and investment (infrastructure development) increased greatly in the 1970s while the Central Government deficit grew. The savings-investment gap increased as did dependence on external borrowings to finance public and private investments. The high inflation rate resulted directly from the ambitious construction program whose returns were slow in being realized. Further, the investments themselves were not as productive as originally envisioned.

The current extremely unfavorable balance of payments situation has arisen because of several factors. First, the dependence on short-term external borrowing to finance current deficits has already been pointed out. The problem was compounded by increasing interest rates on these loans. Secondly, the protection afforded to import substituting import dependent industries penalized export oriented industries. Thirdly, currency overvaluation (prior to the recent devaluations) fueled imports and dampened exports. Finally, the growing political instability resulted in foreign capital flight.

By the end of 1984, the Government was attempting to improve and expand its stabilization program by reducing credit for the public and private sectors, adopting a floating exchange rate, improving the level and structure of taxation, reducing imports and giving increased incentives for export production. However, these measures have been mostly inadequate. The exchange rate adjustment, for example, has had little impact. The economic environment in 1985 is, therefore, one of reduced public expenditures and smaller budgets for government agencies.

The austerity measures have had their impact upon irrigation as on every other sector of the economy. This has meant reduced investment

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[2]"An Analysis of the Philippine Economic Crisis--A Workshop Report," (Quezon City: University of the Philippines, School of Economics, n.d.).

Table 4-1: Selected Economic Data, 1971 to 1982
(annual average in millions)

	1971-75	1976-80	1981-82
Private Consumption (in current pesos)	53,419.0	126,145.2	
Government Consumption (in current pesos)	7,141.0	16,757.2	
Government Construction (in current pesos)	2,047.8	10,547.2	
Private Construction (in current pesos)	3,979.6	14,158.8	
Share of Government in Total Construction (%)	33.9	42.7	
Overall Deficit of Central Government			
(in current pesos)	842.3	2,252.0	13,180.0
(in 1972 pesos)	1,124.0	1,708.0	3,585.0
Government Expenditure Share in GNP (%)	12.37	15.41	17.66
Government Deficit Share in in GNP (%)	2.83	2.19	3.88
Excess of Investment Over Savings (in current pesos)	1,900.0	9,100.00	20,550.0
Current Account Deficits (in US$)	105.2	1,320.4	2,820.0

Source: Compiled from the National Economic Development Agency, the Philippine National Account Statistics and Key Indicators of Developing Member Countries of the Asian Development Bank (April 1983).

in new irrigation development and a shift towards emphasizing rehabilitation and development of the smaller communal systems. On the institutional side, it has meant greater concern with cost recovery and with the development of farmer organizations capable of assuming responsibility for operations and maintenance (O and M) on their own systems.

b. The rural and agricultural sector

Agriculture in the Philippines provides employment for over half the labor force, contributes over 30 percent of net domestic product and generates 40 percent of export earnings.[3] It is characterized by small family-operated farms, the average size being 2.7 ha. The distribution of cultivated land is highly skewed with 61 percent of farmers having less than three ha and owning only 24 percent of all farm land while 5 percent have more than ten ha and represent 34 percent of farm land ownership. Landless laborers comprise 16 percent of the population in the agricultural sector.[4] Tenancy is common, particularly among rice and corn farmers. As an example, the distribution of rice farm holdings is shown in Table 4-2.

There are large income variations among farmers and rural poverty exists particularly among subsistence farmers in rainfed rice and corn production, shifting agriculturalists in mountain areas and in inaccessible resource poor areas. An agrarian reform program was instituted by the Government in 1972 to transfer land ownership to tenant farmers on rice and corn lands. Landowners with over seven ha were required to sell the land to tenants who could pay for the land over 15 years thus becoming owner cultivators. Under a second scheme, for lands up to seven ha, tenants were given security of tenure on land being cultivated. About 1.4 million families were targeted under both programs which have been partially fulfilled, reaching 80 percent of intended beneficiaries in the first case and 70 percent in the second.

The focus of agricultural development in the 1970s was on achieving rice self-sufficiency. Irrigation development in rice-producing areas was an important aspect of this process. Rice production on irrigated lands as a proportion of total area planted increased from less than 50 percent in 1968 to about 58 percent in 1983. During the same period, the adoption of high yielding rice varieties (HYVs) increased as well so that the area planted in HYVs

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[3]The World Bank, Philippines Agricultural Sector/Inputs Project (Washington, DC: The World Bank, 1984).

[4]The World Bank, An Agenda for Adjustment, p. 63.

Table 4-2: Distribution of Rice Farm Holdings

Size of Farm (ha)	Percent of Farms	Percent of Area
Less than 1.0	14.6	2.9
1-3	54.1	33.6
3-5	21.5	28.3
5-10	7.3	16.6
10-25	2.2	10.8
25.0 and above	0.3	7.8
TOTAL	100.0	100.0

Source: The World Bank, The Philippines: Irrigation Program Review (Washington, DC: The World Bank, 1982).

went from less than 50 percent in 1968 to 58 percent in 1983.[5] Rice yields on irrigated lands increased from 1.65 t/ha in 1965 to 2.84 t/ha in 1982, while yields in rainfed areas went from 1.19 t/ha to 1.93 t/ha in the same period.[6] Accompanying the productivity improvements in irrigated rice production were corresponding increases in the incomes of farmers. Despite declining farmer margins from 1977 to 1981, real farm incomes were higher after irrigation making possible the adoption of new technologies. From being a major importer of rice, the Philippines for a while became a small exporter although now it has once again become a net importer of rice.

The other major cereal crop is corn which with rice accounts for about 75 percent of cultivated land. Other important crops are sugar and coconuts which are grown for export while the cereal crops are for domestic consumption. During the 1970s agriculture grew at the rate of 4.5 percent a year, the growth coming from both expansion of cultivated area and yield improvements. Performance has varied greatly by sub-sector with rice, sugar and banana yields increasing considerably, corn and tobacco more slowly, and coconuts and abaca declining. A comparison of area, yields and production of rice, corn and sugar is given in Table 4-3. The area under rice has remained relatively stable at around 3.5 M ha but the area in sugarcane has fluctuated severely due to unstable prices. The areas in corn, coconut and other crops have increased greatly. As most cultivable land is already in use, future growth in production will have to come from higher yields and more intensive land use. In the 1980s, growth rates in agriculture have slowed, falling to 3.5 percent in 1982 and in 1983 to 1 percent which is below the rate of population growth.

There has been a steady decline in the contribution of agriculture to total export value from 73 percent in 1970-72 to about 50 percent in 1978-80 and 38.3 percent in 1981-83. The most important agricultural commodities in 1978-80 was coconut products which accounted for 20 percent of total exports followed by sugar with 8 percent, forest products with 10.3 percent and all other agricultural exports with 11 percent.

Although agriculture remains a significant source of export earnings, macroeconomic and commodity-specific policies have tended to favor industry and to penalize agriculture. Consequently, resources have shifted away from agriculture and its contribution to national output and employment have declined as has the level of exports.

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[5]M.C. Cruz and R. Siy, Issues in Irrigation Water Management in the Philippines, Agricultural Policy Working Group Mini-Workshop on Rice Policy, University of the Philippines at Los Banos, January 3-4, 1985, pp. 3.

[6]The World Bank, The Philippines: Irrigation Program Review (Washington, DC: The World Bank, 1982), p. 61.

Table 4-3: Area, Yield and Production of Three Major Crops

Crop	1970			1975			1981		
	Area (000s ha)	Yield (t/ha)	Prod. (000s t)	Area (000s ha)	Yield (t/ha)	Prod. (000s t)	Area (000s) ha)	Yield (t/ha)	Prod. (000s t)
Rice	3,115	1.68	5,233	3,540	1.60	5,660	3,330	2.27	7,572
Corn	2,390	0.84	2,008	3,060	0.84	2,570	3,560	0.98	3,489
Sugar	425	5.03	2,127	480	5.14	2,474	414	5.97	2,395

Source: The World Bank, The Philippines: Irrigation Program Review (Washington, DC: The World Bank, 1982).

Domestic pricing policies also had an adverse effect upon agriculture. The Government's objective was to stabilize producer and consumer prices of rice by buying from farmers at guaranteed prices, releasing stocks to dampen price increases and imposing controls on retail prices. The National Food Authority (NFA) had an instrumental role in the price support process, an increasing role in marketing of food grains and pulses and a virtual monopoly to export rice and import corn, soybean meal and wheat. Altogether, the Government's efforts were successful in obtaining low consumer prices but less successful in maintaining producer prices. In addition, implicit tariffs on important farm inputs kept domestic prices well above border prices. This dampened agricultural growth.

Recent policy reforms have been directed at reducing the role of the NFA, and basically, attempting to phase out government interventions that reduce production and private sector incentives. There is also a move towards greater liberalization of domestic and foreign trade in agricultural products. While some form of government intervention may be required to moderate price fluctuations, it is intended that there will be greater reliance on competitive pricing.[7]

2. Irrigation development

a. General

The Philippines has a lengthy tradition of irrigation development which predates the Spanish. There were already 25,000 ha of irrigated rice terraces in Northern Luzon before the Spanish arrived. The latter then developed 30,000 ha of irrigated area near Manila and the Philippine Government began its role in the 1900s. The major phase of irrigation expansion took place after the creation of the National Irrigation Administration (NIA) in 1964. By 1983, the total service area under irrigation had increased from 541,000 ha to 1,385,940 ha. This represents an increase of 156 percent or 7.8 percent per year. There are now two main types of irrigation systems in the Philippines--the National Irrigation Systems (NIS) which in 1983 covered 40 percent of total irrigated areas, and the Communal Irrigation Systems (CIS) which represent 49 percent of irrigated area. A third category, Private Irrigation Systems (PIS) (usually pumps serving an area of 20-25 ha) also exists but it comprises only 11 percent of total irrigated area.[8]

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[7]The World Bank, Philippines: Agricultural Sector, pp. 13-14.

[8]L. Cabanilla, "Study of Operation and Maintenance Problems in Irrigation: The Philippine Case" (Manila: USAID, November 1984), pp. 5-6.

The Philippine Government made large investments in irrigation infrastructure development during the 1970s. Irrigation's share of the infrastructure development budget grew from 8 percent in 1970 to 11.6 percent in 1978. It declined in 1980 to 9.2 percent. An allocation of about 11 percent of the budget had been planned for irrigation construction in the 1980s but given the current financial situation in the country, it is likely that the goal will be revised. Current indications are that construction will be deemphasized in order to focus more upon rehabilitation of existing projects and improved O and M. Such a program would include upgrading and rehabilitating irrigation systems to facilitate operation at improved efficiency levels.

b. Current status of irrigation development

(1) Description

The areas covered by existing irrigation systems and the potential for future development in the five major geographical regions of the Philippines are shown in Table 4-4. These are Northern Luzon, Central Luzon, Southern Luzon, the Visayas and Mindanao. In Northern Luzon, the mountainous Ilocos region has 15,000 ha of irrigation while the potential in the Cagayan Valley is being developed under the Magat and Chico River Projects which are together planned to provide for 122,000 ha of irrigation. There are, in addition, 20,000 ha provided by small projects. Central Luzon has the most irrigated area and considerable potential for further development. The total potential irrigable area is 820,000 ha of which 360,000 ha are irrigated and 160,000 ha are CIS or pump systems. This is the major rice-growing region of the Philippines and the site of the Upper Pampanga River Project which was visited by the team.[9]

Irrigation is also highly developed in the Southern Tagalog region of Southern Luzon, which has 17 irrigation systems covering 41,000 ha. There is not much potential for further new development here or on Mindoro Island, but Bicol has 50,000 ha currently under irrigation and the potential for further new development. The Visayas consist of six major islands of which Panay has the most irrigated land (about 40,000 ha), while Negros has 13,000 ha. Only communal systems exist in Bohol, Cebu and Samar. There are 225,000 ha of irrigation in Mindanao but the potential exists for expanding irrigation area by 325,000 ha.

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[9]The World Bank, The Philippines: Irrigation Program Review, p. 29.

Table 4-4: Areas Served by Irrigation Systems, 1980
(000s ha)

Regions	National Systems			Existing Communal Systems	Existing Pump and Other Irrigation Systems	Total Area Served	Total Area to be Served in Future[b]
	Existing	Under Construction	Total				
Northern Luzon	80[a] (40)	110	190	165	40	285	395
Central Luzon	200 (35)	20	220	115	45	360	380
Southern Luzon	55 (50)	75	130	80	40	175	250
Visayas	70 (45)	25	95	60	35	165	190
Mindanao	65 (35)	100	165	130	30	225	325
Philippines	470 (205)	330	800	550	190	1,210	1,540

[a]Figures in parenthesis are areas under rehabilitation.
[b]Excluding communal systems under construction.

Source: The World Bank, The Philippines: Irrigation Program Review (Washington, DC: The World Bank, 1982).

(2) Types of systems

(a) The National Irrigation Systems

The NIS, which are built, operated and maintained by the National Irrigation Administration range in size from about 100 ha to 80,000 ha. Existing systems cover an area of about 470,000 ha of which 205,000 were being upgraded in 1980. Total cropped area is 640,000 ha which yields a cropping intensity of 137 percent. The service unit in these regions is about 50 ha with a turnout at ten ha sub-units having ditches to carry water to the farms. The canals are equipped with gates to allow water control over large areas. The systems are also provided with service roads along the main canals and laterals to facilitate access for O and M. Responsibility for O and M lies primarily with the NIA representatives at the regional level. The officials are authorized to collect fees for their services. The record of fee collection and O and M has been inadequate and the NIA's recent financial difficulties have resulted in an increased emphasis on making users responsible for their local systems through organization of Irrigator Associations. These developments will be discussed at greater length in Section B.

(b) The Communal Irrigation Systems (CIS)

The CIS vary in size from a few hectares to 4,000 ha and cover nearly 600,000 ha. There are about 5,700 systems, most of them built before 1965. Cropping intensity on these systems is about 130 percent. Performance varies greatly depending upon a variety of factors that include soil and water conditions and construction and maintenance levels. Where river flows are dependable, these systems provide adequate and reliable water supplies. The Government has pursued a policy of rehabilitating and upgrading some of them by such means as replacing temporary dams with permanent diversion weirs and upgrading canals and service roads. Government assistance to communals rose rapidly in the 20-year period from the 1950s to the 1970s resulting by 1980 in the improvement of about 900 systems which encompassed an area of over 350,000 ha.[10]

Management of communal systems varies, the smaller ones often being informally managed by village leaders or large landowners. More formal management structures exist on the larger systems with 90 percent of those over 100 ha having Irrigator Associations (IAs) to facilitate farmer participation in O and M. Some of these IAs have

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[10]The World Bank, Staff Appraisal Report: Philippines Communal Irrigation Development Project (Washington, DC: The World Bank, 1982), p. 8.

paid personnel to operate control structures; other IAs perform their own maintenance and carry out administrative duties and some also collect irrigation fees.[11]

(c) Pump irrigation systems

Pump systems provide irrigation for about 150,000 ha but there is no reliable inventory of these projects or of the development potential. The only data available to the team were the results of a survey done in 1971-72 in Quezon and Batangas provinces of 52 owner-operated small-scale pumps.[12] The study found that pump users were basically satisfied with the water distribution system as it was able to ensure delivery of the minimum water requirement for all farms even during times of scarcity. Irrigation charges varied but the most common was in-kind payment of 20 percent of net product divided between tenant and landlord in both wet and dry seasons. The major problem encountered by pump owners was a shortage of funds for repairs. The problems were compounded by the difficulty of obtaining spare parts and the shortage of skilled mechanics. More recently, the most significant problem has been high energy costs which is likely to limit further pump irrigation development.

B. The National Irrigation Administration and Policy

1. Organization of irrigation administration

The major organization having responsibility for irrigation in the Philippines is a government corporation called the National Irrigation Administration. Several other institutions are also involved, namely: The National Water Resources Council (NWRC), the Farm Systems Development Corporation (FSDC) and the Bureau of Flood Control and Drainage of the Ministry of Public Works.

a. The National Irrigation Administration

The NIA was established in 1964 as a successor organization to the Irrigation Division of the Bureau of Public Works whose staff and responsibilities it inherited. It was entrusted with the task of constructing and administering the entire irrigation system of the country including the collection of water rates from users. As a corporate entity, it was empowered to collect fees and to negotiate loans with foreign lending institutions. The governing body of the NIA is a Board of Directors composed of a Chairman, who is the Minister of Public Works, and five members including the Ministers of Agriculture and of Planning, and the General Manager of the National Power Corporation. The Administrator is responsible for management of

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[11] Ibid., p. 9.

[12] D.L. Evangelista, R.D. Torres and M.M. Faigmane, "The Economics of Groundwater Irrigation" in Water Management in Philippine Irrigation Systems: Research and Operations. Los Banos: International Rice Research Institute, 1973, pp. 195-206.

four divisions each under an Assistant Administrator: Development and Implementation, Engineering and Operations, Finance and Management, and Administration and Personnel. The first two Divisions are responsible for technical matters while the latter two provide support services.

Figure 1 shows the organization of the NIA with the Central Office and its four main Divisions located in Manila. There are 12 regional offices and 72 provincial offices responsible for the administration of both the NIS and CIS that fall under the NIA's province. Foreign assisted projects have a separate administrative agency at the Provincial Irrigation Office level. The Regional Irrigation Offices also have Divisions for specialized functions such as Engineering, Equipment, Administration, Dam Construction and Institutional Development. The last Division has recently assumed greater importance because of the increased emphasis on development of farmer associations. In 1979, the total staff employed by the NIA numbered 35,500 people.

The NIA's funding is obtained from several different sources including loans and grants from international agencies, budget appropriations from the national government, irrigation service fee collections, amortization payments from construction loans to water user organizations and payments from the sale or rental of equipment. Initial funding was provided by the Government. In 1974, annual capitalization was increased from ₱ 30 M to ₱ 2 billion and, in July 1980, to ₱ 10 billion. The agency is also authorized to charge 5 percent from foreign loan funds as administrative or management fees. Over 80 percent of its operating income comes from irrigation fees, equipment rental and interest earnings.[13]

Until 1980, the Treasury also provided subsidies for O and M on the NIS. This is no longer the case but it now receives appropriations for construction of CIS projects that in 1983 amounted to ₱ 122.5 M (see Table 4-5). In 1984, the CIS construction budget was expected to decline to ₱ 90 M.

Between 10-20 percent of the NIAs annual budget goes towards operating expenses which in 1983 amounted to ₱ 256 M, the largest expense being for salaries. Irrigation fees provided ₱ 74 M or 29 percent of operating income. As shown in Table 4-5, income from foreign sources provided ₱ 944 M or 45 percent of the NIA budget.

The consolidated income and expense statement for the 1978-83 period is shown in Table 4-6. Annual operating expenditures rose from ₱ 107 M in 1978 to ₱ 244.7 M in 1981 mostly because of improved personnel pay scales. However, by 1983, expenditure declined to

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[13]Cruz and Siy, Issues in Irrigation Water Management, p. 3.

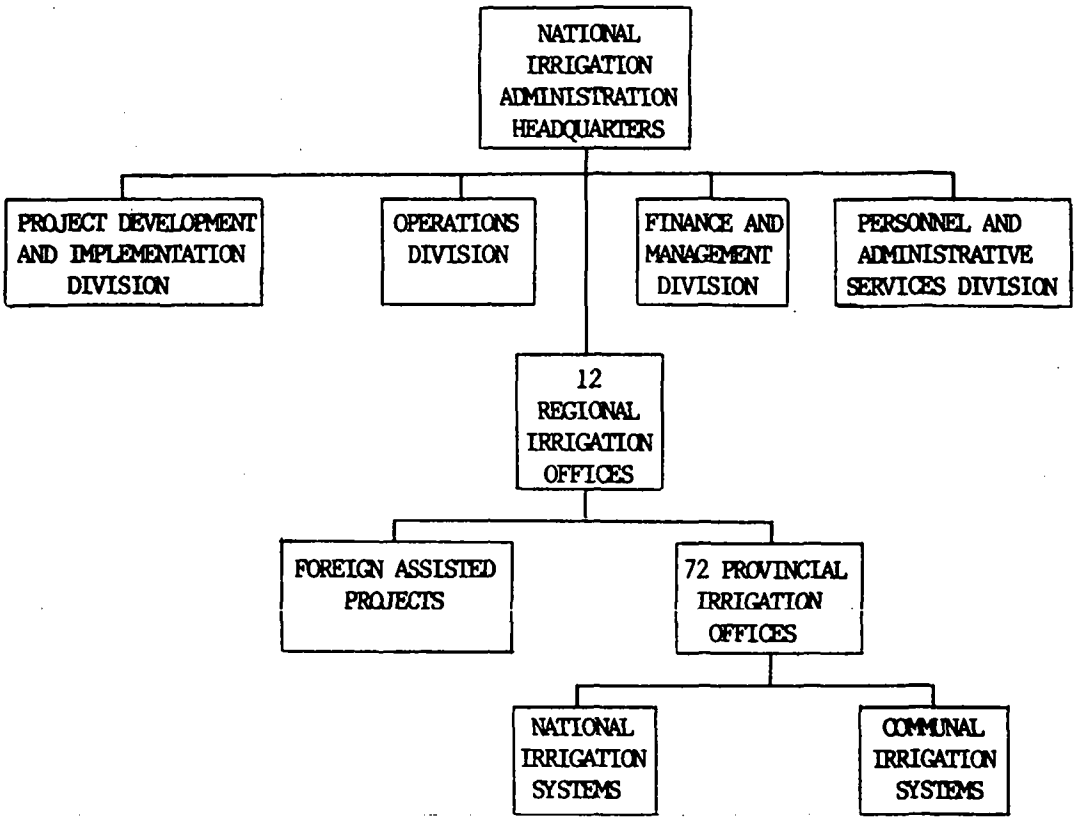

Figure 4-1: Organization of The National Irrigation Administration

Source: Adapted from Figure 1.1 in the World Bank, Staff Appraisal Report: Philippines Communal Irrigation Development Project (Washington, DC: The World Bank, 1982).

Table 4-5: The National Irrigation Administration's Budget, 1983
(000s Pesos)

Current Operating Expenditures	
Personal services	193,875
Operating expenses	62,125
Subtotal	256,000
Capital Expenditures	
Foreign loan-assisted projects	1,625,616
Locally funded projects	202,303
Subtotal	1,827,939
Total Expenditures	2,083,939
Funded by:	
General Appropriations	
Corporate equity	760,000
Communal irrigation program	122,500
NIA Operating Income	257,000
Foreign Loans	944,439

Source: National Irrigation Administration, Annual Report 1983.

Table 4-6: The NIA's Actual Operating Income and Expenses: 1978-83
(M of Pesos)

	1978	1979	1980	1981	1982	1983
INCOME:						
Irrigation Fees	36.72	45.35	59.24	52.74	57.49	72.71
Equipment Rental and Pump Amortization	12.36	11.74	23.33	23.80	30.83	29.79
Interest						121.79[a]
Others[b]	84.55	92.87	73.76	81.14	132.38	22.43
TOTAL	133.63	149.96	156.33	157.68	220.70	246.73
EXPENDITURES:						
Personnel	89.08	124.51	80.64	166.66	165.26	137.08
Administrative Depreciation Financial	8.46	14.71	5.94	5.44	17.28	28.63
Miscellaneous	9.66	15.85	22.67	72.63	28.57	16.70
TOTAL	107.20	155.07	109.25	244.73	211.11	182.41
PROFIT (LOSS)	26.43	(5.11)	47.08	(87.05)	9.59	64.31
MANAGEMENT FEE	-	76.64	-	104.45	104.45	81.24
NET AFTER FEE	26.43	71.53	47.08	17.40	114.04	145.55

[a]Interest is from charter of NIA's capital funds.

[b]Excluding 5 percent Management Fee.

Source: NIA Corporate Planning Staff, The Agricultural Input Loan: Irrigation Study (Manila: NIA, November 1984).

₱ 182 M as a result of economy measures adopted by the agency. Only in two years, 1979 and 1981, was operating income less than operating expenditure but the deficits were made up by earnings from management fees.

Projections done by the NIA's Corporate Planning Staff show that operating expenses could reach a high of ₱ 576 M by 1993. Although much of the operating income could be provided by irrigation fees these would not be fully adequate. If the agency were to assume responsibility for debt servicing, projected annual operating losses would amount to ₱ 100-200 M between 1988-93 and the NIA would not be able to sustain debt servicing beyond 1993.[14]

b. Other institutions involved in irrigation

The National Water Resources Council (NWRC) was created in 1974 with the objective of formulating rules and regulations for the use and management of water resources for all purposes including irrigation and other domestic and industrial uses. It is also responsible for coordination of the activities of the various water resource agencies and the issuance of water permits.

The Farm Systems Development Corporation (FSDC), established in 1975, was entrusted with a variety of tasks, the most important being that of organizing farmers into Irrigator Associations on the CIS or pump systems. The FSDC was also given responsibility by the NIA for collecting 90 percent of the costs of constructing communal systems. In addition, the FSDC has been involved in extension, cottage industry development, storage and processing. The multiplicity of responsibilities proved detrimental to FSDC's main organizational tasks for it was largely unsuccessful in setting up IAs. Consequently, the NIA has assumed all farmer organizational tasks for systems over 100 ha and only some of those with less than 100 ha will be left to the FSDC.

The Bureau of Flood Control and Drainage in the Ministry of Public Works and Highways has been indirectly involved in irrigation through construction of earthen dams at the heads of watersheds primarily for flood control. There are side benefits for irrigation, fish production, and others. By 1981, ten such projects had been completed, each having impact on an average of 100 ha. Their productive impact is relatively small and costs have tended to be high.

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[14]NIA Corporate Planning Staff, The Agricultural Input Loan: Irrigation Study (Manila: NIA, November, 1984), p. 17.

2. Irrigation policies and practice

a. General

The 1974 Water Code of the Philippines sets the tone for the general policy direction of irrigation development in the country. The Code establishes the basic principles and framework relating to appropriation, control and conservation of water to achieve optimum development and rational utilization. It defines the rights and obligations of water users, adopts basic provisions to carry out matters relating to use and protection of water and identifies administrative agencies to enforce the code.

b. Irrigation management

(1) Organization for O and M

(a) The National Irrigation Systems and farmer participation

At the national level, planning and coordination of O and M is done by the Systems Management Department of the NIA which prepares annual budgets and reviews plans and programs for O and M and for repairs. The Operations Division of the Regional Irrigation Office monitors system level O and M and the work is actually performed by water masters and ditchtenders under the supervision of the Irrigation Superintendent. These officials are primarily responsible for the timely and equitable distribution of water and for maintenance of canals, structures and measuring devices. On some of the larger systems, the organizational structure is more complex involving a separate collection section, a repair and improvement section and a hydrology unit.

The varieties of tasks performed by the office of the Irrigation Superintendent include development and dissemination of cropping schedules to farmers, farm level water delivery and maintenance of records on water distribution, maintenance or repair of canals, structures and access roads and fee collections. The major management problem at the farm level is that of delivering properly controlled quantities of water to the fields at the appropriate times during the cropping season. For this purpose, the initial design was for a rotational water delivery system whereby four or five 10-ha units comprised one rotation area. Each rotation area has a gated turnout, flow measurement devices and appropriate conveyance structures. Water was to be distributed on a timed schedule with continuous flow in a rotation area while turns for water were to be rotated among ten-hectare blocks. A major difficulty in proper operation is that although 68 percent of the systems were designed for rotational irrigation, only a small percentage actually follow the schedule. Most practice continuous irrigation. In fact, the rotational scheme was officially discontinued in 1978 in favor of continuous and simultaneous

delivery, thereby acknowledging the actual practice among farmers.[15] The result is water flow cannot be properly controlled and farmers at the head end tend to over-irrigate while tailenders are deprived of their water share.[16] Illegal turnouts are also a problem especially during times of scarcity.

The Water Management Technician (WMT) is the official at the farm level responsible for a 500 ha rotation area where his functions are to improve water management practices, educate farmers on proper methods of water control and, in general, to prepare them for eventually assuming control of O and M at the field level. Ditchtenders are in charge of monitoring up to 3.5 km of canals while gatekeepers operate and maintain three major gates and 1.5 km of canals. The ditchtenders often receive complaints about inadequate water supplies as they are most directly in contact with farmers.

O and M on the national systems has generally been inadequate as there has been a chronic shortage of funds.[17] Lack of funds has meant inability to purchase necessary maintenance equipment thus compounding the O and M problem. Further, lack of proper O and M and inadequacies in the water delivery system have been reflected in low water fee collection rates. This has resulted in fewer funds and lower levels of O and M in a downward spiral.[18] More recently, the Government's weakening financial situation has added an additional burden to the NIA's ability to undertake efficient O and M. Consequently, there has been a growing emphasis over the past few years upon developing Irrigator Associations among farmers, the objective being to organize farmers to assume increasing responsibility for O and M and for fee collection.

Farmers are organized into Farmer Irrigator Groups (FIGs) within hydrologic boundaries starting at the rotational level which is approximately a 50-ha area served by one turnout. The farmers elect officers such as a President, Secretary and Treasurer and sometimes unit leaders for the sub-farm ditch level. As the organizations develop they are formally integrated into a bigger group known as the Farmer Irrigators Association (FIA). Consisting of at least two or three FIGs, the FIA is registered with the Securities and Exchange Commission (SEC), making it a formal organization. To perform the roles of management, maintenance, dispute resolution and fee collection, a Board of Directors is elected to lead the group.

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[15]M. Svendsen and E. Lopez, "Six Rotational Areas in the Penaranda River Irrigaiton System" (Ithaca: Cornell University, 1980), pp. 9-12.

[16]Cruz and Siy, Issues in Irrigation Water Management, p. 7.

[17]Government allocations for O and M were discontinued in 1980.

[18]The World Bank, The Philippines: Irrigation Program Review, p. 19.

Specialized committees such as Education and Training, Audit and Inventory, Finance and Development, Irrigation Management, Agricultural Supervision and Complaints Committees are also formed.

At first, the FIGs were only expected to maintain the tertiary level canals and the NIA offered incentives such as a fee collection bonus determined by the attained collection efficiency. The NIA has now instituted a policy of speeding up the organizational development process in order that farmers may assume responsibility for O and M on sectors of the main canal and laterals in addition to the tertiaries. The NIA expects to derive two specific economic benefits from this process. First, if O and M activities are entirely assumed by the farmers groups, the ditchtenders job becomes superfluous and the NIA obtains a savings on his salary. Second, the NIA hopes that fee collection efficiency can be improved with the help of farmers. A number of incentive schemes have been devised to promote this objective. For example, in one scheme in the Bicol region, the farmer association is allowed to keep 35 percent of total collections if it achieves a 50 percent collection rate. But if collections exceed 50 percent, the association is allowed to retain 65 percent of the amount collected over the target of 50 percent of charges.[19]

As a result of its intensified efforts over the past few years, maintenance of over 884 km of irrigation canals under 241 sections throughout the country have been undertaken by IAs. Ditchtenders have been retired. In addition, seven national systems servicing 1,690 ha have been completely turned over to IAs.[20]

(b) The Communal Irrigation Systems and farmer participation

The necessity for establishing viable IAs on the communal systems was felt sooner than on the NIS because in 1974 the government decreed that rehabilitation and construction costs on the CIS had to be shared by beneficiaries. Thus, farmers were required to provide 10 percent of construction costs and to enter into an agreement with the NIA to amortize the total cost of construction over a 50-year period. The initial payment could be contributed in the form of money, labor, rights of way or materials.

In order to assist the communal systems develop means for repaying long-term costs and to ensure that O and M requirements would be met by the local communities, the NIA helped to establish Irrigator Associations (IAs). A distinctive feature of the NIA's program was to employ a participatory approach which started with a Ford Foundation assisted pilot project in 1976. The idea was to involve farmers in the organizational process from the very start at the preconstruction

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[19]Cruz and Siy, Issues in Irrigation Water Management, p. 7.

[20]NIA, The Agricultural Input Loan, p. 21.

phase. This would give them a sense of ownership and involvement and would facilitate their understanding of and capacity to assume responsibility for the system after construction was completed. Community Organizers were employed to do the organizational work with farmers helping them build financial and water management capability and to train leaders. The institutional development process is designed for implementation over a period of several years (generally about six) ending with the complete takeover of the system by the IA.

The shift in emphasis on institutional development of the CIS required a substantial reorientation of policy and attitude within NIA. Originally, the organization was charged with expanding an irrigated area and had therefore focused primarily on design and construction. By the mid-1970s, it was required to develop functioning irrigation systems rather than simply to construct them. This meant it had to take account of both physical structures and the social forces that affected organizational arrangements. It required implementing a change of attitude among its personnel, particularly the Provincial and Project Engineers, in order to make them more sensitive to the role of farmers and community organizers in achieving the new institutional objectives.[21]

The system is then managed by a set of officers composed usually of the President, Vice President, Secretary and Treasurer elected by the IA members for a period of two or three years. Canal cleaning and maintenance and repair are done by hired workers or by members of the IA who contribute labor in lieu of fees payment. By 1985, there were 150 participatory communal projects in various stages of development. Some of the IAs have been successful enough to raise the required 10 percent of construction costs especially when these have been below ₱ 3,000/ha. As a trial program, NIA offered complete exemption from amortization payments to associations that could raise labor and material contributions equivalent to 30 percent of construction costs. Several associations around the country succeeded in achieving the 30 percent target while some others came close to doing so.

According to the NIA officials, the quality of O and M is better and there are fewer conflicts over water distribution on systems with active IAs.[22] Conversations with other observers did not indicate that this was uniformly so. Perhaps some of the success on the CIS systems stems from the fact that they are smaller and lower cost systems and

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[21]This process of instituting the attitudinal change is described at length in E.C. de Jesus, "Bureaucratic Reorientation at the National Irrigation Administration: A Philippine Case Study" (Manila: Asian Institute of Management, September 1982).

[22]Cruz and Siy, Issues in Irrigation Water Management, p. 18.

therefore more manageable.[23] However, the NIA's policy is to employ the institutional development techniques used on the CIS to speed up the process of developing IAs on the NIS.

(2) The cost of O and M

Table 4-7 shows average expenditures per hectare on O and M for sample irrigation systems.[24] The average cost per hectare is ₱ 176 although it is much lower on the CIS at ₱ 67/ha than on the NIS. Further, the pump systems are almost three times as expensive to operate because of high energy costs than are the gravity systems. In the case of the NIS personnel costs are the major expense while this is not the case on the sample CIS. The NIA's future development plans are designed to reduce personnel costs by getting FIGs and FIAs to assume full responsibility for O and M at the tertiary level so that the position of ditchtender can be eliminated as farmers do this work themselves.

c. Cost recovery

(1) Policy

In the Philippines, current national policy with regard to irrigation fees is set forth in Resolution No. 20, Series of 1978, of the National Economic and Development Authority (NEDA). Under this resolution, the government assumes responsibility for paying the interest on funds invested in the NIA irrigation projects. The NIA is supposed to impose charges on farmer beneficiaries that are sufficient to cover 100 percent of the costs of O and M, plus repayment of total outlay on construction within 50 years without interest. However, some specific constraints are placed on the magnitude of irrigation fees:

- Fees should be within the farmers' capacity to pay;
- Fees should not impair the incentive to use irrigation water; and
- Fees should not be charged to repay the costs of power, reforestation, roads, and flood control in multipurpose projects.

Obviously, there is a degree of conflict between imposing fees that are high enough to cover all costs except interest on loans yet low enough to be within farmers' capacity to pay.

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[23]Conversation with Jerry Sison.

[24]L. Cabanilla, "Study of O and M Problems in Irrigation," p. 31.

Table 4-7: O and M Expenses by Type of System, 1983
(₱/ha)

	Personnel	Power Cost	Other	Total
Type of System				
National				
Gravity	138	0	12	150
Pump	157	246	39	442
Gravity and Pump	207	58	29	294
Communal				
Gravity	23	0	44	67
All	115	33	28	176

Source: L. Cabanilla, Study of Operation and Maintenance Problems in Irrigation: The Philippine Case (Manilla: USAID, November 1984).

(2) Level of charges

From 1946 to 1966, the irrigation fee rate was fixed at ₱ 12 per ha per year regardless of season, crop and type of system. Starting in 1966 until June 30, 1975, this was increased to ₱ 25/ha during the wet season and ₱ 35/ha during the dry season for rice. For crops other than rice the rate was ₱ 20 per ha. The NIA Board of Directors approved a major change in fees that took effect on July 1, 1975. Instead of fees being expressed in pesos, they are now in cavans (50 kg) of palay (paddy) per ha. In general, on gravity irrigation systems, the fee is now two cavans/ha in the wet season and three cavans/ha in the dry season. These rates represent approximately 2-3 percent of production. Exceptions to these rates are in the Upper Pampanga River Improvement System (UPRIIS) where the rates are 2.5 cavans in the wet season and 3.5 cavans in the dry season. Higher rates are also charged in Northern Luzon and Mindoro. These amount to 3.5 cavans and 4.5 cavans for the wet and dry seasons respectively.[25] Lower rates prevail on the smaller communal irrigation systems where the rates are set by the farmers themselves. On the average, the charge is one cavan/ha per season which is used to pay for amortization of construction or rehabilitation costs.[26]

The water rates levied on pump systems vary both from the gravity systems and between systems in different regions. Thus, in Ilocos Norte, the wet season rate is eight cavans/ha and in the dry season 12 cavans/ha. The Libmanan-Cabusao Pump Irrigation System has a fixed rate of six cavans/ha for both seasons. The rates are different as well for irrigation systems serving non-rice regions.[27] For crops such as sugarcane, banana and other annual crops, the charge is five cavans/ha per year in gravity systems and eight cavans in pump systems. Payment is required in cash equivalent based on the support price.

A noteworthy feature of the irrigation fee system is that it is expressed in kind so that there is an automatic indexation. Thus, the cash equivalent of the fee increases with the support price for palay. However, due to rice pricing policies that favor the urban consumer, indexation does not function properly. In fact, the irrigation fee has been declining in real terms. (See Table 4-8). Further, as the rates are fixed, if the terms of trade in agriculture deteriorate, the share received by irrigation declines simultaneously.

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[25]Cruz and Siy, Issues in Irrigation Water Management, p. 11.

[26]Cabanilla, "Study of O and M Problems in Irrigation," p. 33.

[27]Irrigated area in non-rice crops represents a very small proportion of total irrigation hectarage. Of the total area of 513,926 ha served by the NIS in 1982, only 20,557 ha were planted in other crops.

Table 4-8: Nominal and Real Fee Rates by Season on Gravity Irrigation System (₱/ha)

Year	Nominal		Real	
	Wet	Dry	Wet	Dry
1946-66	12.00	12.00	-	-
1966-75	25.00	35.00	-	-
1975	100.00[a]	150.00	130.00[b]	196.00
1976	110.00	165.00	132.00	199.00
1977	110.00	165.00	120.00	179.00
1978	110.00	165.00	110.00	165.00
1979	130.00	195.00	107.00	161.00
1980	140.00	210.00	92.00	138.00
1981	151.00	226.50	88.00	132.00
1982	165.00	247.50	85.00	128.00
1983	178.00	267.00	82.00	123.00
1984	223.00	334.50	80.00	120.00

[a]Cash equivalents for the rates set as Cavans (50 kg/ha).
[b]Nominal values deflated by Price Index on Services (1978=100).

Source: L. Cabanilla, Study of Operation and Maintenance Problems in Irrigation: The Philippine Case (Manila: USAID, November 1984).

Farmers are permitted to pay irrigation fees either in kind (palay) or the equivalent in cash. Collection in kind, however, is not implemented very seriously by the NIA because the agency's lack of post harvest storage facilities results in large losses.

(3) Fee collection rates

Rates of fee collection for the NIS are highly variable ranging from as low as 30-35 percent up to 80 percent, with a system-wide average of about 56-57 percent.[28] This is evident from Table 4-9 which compares collections on two systems in the NIS.[29] The NIA's fee collection record improved between 1969 and 1974 from 50 percent of total collectibles to 66 percent.[30] However, there was a sharp decline from 1975 to 1976 when new rates were introduced and fees doubled ₱ 60 per double cropped ha. Collection declined to 31 percent. By 1981, it had again increased to 53 percent.

Prior to 1983, average collection rates on the NIS were about 56 percent with some areas achieving rates as high as 80 percent and others as low as 3-35 percent. The leading example of effective fee collection is the Bicol region where collections used to average 50 percent. After rehabilitation of the system in 1983, collections shot up to 100 percent. This is the best paying NIA system whose success can be attributed to improved management. Although there is not much farmer participation on the system, the rapport between officials and farmers is good and the system is reliable.[31]

Collection rates on communal systems are substantially lower than on national systems for a variety of reasons. But, as de los Reyes points out, a closer examination of the issue is necessary to properly determine actual fee payment levels. Even though farmers may not post official charges, they often pay a variety of non-official charges including gifts to water tenders, right-of-way payments to other farmers and contribution of labor for system maintenance.[32] Thus, some farmers who do not pay official irrigation fees or only make partial

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[28]Conversation with Ben Bagadion and Cabanilla, "Study of O and M Problems in Irrigation," p. 34.

[29]It should be noted that UPRIIS is reported to have a lower average rate of collections than the NIS as a whole. (Conversation with Ben Bagadion.)

[30]Cruz and Siy, Issues in Irrigation Water Management, p. 12.

[31]Interview with Jerry Sison.

[32]R.P. de los Reyes, "Stereotypes and Facts in Irrigation Management: Preliminary Findings from a Case Study of a Philippine Communal Gravity System," in Irrigation Policy and Management in Southeast Asia (Los Banos: IRRI, 1978), pp. 194-198.

Table 4-9: Fee Recovery Rates on National Irrigation Systems
(Amount collected as percent of fees due)

Year	Upper Pampanga River Project (78,400 ha)	Cotabato Irrigation Project (8,900 ha)
1974	NA[a]	71
1975	NA	30
1976	23	8
1977	34	NA
1978	28	NA
1979	29[b]	NA

[a]NA = Not Available.
[b]Represents collection for dry season crop only.

Source: The World Bank, The Philippines: Irrigation Program Review (Washington, DC: The World Bank, 1982).

payments actually pay a substantial amount. Thus, de los Reyes estimated that 172 of 424 sample farmers in Camarines Sur by contributing their labor paid an imputed value of about ₱ 300 in addition to the average irrigation fee of ₱ 158. By the same means, those who worked but did not pay the fee were still contributing ₱ 145 above what they owed the association for water.

In principle, sanctions exist for non-payment of fees. Farmers can be penalized by such means as cutting off the water supply or charging interest on overdue accounts, but the measures are difficult to apply. For example, water control facilities do not allow water to be cut off from only delinquent farmers. Further, it is difficult for political reasons to curtail water supply. An interesting finding by Cabanilla is that higher delinquency rates exist among the larger, richer, more powerful farmers.[33]

More effective methods of improving collection efficiencies are informal means of pressure such as exist between farmers when they are organized into user associations. One example is of the Angat Maasim River Irrigation System where collection performance increased 15 percent after the formation of user associations.[34] Higher collection rates are also found on smaller systems where the rapport between irrigation officials and farmers is best. Good collection has also been associated with newer or newly rehabilitated systems that function more efficiently and where farmers get a fair and reliable share of water supply. This was found to be the case, for example, in the Bicol region where collection rates increased from 50 to 100 percent following system rehabilitation in 1983.[35]

(4) Adequacy of charges and future planning

The fee structure of the NIA was devised with the objective of meeting all O and M costs plus construction costs over a 50-year period without interest. Table 4-10 shows that the NIA's fee collections did not cover O and M expenses for the years from 1979-83. In 1980, available funds for O and M on the NIS were ₱ 152/ha while the estimated cost was ₱ 164/ha. As discussed above, fee collection is a major problem on most systems. The rate of fee collection in 1982 was 60 percent resulting in a deficit of ₱ 42/ha for O and M costs. Based on the NIA's estimates, collections must be 80-85 percent for full recovery of O and M costs.

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[33]Cabanilla, "Study of O and M Problems in Irrigation," p. 40.

[34]Ibid., p. 13, and conversation with Ben Bagadion.

[35]Conversation with Jerry Sison.

Table 4-10: The NIA's Total Irrigation Fee Collection and O and M Fund Releases, 1979-83
(M of Pesos)

Year	Total Collections	Fund Releases
1979	45.35	66.15
1980	59.24	85.75
1981	52.74	103.45
1982	57.49	108.14
1983	72.72	100.99

Source: NIA Corporate Planning Staff, The Agricultural Input Loan: Irrigation Study, (Manila: NIA, November 1984).

The increasing financial difficulties in the government have caused it to require the NIA to assume responsibility for debt servicing including repayment of principal in addition to recovery of all O and M costs. The Corporate Planning Staff of the NIA in 1984 investigated the feasibility of assuming these financial burdens. It determined that in order to recover all irrigation loans at actual interest rates within the recovery period plus O and M costs, irrigation fee rates would have to be revised up to nine to ten cavans/ha of rice and 10-12 cavans/ha in the wet and dry seasons respectively for gravity systems.[36] Rates on pump systems would have to be proportionately higher because of high energy costs. This amounts to about 6 percent of production. Since the principal on foreign loans is due starting 1988, capital cost recovery from irrigation fees alone will not be feasible, although it may be possible to achieve full recovery of O and M costs.

C. Irrigation Projects

1. Upper Pampanga River Integrated Irrigation System (UPRIIS)

a. Background

(1) Description

The project is located in the Upper Pampanga Basin in Central Luzon, 150-300 km north of Manila. It is part of one of the five large river basins in the country. Some new facilities were constructed and rehabilitation was done in this river basin, referred to as the country's "rice granary", by NIA soon after its formation in 1964. In 1969, this was followed by implementation of a major irrigation project termed the Upper Pampanga River Project (UPRP) financed by a World Bank loan for US$ 34 M. One of the project objectives was to increase paddy production from 130,000 to 570,000 tons annually. Another was to increase cropping intensity from 143 percent to 198 percent.

The project entailed construction of the earth fill Pantabangan Dam across the Pampanga River to provide reservoir storage of 3,000 M m^3 and six existing diversion dams on the Talavera and Pampanga Rivers. Some local creeks were rehabilitated and modified to make better use of natural inflows and to accommodate additional supplies from the Pantabangan Reservoir which was finished in 1974. A 100-MW hydroelectric plant was installed at the toe of Pantebangan Dam with a re-regulation dam some five km downstream. A low-head power plant of 12 MW capacity was installed at the re-regulation dam. Facilities for close control of water delivery were instituted to serve 32,400 ha of rice fields for the first time, and 46,000 ha of existing systems were brought up to standard. Irrigation service began in 1974.

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[36]The NIA Corporate Planning Staff, The Agricultural Input Loan.

In a normal year, the project is designed to provide a dependable water supply to 77,000 ha during the wet season and 72,000 ha during the dry season. The system was designed for the rotational method of irrigation.[37] The UPRIIS service area now also includes the Aurara-Penaranda Project supported by the World Bank and completed in 1978 which expanded Zone IV of UPRIIS and has an area of about 26,000 ha. Most of the analysis herein includes only the UPRP.[38]

According to the Project Operations Manager (OM), the water supply will serve 90 percent of the area in a good year. During the 1984 drought, only 34 percent was served. Current-year water supplies will serve 65,000 ha.[39] Ng and Lethem report that shortages were expected to occur about every ten years, but at the time of their report (1980), none had occurred.[40] The area is in the path of tropical storms. There is at least one major storm each year. Rainfall is about 1800 mm annually concentrated in the wet season. Soils are generally suited for rice, but also for growing other crops. The rice production target for the region is 800,000 t/year.

There is inadequate reservoir storage to insure supplies for all of the area (about two-thirds of dry season and one-half during wet season) all of the time so that some of the area is served by less reliable run-of-the-river supplies. The system is gravity-fed with the canal network supplying outlets serving rotational areas of about 50 ha. Distribution within these blocks is up to the farmers. Some delivery is field-to-field.

The hydroelectric facilities produce 70 MW of firm power supplied to the National Power Council's Luzon grid. This is possible, as we understand it, without interfering with irrigation because of the re-regulation dam. The Operations Manager did not expect that irrigation flows might be preempted for hydropower in the future, but

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[37]UPRIIS, Operation and Maintenance Manual (Cabanatuan City: UPRIIS, 1985), pp. 1-3.

[38]Ng, Ronald and Frances Lethem, Monitoring Systems and Irrigation Management: An Experience in the Philippines (Washington, DC: The World Bank, September 1982), pp. 10-11.

[39]Conversations with UPRIIS Operations Manager at Cabanatuan, April 3, 1984.

[40]Ng and Lethem, Monitoring Systems, p. 11.

did not rule out this possibility. Other project benefits include flood control because of reservoir storage, fish conservation and recreation.[41]

There are some privately-owned shallow dug wells in the area which are pumped during periods of drought. There were some tube wells at one time, but we were told that these had been abandoned because of the high cost of pumping water compared to surface supplies.

(2) Agriculture in the project area

The UPRP system covers most of Nueva Ecija Province and parts of Balacan and Pampanga provinces. It includes 24 municipalities. About 26,000 farm families are served. Most land holdings are in the one to five ha range with an average size of 2.15 ha.[42] Ng and Lethem report an average of 1.6 ha elsewhere in their report.[43] UPRIIS reports a service area of 99,362 ha and 54,194 farmer irrigators, an average of 1.83 ha in the greater UPRIIS area.[44] Ng and Lethem report that under land reform laws, sharecropping has virtually disappeared from the area.[45] Later in the report Ng and Lethem report about 50 percent leaseholdings.[46] These differences may reflect the status at various times during the land reform activities as well as the problems of registering land title changes.

By 1979/80, dry season rice yields exceeded 5.0 t/ha of paddy on 24 percent of the planted area, although more than half of the area was still producing yields below the average. Some 16 percent of the land area is judged suitable for cultivation of crops other than rice, such as maize, vegetables and beans. However, diversification to other crops has been slow. All farmers in the project area are planting per ha to 76 kg/ha high-yield varieties. Fertilizer use rose from 55 kg nitrogen/ha to 76 kg/ha during the three years prior to 1979/80.[47]

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[41]UPRIIS, Operation and Maintenance Manual, pp. 5-6. Personal interview with Operations Manager, April 3, 1985.

[42]Ng and Lethem, Monitoring Systems, p. 21.

[43]Ibid, p. 66.

[44]UPRIIS, Organization and Development of Farmer - Irrigators Association (Zone Team Approach) Completion Report, (Cabanatuan City UPRIIS NIA, January, 1985), p. 2.

[45]Ng and Lethem, Monitoring Systems, p. 21.

[46]Ibid, p. 67.

[47]Ibid., p. 66.

In a general way, the agricultural status described in the literature was verified by our conversations with the Operations Manager and by the local leader of Poblacion Sur (Cabanatuan City), who is also a farmer. Poblacion Sur, an enclave of about 2,000 people is located in the central part of the project service area. We visited this official at his residence. Perhaps a dozen people were present and most participated, peripherally at least, in the discussion. Among them were two or three UPRIIS employees and presumably some other farmers and villagers. This official reported that holdings average about three ha in this area. Two crops of rice are grown with fertilizer and, given current high reliability of water supplies, very good yields, five to seven t/ha, are received. With development of a water users' association in his turnout area (50 ha), water service has substantially improved according to this leader. We do not conclude from this conversation that water service was not good before or that the principal reason for satisfactory water source was formation of the IA. The interviewee was an obvious enthusiast. The documentation on project success indicates that service must have been quite good over the project's history.

Production goals targeted for 1983 were largely being achieved by 1979/80. The 1979 wet season average yield of 3.5 t/ha was more than 90 percent of the level projected at full development and the 1970/80 dry season yield of four t/ha approaches the full development projected yield. These yields projected over the project area approximate the full development target of 570,000 T. Though shifting from single to double cropping started slowly, cropping intensity was close to appraisal targets by 1979/80. Full development took only eight years, instead of the 13 years projected at appraisal. A 1980 World Bank audit indicated an increase in the rate of return to 14 percent from the earlier projected 13 percent.[48]

The average farmer (1980) received a gross return of US$ 531/ha for his wet season, and US$ 668/ha for his dry season crop. Net farm income deducting imputed value of farm labor is over US$ 550/ha annually. Farm income is highest for owner operated farms in the 2-3 ha size range, approaching US$ 726/ha (1979/80). For leaseholders in the same size range, it is US$ 527 and for all farmers together in this size range income is US$ 627. The average farmer, with a farm size of 1.6 ha, received an annual net income of about US$ 900 from irrigated agriculture according to Ng and Lethem.[49]

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[48]Ng and Lethem, Monitoring Systems, p. 64.

[49]Ibid, p. 67. These are in current (1979/80) dollars. US exchange rate is not cited. Working back using the above yields gives prices of US$ 152/t for wet season and US$ 167/t for dry season.

(3) Functioning of irrigation in project area

The level of irrigation service is discussed generally in the preceding section. Agricultural management during 1975-82 was based on a massive monitoring and feedback system involving some 278 indicators ranging through input use and availability, cultural practices, soil and crop status and water supply. Twenty-five of these were concerned with water and irrigation, and include management, physical and agronomic items. Ng and Lethem published annual summary information on these indicators for wet seasons (1976-80) and for dry seasons (1977-78 to 1979-80).[50] These results are discussed below.

During the wet season adoption of recommended cropping schedules increased from 80 percent in 1976 to 95 percent in 1980. Adequacy and timeliness of water supply was reported at various critical times (planning, tillering, tillering to vegetative stage). In 1980, these indicators were either 95 or 96 percent of being adequate or timely, up from those for 1976 where they were 94 percent adequate at planting, but ranged from 78 to 84 percent for the other three indicators. Adequacy of facilities maintenance and canal cleaning and maintenance was judged at 83 percent in 1976. This indicator steadily increased to 98 percent in 1980. For the dry season, all water and irrigation indicators were in the 90-98 percent range during the three-year period and tended to improve during the course of the period.[51] Based on these reports and our discussions, we conclude that the functioning of the irrigation and water supply system and maintenance has been good.[52]

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[50]Ibid., Annex A.

[51]However, since this was written, Mark Svendsen has pointed out that the reports of good performance from the monitoring study should be treated with caution as all data were derived from survey questionnaires seldom checked for consistency with actual system performance.

[52]Observations commonly utilized by evaluators appraising the effectiveness of irrigation systems include physical inspection, and examination of various agricultural production factors and water balance studies such as cropping intensity and its variations, comparing field demand hydrographs with water releases, etc. Often the latter software indicators yield the best insights. For a discussion of diagnostic analysis or rapid appraisal of the effectiveness of irrigation systems see Robert Chambers. "Diagnostic Methodologies for Improving Land Irrigation Systems". Discussion Paper No. 8. Ford Foundation, New Dehli, 1983.

The Monitoring System developed some linear regression models designed to relate agricultural success to various indicators, but no information was found on the relative weighting which could be attributed to water and irrigation factors in contrast to other inputs and services in the agricultural production sector.

The OM indicated that his biggest problem was water charge collections. This is aggravated because of periodic calamities from typhoons. While there are some exemptions of water charges for such catastrophies, these disasters nevertheless aggravate the farmer's inability or unwillingness to pay. The OM's second critical problem is management during drought years. There is some opportunity to carry over reservoir storage, though how this would be managed in anticipation of future droughts was not discussed. There are some shortcomings in being able to check water surface elevations in canals to deliver water properly to outlets during the dry season. Silting occurs at a steady rate and continues, but the Manager did not name it as one of his major problems. Maintenance of farm-market roads is a problem, but some assistance may be given by the Public Works Department as the result of UPRIIS management working through the provincial Governor.

b. Project management

(1) Bureaucratic level

(a) Interagency linkages

Realizing that full cooperation of agencies outside of the NIA administrative control and of concerned private entities would be necessary to fulfill the objectives of increasing production from 130,000 to 570,000 T of paddy annually, the NIA established the Agricultural Development Coordinating Council (ADCC).[53] This Council was in place during 1975-82. In 1982, the Provincial Agricultural Council (PAC) was created by Executive Order and replaced the ADCC.[54]

- Agricultural Development Coordinating Council: The ADCC was composed of the provincial heads of the various agricultural line agencies with a member from the credit sector and a farmer member. The UPRP Project Manager and later the UPRIIS Operations Manager chaired the Council with the Governor of Nueva Ecija Province, serving as Honorary Chairman. In order to provide ADCC with reliable information to perform its function, NIA also set up an Input-Output Monitoring Program (IOMP). The IOMP was designed to provide information on the availability and use of inputs such as seeds, fertilizer and

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[53]Ng and Lethem, Monitoring Systems, p. 23.

[54]UPRIIS, Operation and Maintenance Manual, p. 67.

pesticides and monitored results achieved. It had a staff of 42 persons and collected information on 278 indicators using sample survey techniques. Though under NIA, the IOMP operated independently from the UPRIIS Operations Manager reporting through the Irrigation Assistance Department in NIA headquarters to the Assistant Administrator for Operations. In practice, as noted above, the monitoring and evaluation program was not particularly effective.

In 1975, the ADCC prepared a five-year development plan which targeted levels of input to be achieved during the 1976-80 period. Situation reports were developed fortnightly and selected information was made available to concerned agency officials including the UPRIIS operations staff as appropriate so that timely action could be taken without waiting for the regular meeting. Summary information was also prepared for the monthly meetings of the ADCC. The reports were also reviewed and discussed at the Provincial Development Council (PDC) of Nueva Ecija chaired by the Governor and at the NIA headquarters where a senior official from the National Food and Agriculture Council was also present. While much of the data was usefully presented in simple compilation form, other data received statistical analyses at some appropriate level including use of linear regression modeling.

- o Provincial Agricultural Committee (PAC): Because the PAC is created by law and is directly under the office of the Provincial Governor, the UPRIIS Management believes this arrangement may be more effective than the ADCC. Collection and monitoring of data appear to have been simplified. However, it still includes monitoring of a substantial number of physical and agronomic variables.[55]

(b) Project operations

The UPRIIS integrates the operation of five different irrigation systems. The organization is headed by an OM headquartered in Cabanatuan City who reports directly to the NIA Assistant Administrator for Operations. The OM is supported by staff divisions with responsibility for Engineering and Operations, Administration, Equipment, Dam and Reservoir and Institutional Development, and a Water Control Coordinating Center which formulates plans and programs water releases based on information processed through the line divisions.

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[55]UPRIIS, Operation and Maintenance Manual, Chapter III, pp. 23-49.

The service area is divided into four districts each headed by a District Manager. Districts are responsible for implementing the UPRIIS program within the district area. Administratively, district officers are divided into three sections with responsibility for:

- o Repair and Maintenance;
- o Operations; and
- o Administration.

The Operations Section is supported by a staff hydrologist. The district is divided into zones of about 8,000 ha each under a zone engineer and further into water management divisions of about 750 ha each headed by an assistant water management technologist or a watermaster supported by ditch tenders. The basic rotational unit, served by one outlet has an area of about 50 ha. Zone engineers are graduates in civil or agricultural engineering with five years or more experience. Assistant water management technologists are college graduates usually in agriculture. Watermasters, gatekeepers and ditch tenders are high school graduates with experience and/or specialized training.[56]

The OM presides over a complex range of responsibilities and tasks. These include safely operating the dams, reservoirs and canals and keeping them maintained; planning, scheduling and delivering water to outlets efficiently in optimal quantities at the proper times; and, in the case of UPRIIS, integrating and coordinating agricultural inputs and supporting services other than irrigation for increasing production. The UPRIIS has developed a fairly comprehensive system of long- and short-term planning and scheduling utilizing the information described in the previous section, but the team was unable to determine the extent of its effectiveness in actual practice.

(c) Institutional Development Division

This Division is headed at the UPRIIS level by a separate officer who is attached to the Office of the OM, but who also reports to the Director of the Institutional Development Department under the Assistant Administrator for Operations at the NIA headquarters in Manila. At first, organization of irrigation farmers was undertaken exclusively by the Farm Systems Development Corporation (FSDC), an entity of the Ministry of Human Settlements. About seven years ago, NIA initiated its own program for institutional development,

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[56]UPRIIS, Operation and Maintenance Manual, pp. 9-22 and discussions with Operations Manager, April 3, 1985.

working on NIA projects and on traditional community ones.[57] For UPRIIS, the Institutional Development Division Chief has wide discretion in how he approaches his task of developing water user associations that will assume much of the responsibility for collection of water charges and for operating and maintaining tertiary portions of the system.[58] - [59] This is in response to a very strong national policy designed to increase NIA revenues and to relieve formerly subsidized O and M costs to NIA.

The FIGs or water user associations are first formed at the water service unit or outlet (50 ha) level and then organized into the larger federations of FIAs at the division level as described in Section B.2.b. There is one overall farmer organization for the UPRIIS.

Organizationally, each of the four districts in the project area is divided into three units, each headed by an Institutional Development Officer who works through the divisional level water management technician (WMT) or watermaster (WM). WMTs and WMs are provided with substantial resource materials in the form of field training and audio-visual aids.

(2) Farm level management

The farmers in any rotation unit served by an outlet (about 50 ha) are responsible for distribution of water and maintenance of facilities within the unit. They are supported in this activity through extension, but the effectiveness of this support could not be evaluated.

For his production responsibilities, the farmer gets support from a number of agencies. This support is planned and monitored through the ADCC or, since 1982, the PAC, as described. Farmer organizations are expected to participate in both long- and short-term scheduling activities.[60]

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[57]See Korten, Francis F., Building National Capacity to Develop Water User Associations--Experience from the Philippines, World Bank Staff Working Paper No. 528, (Washington, DC: The World Bank, July, 1982), for description and analysis of community-based systems.

[58]Interview with Chief of Institutional Development Division, UPRIIS, April 3, 1985. This officer has a bachelor's degree in agricultural engineering and a PhD in agricultural and irrigation engineering from a US university.

[59]UPRIIS, Organization and Development.

[60]UPRIIS, Operation and Maintenance Manual, p. 27.

As stated earlier, a cornerstone of current national irrigation policy is to engage the farmers, through Irrigation Associations, in achieving higher collection of water charges and in assuming a significant share of the financing and execution of O and M. While hesitant to quantify, the Operations Manager did estimate the reduction in cost of O and M to UPRIIS through mobilization of farmer resources to be 25 percent.

Farmer organizations are arranged hierarchically as follows:

- Rotational Unit Group (RUG): A rotational unit covering about ten ha with the purpose of systematizing water distribution through a chosen group leader;
- Farmer Irrigators Group (FIG): Implements the water distribution schedule among three to five RUGs through an elected president;
- Farmer Irrigators Association (FIA): Consists of farmers from 10-25 FIGs within a 200-750 ha area served by a common source. FIAs have a constitution and bylaws and acquire a juridicial personality through registration with the Securities and Exchange Commission; and
- Federation of Farmer Irrigators Association (FFIA): Two or more adjacent FIGs may join together in order to enhance individual FIG objectives. FFIAs may be within an individual system in a zone or district.[61]

c. Cost recovery

(1) Charges, collection and recovery rates

(a) Types and levels of charges

Water charge rates are tied to rice so they are automatically indexed as long as rice prices do not change relative to other commodities. For UPRIIS, water charges are 125 kg/ha/palay for the wet season and 175 kg/ha/palay for the dry season.[62] The ratios for UPRIIS, which has reservoir storage, are higher than the standard national ratio of 100 and 150 kg/ha.

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[61]Ibid, Chapter V.

[62]The Economic Report for January, 1985 lists a palay support price of FP 3.35/kilo. The price ceiling for regularly milled rice is listed at FP 6.00/kilo.

In addition to water charges, the Government levies a land tax equivalent to 1 percent of assessed valuation. The average tax amount is about ₱ 60 per ha.[63]

(b) Collection mechanisms

Bills prepared by field personnel (usually WMT/WMs) are delivered to farmers by bill collectors or other field personnel. Bills may be paid either in cash or in kind. Cash receipts or receipts from sales are deposited in the nearest Philippine National Bank branch.[64] A 10 percent discount is given for early payment, but a 1 percent per month interest charge is levied on bills two months or more in arrears. Consideration has been given to linking payment of water charges to eligibility for Land Bank loans but this does not seem practical administratively even if it were a good idea.[65] UPRIIS, as does the NIA, regards Farmer Irrigation Associations as the most promising approach to improving collections.

One step taken by UPRIIS to improve collections is through the collection campaign. All staff members are expected to participate in generating enthusiasm during collection campaign meetings. National studies have shown that good rapport and constant dialogues between NIA staff members and farmer clients is helpful. Steps taken by UPRIIS, as in other national systems, include:

- o Deputization of collectors from personnel ranks other than the regular ones;
- o Participation in the collection thrust of irrigators associations;
- o Creation of a Special Collection Committee to cater to special clients; and
- o Sending of demand letters to delinquent water users.

UPRIIS-NIA says it has "accorded defaulting collectors with disciplinary action to maintain the trust of the payers while top collectors are given accolade, their efforts noted for future reference."[66]

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[63]Ng and Letham, Monitoring System, p. 72.

[64]L.S. Cabanilla, Study of Operation and Maintenance, p. 48.

[65]Ng and Lethem, Monitoring Systems, p. 72.

[66]UPRIIS, Operation and Maintenance Manual, pp. 46-47.

(c) Rates of recovery

The UPRIIS Operations Manager stated that collection rates are low. He did not volunteer a value. No documentation was provided although the OM had intended to do so. The only other information on collection rates is that collected by the IOMP in situation reports one month after each seasonal harvest. In 1979, for the wet season, full payment had been made of 27 percent of water charges and partial payment of 9 percent with 55 percent intending to pay. For the dry season, full payment had been made for 34 percent, partial payment for 16 percent with 50 percent intending to pay. Collection rates were reported to have improved to over 60 percent in 1980 as a result of a concerted mobilization effort by NIA personnel, accompanied by a public relations campaign. We are indebted to Mark Svendsen for this information. In spite of intentions, collections fall far short of the 85 percent needed to fully finance O and M.[67]

(2) Application of charges

Water charge collections are pooled at NIA headquarters, supplemented using revenues from other sources, and rebudgeted for O and M to national projects. While the Operations Manager listed water charge collections as his most difficult and pressing problem, a reasonably acceptable level of operating and maintaining the system is being achieved.

d. Farmer participation and perception: Farmer organizations for water management

The activities of UPRIIS' Institutional Development Division were briefly described in Section C.1.(c), B.1.c. A total of 281 FIAs are planned. These FIA's would serve a membership of 54,194 farmers occupying 99,362 ha within the 127 divisions contained in the project area. The average FIA would serve 354 ha and 193 farmer-irrigators, with slightly more than two FIAs per Water Management Division.

In order to encourage the development of farmer organizations, the NIA has the following incentive schemes:

- Collection Incentive: When an FIA achieves 70 percent collections it is allowed to retain 2.5 percent of the collection as a bonus. This increases to 3 percent of the collection if 100 percent of the fees are collected; and

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[67]Ng and Lethem, Monitoring Systems, p. 72, Discussions with Operations Manager, April 3, 1985.

- o Maintenance Contract: The FIA may contract to maintain a portion of a canal ordinarily handled by a ditchtender. This formal contract cites legislative authority, specifies NIA and FIA obligations and compensation to be paid. Contracts are renewable annually. On the draft sample we were shown, the length of canal to be maintained was 4.10 km.[68] A length of 3.5 km was mentioned both by UPRIIS and by NIA headquarters officials as about the length which one ditchtender can handle.

As of the end of calendar year 1984, 94 FIAs had been organized, 39 were registered with the Securities and Exchange Commission and 31 had entered into a contract with NIA to collect irrigation fees. Five of the latter had attained collection incentives and maintenance of canal sections had been turned over to farmers in six instances.[69] In the latter case, the ditch tender's position was terminated as farmers made maintenance contracts.

Institutional development achievements were reviewed and plans discussed at workshops held in each zone during September-October, 1984. Based on these discussions the following targets were set for 1985: A total of 130 FIAs organized (57 additional) with 117 registered, 105 with contracts to collect water charges and maintenance contracts negotiated with 12.[70]

Aside from the sketchy information given above and the enthusiastic endorsement of the local leader at Poblacion Sur, we have little information on how effective the FIAs are or can be expected to be in the UPRIIS area.

All of the people we talked to are members of a bureaucracy which has been asked to put itself out of business (at least in part) and many will lose their jobs. Yet they are proceeding with the task of farmer organization with a will and with confidence. This optimism is certainly exemplified by the attitude of the NIA Assistant Administrator for Operations who expressed great confidence that the efforts will fully succeed. We did not, however, talk to many people at levels whose jobs were at risk, except two or three who joined us at the local leader's house at Poblacion Sur. They seemed to agree that there had been improvements under the user associations and engaged in light-hearted banter about their impending early retirement.

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[68] Ibid.

[69] UFPRIIS, Organization and Development.

[70] Ibid., p. 2, 10.

2. Laur (Pinagburyuhan) Project

a. Background

(1) Description

Laur Municipality is located in Nueva Ecija Province in a small valley some 20 km northeast of Cabanatuan City and 100 km northerly from Manila. There are two irrigation systems in the valley. The Pinagburyuhan System (PIS) irrigates about 900 ha contiguous to the town. The Bagting-Siclong System serves about 300 ha located in three barrios about 7 km from Laur. No information was found about the origins of the Pinagbuyruhan system but an irrigator's association existed as early as 1920. The Bagting-Siclong System was built about 1932 when seven farmers organized the Bagting-Siclong Irrigators Association (BSIA).[71]

The diversion structure is a brush dam serving two concrete headgates and main and lateral canals. About 1980, the Pinagburyuhan Irrigators Association (PIA) entered into an agreement with the NIA for a rehabilitation project. This included construction of a permanent dam which would also serve the BSIA area and reconstruction and remodeling of the canals to serve approximately 2,000 ha. Construction of the canals and of the dam went ahead concurrently. The canals were completed, but the pile foundations for the dam were washed out by a typhoon flood and the dam has not been finished.[72]

The PIA manager gave the impression that the reason for not completing the dam is financial including the question of the irrigator's ability to repay the ₱ 5,000,000 - ₱ 10,000,000 M ($300,000 - $600,000) that the dam might cost. Subsequent conversations with the Officer in Charge of the Communal Projects Implementation Department in NIA headquarters revealed, however, that the problem was a technical one regarding the safe design of the dam. This issue was on the agenda for decision by the NIA within the week. The NIA's intentions are to complete the system. The cost estimate will be included in the pending decision but could be larger than the ₱ 5-10 M mentioned above. Meanwhile, irrigation continues on about 900 ha using a temporary rock and brush dam. According to the PIA Manager, this dam is washed out at least once annually, sometimes three times, and costs about ₱ 35,000 to replace each time it is destroyed.

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[71]Unson, Delia Cecelia Ochoa. Social Development and the Communal Irrigation System in Laur, Nueva Ecija: Baseline and Selected Interim Monitoring Results, Final Report," (Atenea de Manila University, Quezon City, Institute of Philippine Culture, 1978). This is the principal documentary source for material included in this chapter.

[72]Interview with PIA Manager at Laur, March 28, 1985.

The Laur Project was picked by the NIA in 1976 as a pilot project under its Communal Projects Implementation Program in which two irrigation associations would be developed with the objective that their members fully participate and become self reliant in managing their irrigation systems. More specifically, the objectives were to (a) involve association members in the planning, construction and rehabilitation of their irrigation systems, (b) strengthen self reliance of existing indigenous organizations, and (c) transform irrigation associations into cooperatives able to respond to other needs of their members. Strategies included use of community organizers, farmer participation in group dynamics and leadership seminars, and eventually, participation in the planning and construction of a rehabilitated and expanded project and assumption of responsibility for its continued operation and maintenance. Results were to be studied and, if successful, adopted for the development of communal associations throughout the country. NIA and the Ford Foundation, a co-sponsor of the effort, requested the Institute of Philippine Culture (IPC) to evaluate and determine the effectiveness of the pilot project.[73]

The NIA had an ongoing program of some 250 projects per year. Between 1976 and 1980, only 15 projects serving 275 ha using the new participatory approach were started. Projections for the end of 1983 were that 347 projects serving 52,550 ha would be constructed or under planning using the new approach. By December 31, 1982, 21 of these projects serving 3,250 ha had been completed.[74]

(2) Agriculture in the project area

The project area has a population of about 10,000 with 2,140 households. Average family size is 6.6 persons.[75] Average farm size for PIA members is about two ha. The area has a high proportion of owner tenants.[76] Unson reports 17 percent share tenants and 53 percent lessees (1976). The primary crop is rice and two crops are planted each year: March/April - June/July and July/August - November/December. PIA members planted both seasons and averaged about two ha per crop. The most important secondary crop is onions, but other secondary crops include vegetables, sugarcane, maize and peanuts. Secondary crops are grown during December-March. Farmers who

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[73]Unson, Social Development.

[74]Bagadion, B. V. and Francis F. Korten. "Developing Irrigators Organizations: A Learning Process Approach to a Participatory Irrigation Program," Draft prepared for inclusion in Putting People First, Michel Cornea, ed. to be published by the World Bank.

[75]Unson, Social Development, pp. 37-65.

[76]Interview with Association Manager.

have water and sufficient capital plant all three crops. Most farmers who lack irrigation plant only the wet season rice crops; those with limited capital are unable to plant onions.

Yields (1976) were 2.5 t/ha (dry season) and 2.23 t/ha (wet season). According to the Association Manager, introduction of high yielding varieties during the past ten years has raised the potential by 2.5 t/ha. This official reported that he could not remember when there had been a shortage of fertilizer or pesticide. Fields are tilled by either buffalo or tractor. There are several large tractors in the area.

The median income of PIA members was ₱ 9,321 total, of which ₱ 3,800 was in cash. The PIA applicants[77] total income may be judged by comparison with 1976 Philippine rural area poverty threshold levels of ₱ 5,386 for food and ₱ 8,976 in total.

(3) Functioning of the irrigation system

Most of the efforts of the Association go into replacing the brush and rock diversion dam when it is washed out while some attention is also given to rehabilitation of channels. Because of water scarcity, rotational scheduling has been introduced, but there have been problems with adhering to it. The failure to complete the system has complicated matters for the Association, so that it is difficult to improve discipline. Generally, the distribution channels and the condition of the fields indicate a reasonable level of maintenance.

The Association Manager indicates that present yields are 2.5-4.0 t/ha, but could be raised to 5 t/ha with reliable irrigation insured by the permanent dam.

b. Project management

Present Association membership exceeds 700. This has grown from the 370 members and 65 applicants reported in 1976. There are 11 directors, one from each of the districts served. They elect the President and Vice President and select the Manager. A Treasurer and Secretary are also named. The present Treasurer is paid a salary and resides at the headquarters building. Approximately 30 kapitans (group leaders) serve under the Directors. The functions of the organization are to operate and maintain the system, mobilize labor sessions to do repairs, clean channels, hold meetings of directors and members, resolve conflicts and collect annual dues. The PIA also has the responsibility to continue negotiations with the NIA

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[77]Applicants are farmers who have applied for association membership whose lands are not served by irrigation, but would be under the improved project.

regarding completion of the project. During the planning and construction phase, the Association arranged for participation of its members in various planning and construction activities.

c. Farmer participation and perceptions

(1) Background

Under the NIA's Communal Project Implementation strategy, farmer participation begins well in advance of planning and construction. This preparatory work is designed to develop individual and organizational interest and capability so that eventual participation will be fruitful. Beginning in 1976, using pilot programs, NIA began developing a methodology for achieving systematic involvement of participants. At the same time, NIA used these programs and their subsequent implementation experience as a learning exercise for NIA institutionally and for its staff members.[78]

NIA recognized the need to understand the existing social structure including existing irrigation organizations so that these could be built upon and important indigenous social constraints would not be overlooked. Realizing the danger of building false expectations, the first step in the farmer participation methodology is to ensure technical feasibility based on a social technical profile. If a decision is made to go ahead, organizational development, training and collection of technical information follow. This eventually leads to a plan for construction and repayment. Then NIA gradually adds a cadre of institutional organizers who, with the technical people, proceed with the institutional development phase. This includes participant training and involvement in the collection of information, planning, design, procurement of rights-of-way and construction. The NIA has now developed a 28-week institutional program and flow chart leading to initiation of construction.[79] Users are also involved in various aspects of construction, providing labor and materials, assisting in monitoring and cost control, etc. After construction, the NIA attempts to negotiate an agreement to turn the completed system over to the irrigation association for continued operation, maintenance and management.

(2) Farmer organization for irrigation management

Since Laur was an early pilot program, the details of development varied somewhat from the present process. Information about the origin, structure, and membership of the PIA is given in Section (1) above. Sometime prior to the time of initiation of the program (1976), the former single PIA association had split into two,

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[78]Bagadion, Benjamin V. and Frances F. Korten, Developing Irrigators' Organizations.

[79]Ibid., Figure 2.

one for each of the main canals. Reconciling differences and agreeing on leadership led to a rather slow start by PIA. The present problems facing PIA's leadership stem from the delay in completing construction of the dam.

(3) Functioning of farmer participation

(a) Tasks during institutional development phase

Unson suggests the following ten tasks as necessary for the institutional development process at Laur:[80]

- Group dynamics seminar - This required organizing a Committee to develop the logistics, obtain the financing and hold the seminar. The activity also required a visit to the NIA headquarters at Manila by the Committee to arrange financing;

- Drafting and ratifying or amending a set of by-laws - Attempting to draft a set of by-laws by PIA brought into focus several areas of conflict within the organization. These were primarily over the interests of the majority of ordinary farmers vs. influence of a fairly powerful ministry;

- Holding proper elections - The PIA had some difficulty in holding satisfactory elections because the membership perceived that some decisions were being made by municipal leaders, particularly the Mayor, or covertly by factions of directors. Eventually, with the Mayor's agreement, a proper election was held;

- Farmers preparation of their own plan for their irrigation system, that is, the location of the dam site, and the main and lateral canals - The Association created a Special Committee on Physical Plan. Its function was to consult farmers from all barrios to insure that their needs were met in the plan which the Association would present to the NIA;

- Participation of farmers in the surveying of their land - Farmers, including Committee and capata representatives assigned on a rotational basis accompanied the NIA survey team. They discussed the feasibility of their plan and assisted with getting rights-of-entry, clearing paths, and providing survey markers. Though PIA was slow to get started, causing delays, they eventually responded and provided valuable service in persuading a recalcitrant farmer to permit entry;

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[80]Unson, Social Development, Appendix A.

- o Acquisition of water rights - Formal acquisition of water rights from the river by the Association required a complex application supported by survey maps, articles of incorporation, proof of registration and a certified true list of tax declarations of real property for all members. Compiling the latter is a substantial task. It was done by volunteers and was made more difficult by the growing list of new members;

- o Acquisition of right-of-way waivers - The Association had the responsibility to negotiate formal written rights-of-way waivers voluntarily relinquishing land for channels and other structures;

- o Preparation for and attendance at leadership seminars - Unlike the group dynamics seminar, the leadership seminars had to be financed by the Association who also had to arrange for the meeting place and amenities. The PIA recognized its need to air its leadership problems and responded quite effectively in organizing this seminar;

- o Readiness of farmers to contribute voluntary labor for the construction of their irrigation system - This, in effect, is a pledge by an association to provide a defined amount of voluntary labor. In addition, an inventory is made of skilled and semi-skilled personnel available; and

- o Preparation of repayment scheme - This will be described in Section D.

(b) Evaluation of performance

Comparisons between the BSIA and the PIA show some interesting contrasts. The BSIA was able to complete all ten tasks quite efficiently and effectively, whereas the PIA had difficulty with all of them except the leadership seminar. At the conclusion of the IPC evaluation (August 1977), PIA had not completed its water rights application, obtained all of the required rights-of-way waivers, identified fully farmers' willingness to contribute voluntary labor nor developed a repayment plan. Isles and Collado report at a later date that "one of these two associations (obviously PIA) was so divided by internal political conflicts that plans for construction assistance were suspended."[81]

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[81]Isles, Carlos and Manuel L. Collado. "Farmer Participation in Communal Irrigation Development: Lessons from Laur," MS prepared for publication in Philippine Agricultural Engineering Journal, undated.

Unson[82] reports several additional criteria for rating association performance. Each criterion is measured by a prestated set of indicators resulting in a percentage score. The results are based on a sample survey of 15 percent of association members and applicants.

The results are summarized in Table 4-11. Conflicts and conflict resolution within each of the two organizations shows a sharp contrast as do the other indicators. Most BSIA respondents did not perceive that there were any conflicts. Those that did occur were usually resolved among the parties involved or at a general assembly of members. For PIA, prior to recombining the two organizations, the arbiter was usually the president, but this did not provide a solution when the parties were not from the same organization. Conflicts usually arose over water distribution problems such as water stealing and disputes over scheduling. One case finally had to be brought before the Judge Advocate General's Office for decision. Under the combined PIA, difficulties continued. Discontent with the performance of their officers by many members became a major issue. Members were unwilling to accept decisions of their directors; however there was less reliance on municipal authorities. Participation in decision making by members remained low. Discontent led to a petition by about 10 percent of the members to remove the directors. Unfortunately, NIA officials bore a considerable portion of the brunt of the anger and frustration of the Association's officers.

Reasons for the PIA's poor performance could be attributed to several factors besides the conflicts associated with the earlier schism into two associations. The BSIA is a relatively small compact group quite isolated from the Laur municipality. The PIA serves a much larger constituency in which municipal authorities, particularly the Mayor, exercise considerable power over irrigation matters.[83] Transfer of this power to the Association was resisted.

In spite of difficulties that included disappointment about the dam, the PIA was able eventually to qualify for NIA assistance and to continue to function. The difficulties encountered do not mean that effective participation through user associations is unlikely; only that some cases are more difficult than others.

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[82]Unson, Social Development, Ch. V.

[83]NIA communal projects are generally less than 1,000 ha. The average size of 347 participatory projects completed or under planning between 1976 and 1983 was 152 ha. Bagadion and Korten, Developing Irrigators Organizations, Table 1. p. 11.

Table 4-11: Comparison of the Performance of Two Communal Irrigation Systems--the BSIA and the PIA

	Percent Score			
	BSIA[a]		PIA[b]	
	Time 1	Time 2	Time 1	Time 2
System Management				
Management style and capability	98	100	14	64
Meetings	88	96	25	67
Water distribution schedule	58	58	25	33
Cropping patterns	0	0	0	0
Financial capability	83	83	20	40
System Maintenance	83	92	17	33
Conflict Resolution	100	100	25	25

[a]BSIA = Bagting-Siclong Irrigation Association.
[b]PIA = Pinagburyuhan Irrigation System.

Source: D.C.O. Unson, Social Development and the Communal Irrigation System in Laur, Neuva Ecija: Baseline and Selected Interim Monitoring Results, Final Report (Quezon City: Institute of Philippine Culture, 1978).

d. Cost recovery

Annual dues for PIA members are ₱ 70/ha which are applied to the costs of O and M. Repayment charges are not being made and will not be collected until the project is completed. Collection success ranges from 20 to 50 percent. The Manager thinks that collections will approach 100 percent when the system is made reliable by constructing the permanent dam. Officers of the Association are asked to assist in collection of dues from delinquents and are given a share of these dues as an inducement. This year, the Association has collected just enough to meet its costs--mostly for replacing the dam. The Treasurer has to wait for his salary from time to time, but the Association manages to make ends meet.

Under its contract with NIA, the Association worked out a repayment plan which was then negotiated with NIA. The Manager thinks that farmers will honor this commitment once the new dam is installed and the system made reliable. The Team did not ascertain the specific terms of PIA's repayment agreement with NIA. However, the general arrangement presumably follows the pattern established for the CIS of paying 10 percent of construction costs in cash, paddy, right-of-way or labor.

In addition, there are irrigation dues which amount to 75 kg/ha/annum of paddy. Of this, 25 kg is retained by the Association and 50 kg/ha goes toward repayment of the balance of the capital costs. Time for repayment, up to a maximum of 50 years, depends upon the cost of the project. Repayment is at zero interest. Though the original agreement is negotiated in terms of paddy, the repayment obligation is indexed to pesos based on paddy prices at the time the agreement takes effect. Thus inflation reduces the real cost of repayment. When asked if the users would be willing to pay for cost recovery at realistic interest rates, the Association Manager was non-committal, but left the Team with the impression that this was rather a strange new idea.[84]

D. Summary and Conclusions: Study Issues

1. To what extent is cost recovery through direct and indirect charges a feasible goal in irrigation systems?

At UPRIIS, the O and M charge is less than 5 percent of the gross returns. Therefore, from the point of view of the irrigator, there is little question about the feasibility of direct payment. The

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[84]This could hardly have been because of financial naivete. The Manager discussed the Country's balance of payments problem including IMF terms at considerable length and in detail. He is very concerned about the implications to the future Philippine economy and displayed a remarkable understanding of the technical problems at national level.

problem, however, is to increase the rate of collection. UPRIIS and NIA officials stated that 85 percent collection is required to meet O and M costs and this is not being achieved at UPRIIS.

Capital cost recovery is another matter. The precedent in the Philippines is that repayment for the NIS schemes is indexed to the peso at the time of investment and repaid at zero interest over a period of 50 years and even this has not been collected. We would anticipate that changing this concept at the farm level would be difficult. At NIA, there was some optimism that the rate might be raised somewhat and collection improved.

We do not think full recovery of capital costs from farmers is a feasible goal on the UPRIIS project because of the small size of most of the farms. Given the complex structure of subsidies and price fixing, it is not possible to know how much, if any, net gain to the treasury from these indirect sources could be attributed to recovery of irrigation capital costs. Some increase in direct collections could be feasible if accompanied by reductions in subsidies and price fixing, but this is a risky policy issue and has to be weighed against the effects of raising food prices for urban consumers.

O and M charges are already being collected by the Pinagburyuhan associations. However, the collection rate is low and it is not clear whether the amount collected will be sufficient once the associations assume full responsibility for O and M. Given present conditions, it seems likely that this component of cost recovery is feasible.

The user contribution of 10 percent of capital cost at the time of construction has not been much of a problem either. The remaining portion of capital cost recovery may also be feasible, primarily because farmer repayment is interest free and not indexed to real peso value. The average cost of 21 CIS projects completed by 1982 was about ₱ 3,000/ha or about ₱ 360/ha/annum at 12 percent interest for 50-year recovery.[85] The repayment share amounts to only about two percent of total production, even with indexing.

Although the costs of the PIA project may be higher, no attempt has been made to index these costs and it is possible that repayment is within the financial capability of most farmers. This is true despite the fact that even with irrigation, nearly half of the PIA members were at or below poverty level in 1970. On the other hand, irrigation raised median incomes of PIA farmers by nearly three times (see Section 2.a.(2).

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[85]Bagadion and Korten, Developing Irrigators Organizations, Table 2.

2. Do increased farmer participation and control contribute to improved cost recovery?

This is still untested on UPRIIS. The NIA's strategy is to shift O and M costs to farmer irrigator organizations as they become established on the assumption that increased farmer participation will result in improved cost recovery but this has not actually been proven. Neither does the PIA experience confirm this one way or another.

3. To what degree does improved cost recovery depend upon reliable water supply, adequate water supply, water delivery and measurement technology?

The UPRIIS experience has shown that although the system provided reliable and adequate water supply and water measurement technology was employed, collection of water charges did not increase.[86]

On the CIS scheme, the officials interviewed suggested that lack of adequate and reliable water supplies constrained water charge collections. They believed that 100 percent of O and M costs could be recovered if and when an adequate water supply was made available. They also suggested that farmers would be willing to pay a portion of capital costs if the dam they needed was constructed. Given the fact that the association members paid some charges even under conditions of unreliable water supply and were willing to contribute both funds and labor for repeated construction of the brush dam, it is possible that improved water supply from a permanent dam might result in better collection rates. Whether this would amount to the 100 percent asserted by the officials is debatable and may be explained by the officials' desire to present a favorable cost recovery outlook that would inspire investment in the dam. In conclusion, it may be that reliable and adequate water supply are necessary for improved cost recovery but these conditions may not be sufficient.

The PIA experience provides no evidence on the issues of delivery and measurement technology and their impact on cost recovery.

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[86]At UPRIIS, timed rotation of measured streams rather than direct volume measurement is used but water charges are on a crop area basis. It should be noted that the installed water measurement technology of double-gated turnouts at the 50-ha Rotational Areas was only used minimally. Measurements are regularly taken and used only at a handful of points within the system while a somewhat larger number of points are monitored for "historical" purposes. We are indebted to Mark Svendsen for this valuable insight.

4. Are increased water charges a necessary and sufficient condition for improved O and M? To what extent does efficiency of water use vary with the cost of water?

At UPRIIS, O and M is good at the present level of water charges so that increase in charges are unlikely to have much of an impact. On the national systems, as a whole, the NIA's capability to subsidize O and M is declining and it requires 85 percent collection rates on the projects to maintain present levels of O and M. In this case, improved collection levels are required to maintain levels of O and M.

The PIA experience does not provide evidence on this issue. However, on the 21 CIS projects studied by Bagadion and Korten, the total value of voluntary maintenance activities, time spent in collecting fees and management and cash outlays under the Aslong communal project approximately equaled the O and M dues charged by the association.[87] Beyond these contributions, increased water charges over the present level do not seem necessary.

Since water charges are uniform throughout the Philippines, it was not possible to obtain evidence on efficiency of water use relative to cost of water on either project visited.

5. Do institutional arrangements whereby farmers participate in and control irrigation systems improve O and M?

Participation is just beginning on the UPRIIS project. O and M, under NIA, is already good. A carefully designed research effort of fairly long duration (five years) would be necessary to determine the answer and perhaps should be undertaken.

Although no information was available on this issue at Laur, some information on the CIS is available from Bagadion and Korten. They compare field channel utilization on the Upper Lalo system where farmers participated in deciding on channel location with the UPRIIS project, where farmers did not participate. On the Upper Lalo System, farmers suggested modifications of about 60 percent of the locations resulting in a channel length factor of 90 m/ha instead of the NIA value of 94 m/ha. One year later, 68 out of 69 channels were carrying water in a manner satisfactory to the farmers. On UPRIIS, for a sample study of six rotational areas, the NIA designed and constructed channels with a channel length factor of 75 m/ha, and "the great majority of these new channels were erased (by the farmers) as fast as

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[87]Bagadion and Korten, Developing Irrigators Organizations, pp. 33-37.

they were completed."[88] The farmers reverted to using channels existing before the rehabilitation; at the time of the study, in a ratio of 34 m/ha.

It could be inferred that O and M on the Upper Lalo was better (most authorities believe that a channel length factor of about 75 m/ha is desirable for paddy irrigation) and therefore that user participation in deciding on field channel location led to improved O and M. However, the authors caution that this does not mean that farmers always know best. About 25 percent of the farmer-suggested locations needed revision for technical reasons. These revisions were made jointly with the farmers.

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[88]Mark Svendsen, "Irrigator Collective Behavior in Three Philippine Irrigation Systems." Paper presented to a seminar on Investment Decisions to Further Develop and Make Use of Southeast Asia's Irrigation Resources (Bangkok: Kampangsaen Campus of Kasetsart University, 17-21 August, 1981), p.11.

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