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**THE BICOL RIVER BASIN DEVELOPMENT PROGRAM**

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# THE BICOL RIVER BASIN DEVELOPMENT PROGRAM \*

by

Benjamin V. Jaon \*\*

## A. Introduction

In 1972, a 15 member Inter-agency Committee, consisting of national, provincial and private agencies, drew up an integrated development program for the Bicol River Basin, a 312,000-hectare center of agricultural activity in the Bicol Region. About 67 per cent of the River Basin area is located within the province of Camarines Sur, with the remaining 33 per cent in the provinces of Camarines Norte and Albay.

The program is built upon the basic premise that development efforts targeted on the rural sector and the small farmer should focus on delimited geographic areas of high growth potential where incremental investments in infrastructures and agriculture will yield maximum benefits to the national economy in both social and economic terms.

As one of the seven river basins in the country, the Bicol River Basin contains rich, accessible and potentially irrigable agricultural lands. In social terms, the vast majority of tenant farmers concentrate on the rich basin lands. In Camarines Sur, for example, 85 per cent of the identified rice and corn tenants are within the watershed area of the Basin.

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\*/ Paper presented at the Third Policy Congress, CEC, UPLB College, Laguna, October 15-17, 1975.

\*\*/ Deputy Director, Plans and Programs Department, Program Office, Bicol River Basin Council, Baras, Canaman, Camarines Sur.

B. Bicol Region and the Bicol River Basin as a Problem Area

Relative to the other regions of the country, the Bicol Region is economically depressed. Its 2.9 million population (1970) has an out-migration rate of 0.9 per cent annually, indicating a major disparity between population and resources. The average farm household income of P1,500 (1967) per annum is among the lowest of the nation's 11 regions. The regional annual unemployment rate of 12 per cent is comparatively high as compared with the national average of 7.2 per cent. For the last decades, the region is isolated from the rest of the country, being connected to Manila only by seemingly impassable roads during rainy season and by sub-standard single track railway. Because of inadequate infrastructures, value added grew only by 5.3 per cent (1967) as compared with the national average of 5.5 per cent and is projected to dip to 4.5 per cent by 1968-1985.

Within the Bicol River Basin itself, the development of the human, water and land resources is seriously hampered by natural and human constraints. Firstly, the structure of agricultural tenancy is characterized by a relatively large number of landed estates, in one hand, and by a large number of small land owners each with a few tenants, in the other. In Camarines Sur, for example, 85 per cent of the approximately 37,000 rice and corn tenants are located within the Basin.

Secondly, as in any other region subjected to severe

tropical storms and typhoons, the Bicol River Basin experiences extensive flood damage in the lowlands adjacent to rivers and streams. Coincidentally, approximately 42,000 hectares of prime agricultural land are inundated during flood periods. Moreover, flood recovery is slow because of the limited drainage system.

The periodic recurrence of floods and typhoons, coupled with the underdeveloped state of infrastructure facilities, particularly flood control structures, irrigation works, secondary and feeder roads and electrification, makes small scale agricultural production in the Basin considerably more risky than in other areas in the Philippines. Land reform, unless simultaneously supported on a large scale by the development of infrastructure and small farmer support systems, will likely exacerbate this situation making small scale agriculture even more unstable than at present.

These circumstances all point to and emphasize the composite nature of the land, water and human resource situation in the Basin and highlight the need for an integrated approach in exploiting the area's resources as well as tackling its problems.

C. Objectives of the Program

The major objective of the Program is to increase the per capita income of families within the Bicol River Area.

The complementary objectives are to :

1. increase agricultural productivity;

2. increase employment opportunities for majority of the population;
3. provide for a more equitable distribution of wealth; and
4. promote agro-industrial and industrial development in the program area.

D. Development Policies

To enhance the attainment of development objectives set forth above, the choice of development strategies are governed by the needs of the program in consonance with the development policies enunciated under the Four-Year Development Plan, 1974-1977.<sup>1/</sup> These are, but not limited to, the following:

1. Private enterprise shall remain the medium of economic progress within the guidelines defined by the government.
2. Agricultural development shall be emphasized in harmony with industrial development in order to expand agricultural production, attain self-sufficiency in basic staples and raise farm incomes.
3. Within the government efforts at streamlining the administrative machinery for coordinated planning and implementation shall be continuously pursued.
4. Steps will be taken to restructure and provide continuing support to the educational system so as to

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<sup>1/</sup> Four-Year Development Plan, 1974-77, Republic of the Philippines, Manila, 1973, p. 19.

develop the manpower skills required by future development.

5. Infrastructure development shall continue to be accorded high priority.

E. Development Strategy

The Bicol River Basin Development Program is based on the premise that development efforts must focus on a delimited geographic area. This should have a high growth potential so that the benefits to the Regional and National Economy derived from incremental investments will be maximized.<sup>2/</sup> In this context, the Bicol River Basin provides the appropriate geographic framework.

The program is pursued within a "systems" framework. This is an attempt to integrate the various "means" to attain the program objectives as effectively as possible.

Essentially, the approach calls for the raising of rural incomes and achieving self-sufficiency in food production. These are to be attained through food production, and land reform programs, both complemented by the development of cooperatives and infrastructure, particularly irrigation and feeder roads in the rural area. Simultaneously, the thrust will focus on the development and strengthening of both agro-based indus-

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<sup>2/</sup> A.T. Mosher, Creating a Progressive Rural Structure, ADC, 1969, USA.

trial support services and functionally-linked rural and urban activity systems.

While providing the proper setting for development in the program area, efforts will simultaneously be directed towards uplifting the well-being of individuals through education, employment, housing, social welfare, community development and health services. Quiddity for this is that man remains the ultimate target of development; consequently, therefore, social development should govern all other efforts of the government.

(Please refer to Figure 1 for a simplified diagram of the Bicol River Basin Development.)

## F. Targets and Projections

### 1. Per capita and total value added.

The overall target of the Bicol River Basin Development Program is to increase per capita income. Specifically, it seeks to equilibrate the Basin's per capita value added to that of the national average in 1985. In absolute terms, this means an increase in per capita value added from P594 in 1970 to P1,442 in 1985 or an effective annual growth rate of 5.5 per cent from 1975 to 1980 to be accelerated to 9.8 per cent from 1980 to 1985. The latter growth rate is to be sustained at the same pace from 1985 onwards (Table I).

Table 1

Per Capita Value Added

YEAR	Philippines	Basin	Rate of Growth	
			Philippines	Basin
	<u>P e s o s</u>		<u>P e r c e n t</u>	
1970	856	594	2.4	3.1
1975	994	692	3.0*	3.1*
1980	1,197	904	3.8*	5.5
1985	1,442	1,442	3.8**	9.8
1990	1,738	2,301	3.8**	9.8

- \* Actual per capita income growth rates from 1967-1972.  
 \*\* Per capita income growth rate as projected in the Four-Year Development Plan, 1974-1977.

On the basis of the projected targets, the total value added of the Bicol River Basin Area is expected to increase from P814 million in 1970 to P3,138 million in 1985. This corresponds to an annual growth rate of 5.9 per cent from 1970 to 1975 which is expected to increase to 8.9 per cent from 1975 to 1980. The latter pace is projected to accelerate to 13 per cent per annum from 1980 and is expected to be sustained thereafter (Table 2).

Major structural shift is expected to occur within the Bicol River Basin Economy.<sup>3/</sup> The contribution of Agriculture to the total value added, for example, will drop from 58 per

<sup>3/</sup> The BRB economy is divided into three (3) major sectors, namely: Agriculture, manufacturing and others. The latter includes utilities, construction services, wholesale and retail, transportation, communication, warehousing, etc.

Table 2

Total Value Added, Bicol River Basin Area

YEAR	Population	Value Added		Growth Rate
		Per Capita	Total	
		<u>In thousand pesos</u>	<u>million peso</u>	<u>per cent</u>
1970	1,370	594	814	-
1975	1,604	692	1,110	5.9
1980	1,883	904	1,702	8.9
1985	2,176	1,442	3,138	13.0
1990	2,529	2,301	5,819	13.1

cent (P472 million) in 1970 to 50 per cent (P1,600 million) in 1985.

The share of Manufacturing and Others is expected to increase from 27 and 15 per cent, respectively, in 1970 to 31 and 18 per cent in 1985. This is equivalent to an annual growth rate of 10.4 and 10.8 per cent, respectively, for the two major sectors to enable the attainment of targets in 1985 (Table 3).

Although the share of Agriculture to the BRB total value added decreased from 58 to 51 per cent from 1970 to 1985, the value added from Agriculture alone must increase at an average rate of 8.5 per cent per annum. The projected shift in the BRB economic structure, while still exhibiting dualistic character, is to be expected as modernization is accelerated.

Table 3

Total value added by sector  
Bicol River Basin Area

YEAR	Agriculture	Mfg./Commerce	Others	T O T A L
<u>in million peso</u>				
1970	472	220	112	814
1975	621	311	178	1,110
1980	919	494	289	1,702
1985	1,600	973	565	3,138
1990	2,851	1,862	1,106	5,819
<u>per cent distribution</u>				
1970	58	27	15	100
1975	56	28	16	100
1980	54	29	17	100
1985	51	31	18	100
1990	49	32	19	100

2. Employment structure.

Agriculture remains as the major absorber of the labor force. Its rate of absorption, however, will decline from 59 per cent in 1970 to approximately 52 per cent in 1985. Alternatively, the share of Manufacturing/Commerce and Others shall continue to rise, accounting for 18 and 27 per cent, respectively, of the total labor force in 1985. This pattern is expected to continue as the primary indus-

tries of the Basin's economy are continually developing (Table 4).

Table 4

Employment structure by sector,  
Bicol River Basin Area

SECTOR/ITEM	Y E A R				
	1970	1975	1980	1985	1990
- <u>in thousands</u> -					
A. <u>Employed:</u>					
1. Agriculture	254	285	319	352	383
2. Manufacturing/Commerce	48	65	91	123	167
3. Others	95	121	155	187	223
T O T A L	397	471	565	662	773
B. <u>Unemployed:</u>					
	33	28	24	20	24
T O T A L	430	499	589	682	797
- <u>per cent distribution</u> -					
A. <u>Employed:</u>					
1. Agriculture	59.1	57.0	54.2	51.6	48.1
2. Mfg./Commerce	11.2	13.1	15.4	18.0	21.0
3. Others	22.0	24.3	26.3	27.4	27.9
T O T A L	92.3	94.4	95.9	97.0	97.0
B. <u>Unemployed:</u>					
	7.7	5.6	4.1	3.0	3.0
T O T A L	100.0	100.0	100.0	100.0	100.0

3. Investment requirement.

The projected total investment requirement to attain the development goal of the program is approximately P4.5 billion. Of this, P1.12 billion represents public investments and the remaining P3.353 billion represents private investment. The total investment requirement for Agriculture alone is approximately P980 million, of which approximately P851 are needed between 1975-1985 (Table 5).

Table 5. Projected investment requirement, Bicol River Basin Development Program, 1971-1985.

S E C T O R	Y E A R			T O T A L
	1971-75	1976-80	1981-85	
(in million pesos)				
1. <u>Agriculture:</u>				
a. Public	26	104	118	248
b. Private	103	155	474	732
Sub-Total	129	259	592	980
2. <u>Non-agriculture:</u>				
a. Public	86	343	441	870
b. Private	343	515	1,763	2,621
Sub-Total	429	858	2,204	3,491
3. TOTALS				
a. Public	112	447	559	1,118
b. Private	446	670	2,237	3,353
GRAND TOTAL	448	1,117	2,796	4,471

NOTE: The investment requirement is based on the following assumptions:  $K/V(A) = 0.87$ ;  $K/V(NA) = 2.92$ . The proportion of public and private investments are as follows:

Year	Public per cent	Private	Total
1971-1975	20	80	100
1976-1980	40	60	100
1981-1985	20	80	100

4. Population and labor force -

The Bicol River Basin's population is estimated at 1.37 million in 1970. Using the Cohort-Survival Method, <sup>4/</sup> where only the natural increase will affect population growth, it is projected that the population will be 2,176,000 in 1985 and 2,527,000 in 1990. The population growth rate of three per cent for the next two decades is based on the assumption that outmigration will be checked by the growth of the Basin's economy.

The labor force <sup>5/</sup> is projected to reach a total of 682,000 in 1985 and 797,000 in 1990. These were derived using the age specific labor force participation rates for the Philippines based on the 1960 Census.

The projected population and labor force of the Bicol River Basin are summarized below:

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<sup>4/</sup>  $P_t = P_o + B_o - D_o \pm M_o \pm O_o$  where t = future year;  
B = number of births; D = number of deaths; M = migration;  
and, O = outmigration.

<sup>5/</sup> Labor force is defined as the number of persons 10 years old and over who are actually at work or are seeking work during a specified time.

Table 6. Projected population and labor force, Biocol River Basin Area, 1970-1990.

YEAR	POPULATION	LABOR FORCE
	<u>in thousand</u>	
1970	1,369	430
1975	1,604	499
1980	1,883	589
1985	2,176	682
1990	2,529	797

5. Food and Nutrition -

On the basis of the projected population, a total of about 820 MT of cereals will be needed daily or about 299,363 MT annually by 1985. Also, about 348 MT per day or 117,186 MT per annum of meat, poultry and fish will be required by 1985.

The estimated food requirement of the Basin's population in terms of Edible Portion (E.P.) and As Purchased (A.P.) is shown below:

Table 7. Projected annual food requirement (A.P.), Biocol River Basin Area, 1970-1990.

Food Item	1970	1975	1980	1985	1990
	<u>in thousand M.T.</u>				
Cereal	184	216	259	299	349
Starchy roots and tubers	40	46	53	62	72
Sugar/syrup	14	17	20	23	27
Dried beans, nuts & seeds	9	10	12	14	18
Leafy and yellow vegetables	51	60	64	83	97
Vitamin C-rich foods	39	46	55	67	71
Other fruits & vegetables	76	85	99	115	134
Meat, poultry and fish	73	85	102	117	127
Eggs (no. in 1,000)	197	232	277	318	369
Milk & Milk products	46	55	63	73	82
Fats and oil	15	18	21	24	29

6. Health -

Projections on the health requirement facilities are based on morbidity estimates which are necessary to quantify the number of patients who will be recipients of hospital and health services in the future. The three leading causes of mortality namely pneumonia, respiratory tuberculosis and gastro-enteritis are considered in the projection.

The corresponding morbidity projection and health services requirements are summarized below:

Table 8. Projections on morbidity and health services requirement, Bicol River Basin Area, 1975-1990.

Item	1975	1980	1985	1990
	<u>in thousand</u>			
morbidity	17,993	21,121	24,432	28,385
number of hospital beds	1,604	1,883	4,352	5,058
no. of rural health units	80	94	108	126
no. of health personnel	2,118	2,426	2,734	3,256

7. Education -

Student enrollment within the Bicol River Basin Area is estimated to reach more than a quarter of a million in 1975 and increasing up to about 356,000 in 1985.

This would require a total of 1,371 schools with a total land area of about 5,638 hectare in 1985.

G. Program Components

The major components of the Bicol River Basin Development Program are composed of inter-dependent and mutually reinforcing projects designed to improve the productive potential.

of the area, open up new opportunities for improvement, improve the delivery systems and provide the basis for a sustained rise in earning levels. The projects are classified into four major categories, namely: agricultural development, physical development, agribusiness development and social development.

1. Agricultural development projects -

- a. Crop production - this involves the intensification and diversification of crop production; assessment of the feasibility of changing cropping patterns; development and pilot-testing of alternative production prototypes and cropping systems; and, the introduction of new crops.
- b. Livestock production - intensification of backyard livestock production models for basin-wide adoption.
- c. Fish production - evaluation of the viability of intensified inland fish production and identification of priority areas for fish production.

2. Physical development projects -

The main emphasis of physical development is to provide infrastructural support services needed not only to stabilize and promote agriculture but also to guide the growth of settlement and the concentration of investment along desired directions.

- a. Water resources development - this is designed to fully develop the water resources of the basin into usable, dependable and manageable water supplies for domestic, industrial and agricultural uses. Alternatively, it involves the development of facilities to mitigate the adverse effects of floods, thus

protecting valuable investments within the basin. The corresponding projects/activities are:

- 1) Rehabilitation of existing irrigation system and application of improved en-farm water management systems.
- 2) Construction of new irrigation systems.
- 3) Detailed investigation of alternative flood control schemes designed to protect approximately 42,000 hectares of prime agricultural lands.
- 4) Land Classification to provide adequate data base for economic land use and water resources development planning.
- 5) Topographic mapping of the entire basin area to facilitate the development of detailed engineering designs for physical infrastructures.
- 6) Hydrometeorological data collection.

The data output of the above projects/activities are now being utilized in the on-going Comprehensive Water Resource Study, the output of which is a Master Plan for the development of the water resources of the Basin. (See Table 9)

- b. Transport development - The project is designed 1) to meet the transport demand resulting from intensified agricultural and industrial production; 2) to induce greater production by providing outlets for farm and industrial commodities; and, 3) to guide the growth of settlements and the concentration of investments along desired directions.

The projects are:

- 1) Construction of major truckline - the Quirino Highway
- 2) Rehabilitation and construction of secondary and farm-

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 Phase I — Impact Projects
 

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Irrigation

1. Rehabilitation of national irrigation systems.
2. Completion/repair of communal irrigation systems and on going projects.
3. Feasibility study and construction of electrification-irrigation project (NEA-NIA) including formation of electric and irrigation cooperatives.
4. Construction of pump irrigation systems.
5. Land classification of existing and proposed irrigation projects.
6. Reconnaissance investigation of groundwater resources.

Note: Irrigation development priority should be in areas  
 not affected by floods.

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Flood Control

1. Feasibility study, designs, cost estimates of Bicol River Flood Control Project
2. Completion of cutoff channel No. 3 including construction of railroad and highway bridges.

Multi-Purpose Projects

1. Inventory of hydrological and meteorological data for Bicol River Basin and ongoing data collection program.
2. Aerial photography of province for water resource planning, land reform, land-use planning, etc.

Water Management

Water management training for farmers in compact farms and irrigation cooperatives.

Cooperatives

Formation of compact farms and farmers' cooperatives to assume responsibility over operation and maintenance of communal irrigation systems.

## Phase II -- Medium-Range Program

Irrigation

1. Preparation of a master plan for irrigation development of the Lower Bicol River Basin.
2. Construction of national/communal pump irrigation projects (coordinated with Flood Control Program).
3. Land Classification of all agricultural lands.
4. Feasibility investigations of ground-water resources
5. Development of ground water as studies are completed.
6. Operation and maintenance of existing systems.
7. Feasibility study of Bicol River National Irrigation System.

Multi-Purpose Projects

1. Reconnaissance/feasibility studies of Pulantuna River Project.
2. Watershed management studies and action programs.
3. Ongoing hydro-meteorological data collection program.

Water Management

1. Water management training for farmers in com at farms and irrigation cooperatives.
2. Installation of second water management pilot training area.

Flood Control

1. Implementation of Bicol River Flood Control Project including operation and maintenance.

Cooperatives

Formation of farmers' cooperatives to handle 06M of communal irrigation systems.

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 Phase III -- Long-Range Program
 

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Irrigation

1. Construction of national/communal pump irrigation projects based on master plan.
2. Development of ground-water resources for irrigation and other uses.
3. Operation and maintenance of existing systems.

Multi-Purpose Projects

1. Pre-construction activities and construction of Pulantuna River Project.
2. Watershed management programs.
3. Reconnaissance/feasibility studies of Culaing River Project.
4. Ongoing hydro-meteorological data collection program.

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Flood Control

Completion of Bicol River Flood Control Project with operation and maintenance.

Water Management

Water management training for farmers and irrigators.

Cooperatives

Formation of farmers' cooperatives to handle 06M of communal irrigation systems.

to-market roads that connect production centers to the consumption centers.

- 3) Rehabilitation/improvement of the ports and railway systems.

- c. Urban development - This is directed towards systematizing the growth of urban centers and of increasing their capabilities in providing the necessary services to sustain the growth of the rural sector.

3. Agribusiness development

The program involves the determination of potentials for trade and rural service centers within the Basin area. Emphasis are given the following priority areas: a) grain marketing and processing; b) livestock marketing and processing; c) rural banking; d) fish marketing and processing; e) input distribution; and, f) abaca production and processing to support cottage industries.

4. Social development

This component of the Program is designed to promote the development of the human resources and to strengthen the institutional base for socio-economic development. These are to be achieved through manpower training and education, development of cooperatives/associations, land tenure improvement and provision of health and sanitation facilities. The projects are:

- a. Accelerated implementation of the land reform Program,
- b. Technician training on the development of compact farms.

- c. Farmers' training on the operations and management of Compact Farms.
- d. Up-grading the Camarines Sur Agricultural College.
- e. Development of potable water supply through the use of the Frankel Filtration System.
- f. Use of medicinal herbs for deworming and in support of the nutrition program.

H. Organization and management

Implementation of the Program resides on the Bicol River Basin Council created pursuant to Executive Order 412 issued by the President on 17 May 1973. The Council is composed of the Secretaries of the Department of Public Works, Transportation and Communication (DPWTC) as Chairman, Agriculture (DA), Local Government and Community Development (DLGCD) and, Agrarian Reform (DAR); Director-General, National Economic and Development Authority (NEDA), Governor, Province of Camarines Sur, and Executive-Director, BRBC-PO, as Members.

The Program Office is headed by an Executive Director. The Office itself is composed of four (4) Departments, namely:

1. Plans and Programs - responsible for the conceptualization, design, technical and economic justification and programming of the Bicol River Basin Development Program project activities.
2. Social Infrastructure - responsible for the coordination of the implementation of agricultural and social development programs.

3. Physical Infrastructure - responsible for the coordination of the implementation of physical and water-related infrastructures.
4. Administration and Finance - responsible for administration of personnel, general services (including clerical and secretarial support), accounting and budgetting.

Providing support to the Program operations is a Technical Assistance Group composed of faculty members from the University of the Philippines at Los Baños (UPLB) and the Institute of Planning (UIPI) at Diliman, Quezon City.

An Advisory Council composed of representatives of the private sector has been created to maximize the local private sector participation in the Program's activities.

The Institute of Philippine Culture (IPC) in coordination with Ateneo de Naga has been contracted to conduct basin-wide surveys to determine, over time, the impact of the Bicol River Basin Development Program on the income, employment, production and perceived quality of life residents within the Program area. Additionally, the IPC has been conducting specialized surveys and studies in support of the planning activities of Program Office.

To ensure effective implementation of integrated projects at the field level, the basin has been divided into eight (8) Development Areas (DA), each composed of from 5-6 municipalities, and managed by an Area Development Team (ADT). The Team is headed by a Chairman (a Mayor elected from among the Mayors),

an Area Coordinator and Field Supervisors of line agencies. Moreover, all field technicians within a DA are brought into a sustained working relationship under the direction of the ADT. Within this sense, the ADT is seen as (1) a crucial link between Basin planners and the people, (2) a unit to effectively integrate the different sectoral agencies and their programs at the field level and in so doing increase the efficiency of government services and properly exploit program complementarities, and (3) as a unit to bring municipal governments serving the same economic sub-regions of the Basin into sustained and productive working arrangements with each other and with national and provincial level agencies. (See attached integration matrix).

#### I. Funding

The operating funds of the Bicol River Basin Development Program is coursed through the BRBC Special Fund Account (SFA) with NEDA. The major source of operating funds come from the PL-480 peso generated funds, participating line agencies and Counter-Part Funds coming from NEDA itself. Other funding agencies include USAID for grants-in-aid, Ford Foundation and PCAR in support of research and evaluation, and NSDB for the applied testing of locally manufactured farm machineries.

The total obligated operational funds since the start of operations are summarized below:

# BICOL RIVER BASIN COUNCIL INTEGRATION MATRIX

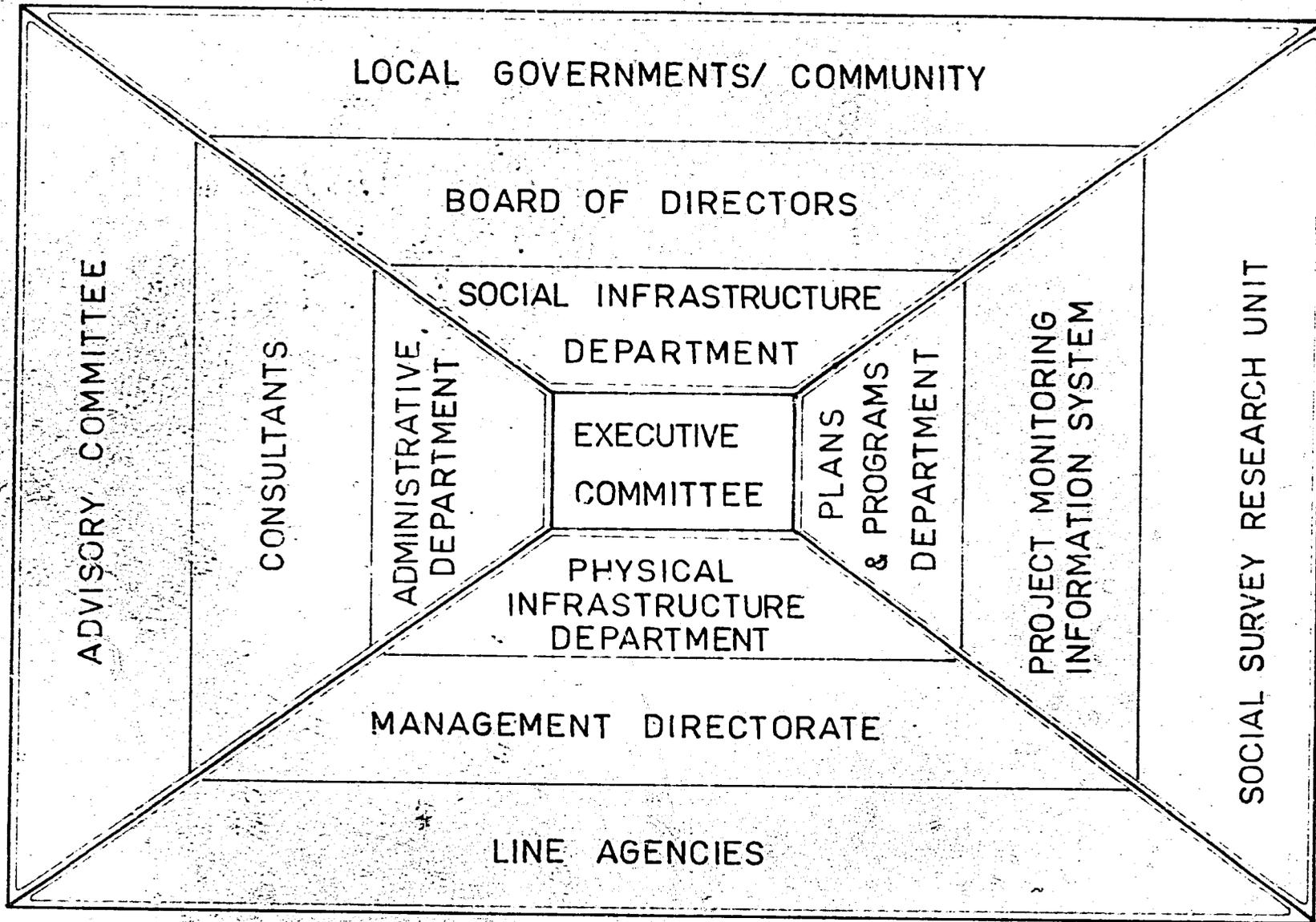


Table 10. Total obligated operational funds, Bicol River Basin 1973-1976.

S O U R C E	FISCAL YEAR			T O T A L
	73/74	74/75	75/76	
<u>in thousand pesos</u>				
1. NEDA: GF	1,500	1,500	1,955	4,955
CF	424.6	463	1,050	1,937.6
PL-480	-	10,850	481	11,331
2. Line agencies	250	1,291	1,943	3,484
3. PCAR	-	-	1,099	1,099
4. NSDB	-	171	-	171
5. USAID	-	-	226.8*	226.8*
6. Ford Foundation	132	-	-	132
T O T A L	2,306.6	14,275	6,754.8	23,336.8

\*/ The figures do not include the total grants-in-aid provided by USAID.

Development loan funds are the primary sources of funding major infrastructure projects. To date, USAID has approved a \$3.5 M to GOP to finance the forex requirement of the Libmanan/Cabusao Integrated Area Development Project. GOP contribution is approximately P30.0 M over a 6-year time frame.

It is expected that all the major financing institutions like the World Bank (WB), Asian Development Bank (ADB), etc. will be tapped to provide the capital requirements of the Bicol River Basin Development Program.

BENGAON/fely  
Oct 14, 1975

Appendix Table 1. General Statistics: Philippines, Bicol Region, and Camarines Sur.

STATISTIC	PHILIPPINES	BICOL REGION	CAMARINES SUR
<b>HUMAN RESOURCES, (1970)</b>			
1. Total Population	36,684,486	2,966,881	948,436
2. % Urban Population	31.8	19.4	21.1
3. Labor Force	11,622,471	906,522	280,279
a Primary Sector	6,372,173	576,215	188,351
b Secondary Sector	1,915,078	132,563	34,870
c Tertiary Sector	3,335,220	197,744	66,058
<b>LAND CLASSIFICATION, Hectares, (1967)</b>			
4. Total Land Area	30,000,000	1,763,249	526,682
5. Forest Area	13,669,896	363,519	67,751
6. Open Land	3,607,818	128,171	4,821
7. Cultivated Area	12,166,666	1,232,982	415,528
8. Swamps/Marsh	554,758	38,577	8,582
<b>MINERALS, 1000 Metric Tons, (1970)</b>			
9. Total Metallics	9,454,714	376,430	2,370
a Gold Ore	916,624	53,770	-
b Copper Ore	1,486,073	567	108
c Iron Ore	3,385,078	88,850	1,049
d Chromite Ore	20,697	220	220
10. Total Non-metallics	17,310,582	2,202,500	677,476
a Clay	270,587	244,442	4,503
b Cement Raw Materials	17,172,945	1,681,840	341,500
c Limestone	6,362,671	341,300	331,300
d Coal	90,624	24,547	-
<b>FISHERY, (1970)</b>			
11. Fishpond in Operation, Ha:	168,118	10,785	3,240
12. Fishpond Production, Tons:	96,461	3,758	648
13. Commercial Fish Production, Tons	381,877	7,762	5,275
14. Total Fish Production (1967), Tons	742,000	57,134	21,025

STATISTIC	PHILIPPINES	RICOL REGION	CAMARINES SUR
<u>AGRICULTURAL PRODUCTION,</u> 1000 Metric Tons (1960)			
15. Total	17,094	821.5	275.0
16. Palay	3,256	263.4	123.9
17. Corn	1,439	63.3	15.1
18. Sugar Cane	9,348	71.9	18.2
19. Coconut	1,102	143.8	18.2
20. Abaca	100.45	31.9	7.9
<u>LIVESTOCK &amp; POULTRY, Heads,</u> (1970)			
21. Total	119,876,806	9,136,301	3,334,359
22. Cattle	2,143,700	92,148	20,116
23. Carabao	4,750,400	426,075	145,350
24. Chicken	94,468,168	7,212,777	2,641,834
25. Ducks	4,877,183	252,152	100,115
26. Swine	10,914,437	994,963	390,430
<u>MANUFACTURING, (1968)</u>			
27. Total Value of Production, M. Pesos	10,553.6	155.6	16.5
28. Fixed Value of Assets	4,196.0	5.9	3.7
29. Firms (1961)	37,369	2,100	211
<u>TRANSPORTATION, (1971)</u>			
30. Total Roads, Km.	72,979.3	5,379.4	1,973.6
a National Roads, Km.	20,208	1,411.3	243.8
b Provincial Roads, Km.	26,888	2,402.6	1,058.7
c Municipal Roads, Km.	9,544	1,324.5	626.0
d City Roads, Km.	9,238	241.0	45.1
31. Road Density Km/Sq Km	0.24	0.305	0.373
32. Motor Vehicles, no.	488,809	9,872	3,140

STATISTICS	PHILIPPINES	PCOL REGION	CAMARINES SUR
<u>WATER SUPPLY, (1970)</u>			
33. Water Works	3,184	417	63
34. Wells	21,194	1,815	460
35. Springs	2,704	268	53
36. Total Population Served	17,115,077	1,506,232	355,698
<u>POWER, KWH</u>			
37. Power Generated	6,300,048	50,456	21,507
38. Power Consumed	6,927,431	38,941	17,935
39. Power Consumption/Capita	190	13.0	18.9
<u>EDUCATION, (1970)</u>			
40. No. of Schools			
a Elementary	23,284	2,427	766
b Secondary	3,262	295	102
c Collegiate	697	47	13
41. Enrollment			
a Elementary	6,802,873	567,527	165,894
b Secondary	1,518,042	92,730	31,382
c Collegiate	669,876	26,974	9,189
42. Literacy Rate, per cent	82	87	85
<u>HEALTH, (1971)</u>			
43. Hospitals	670	43	8
44. Bed Capacity	50,000	1,531	485
45. Health Centres	2,175	145	44
<u>AGRICULTURAL INFRASTRUCTURE, (1970)</u>			
46. Rural Banks	570	41	13
47. Agricultural School	97	7	2
<u>INCOMES, REVENUES</u>			
48. Government Revenue (M. Pesos) 1971	315.7	21.7	5.9
49. Average Family Income (Pesos), 1965	2,541	2,021	1,941
50. Total No. of Families	5,126,000	4,07,000	137,000

Source: Situation Report, Ricol Region  
FRDP Report  
Philippine Almanac

Appendix Table 2. Projected Cultivated Area (hectares), Bicol River Basin, 1975-1990

<u>C R O P S</u>	<u>: 1 9 7 5</u>	<u>: 1 9 8 0</u>	<u>: 1 9 8 5</u>	<u>: 1 9 9 0</u>
1. <u>Palay</u>	101,266	94,304	102,551	102,551
Irrigated	44,274	84,186	99,124	99,124
Rainfed	27,607	980	980	980
Upland	29,385	9,138	2,447	2,447
2. Feedgrains	30,162	28,366	21,275	21,275
3. Coconut	128,134	128,134	128,134	128,134
4. Abaca	18,316	23,316	38,316	28,316
5. Sugarcane	7,570	16,920	18,920	18,920
6. Leafy and Fruit Vegetables	1,599	3,198	4,797	6,396
7. Corn, Tuber and Root Vegetables	10,956	9,357	7,758	6,159
8. Onion & Garlic	165	165	165	165
9. Legumes	1,125	1,125	1,125	1,125
10. Fruits and Nuts	16,453	14,808	13,162	13,162
Banana	13,277	11,470	9,500	9,000
Coffee	1,181	1,181	1,332	1,457
Citrus	481	645	796	921
Cacao	170	170	321	446
Pineapple	62	62	213	338
Others	1,282	1,280	1,000	1,000
<b>T O T A L</b>	<b>315,746</b>	<b>319,693</b>	<b>326,203</b>	<b>326,203</b>

Source: BAECON, NIA, BISUDECO, NFAC and NCSO

Appendix Table 3. Bicol River Basin Development Program  
Project Status Report, as of August 31, 1975.

PROJ. NO.	NAME OF PROJECT	PARTICIPATING AGENCIES	STATUS % COMPLETE
<u>I PILOT PROJECTS</u>			
02	Livestock Project Phase I	BAI, DLGCD, DAR	100.00
	Phase II	BAI, DLGCD, DAR	7.0
13	On-Farm Water Management	NIA, DAP, BAE, DAR, DLGCD, CSAC	48.15
01	Land Consolidation	DAR, NIA, DPWTC, DLGCD, BS, BL	56.33
14	Farm Mechanization	NSDB, PIC, IRRI	16.6
03	Crop Production	BPI, DLGCD, DAR	9.4
16	Aquaaculture	BFAR	25.0
20	Frankel Filtration System	DLGCD, RHO, BPW, MWSS	24.97
27	Medicinal Herb	NEDA, BPI	33.0
<u>II FEASIBILITY STUDIES</u>			
10	Agribusiness	DA, DLGCD, NGA	9.0
11	Transport Feasibility(Phase I)	DPWTC, DPH, PEO, NEDA	100.0
	Farm-to-Market Roads(Phase II)	DPWTC, DPH, NEDA, CAA, PNR,	
	Intermodal Transport	PEO-ALBAY, CAM SUR & CAM NORTE	50.0
24	Libmanan/Cabusao IAD	NIA, DAR, DPWTC, NEDA, BS, UPLB-TAG	-
05	Comprehensive Water Resources Study	NIA, DPWTC, DPH, BPW, BS, NEDA, EM	7.0
19	CSAC Upgrading	DEC, CSAC, DPWTC, NEDA, ACAP, PCAR	33.0
23	Industrial Estate	DPWTC, NEDA	0
<u>III DATA GENERATION</u>			
08	Hydromet Data	BPW, NIA, BUofMINES, PAG-ASA	24.0
07	Land Classification(Phase II)	BS, NIA, BPW, BAECON	25.0
06	Topo-Mapping	BCCS, BS	40.0
09	Water Balance/Supply	BPW, NIA	25.0
15	Agromet Station at CSAC	PCAR, PAG-ASA, CSAC	100.0
26	PCAR Salinity Status Along the Bicol River	PCAR	
<u>IV TECHNICAL ASSISTANCE/PROGRAM MANAGEMENT &amp; EVALUATION</u>			
12	Socio-Economic Research	IPC, NEDA	88.87
25	Area Development Teams	DA, DAR, DLGCD, NEDA, DSW, DOH, DEC	62.75
17	Systems Management	EDF, NEDA	80.0
21	Bi-Annual Evaluation	NEDA, DPWTC, DMS, DA	100.0
18	Technical Assistance Group	UPLB, UPIP	-
<u>V MANPOWER DEVELOPMENT PROGRAM</u>			
04	Compact Farm Training	BPI, BAE, DA, DAR, DLGCD, CSAC	91.0
22	Water Resource Training	NWRC, BPW	100.00

Appendix Table 4.

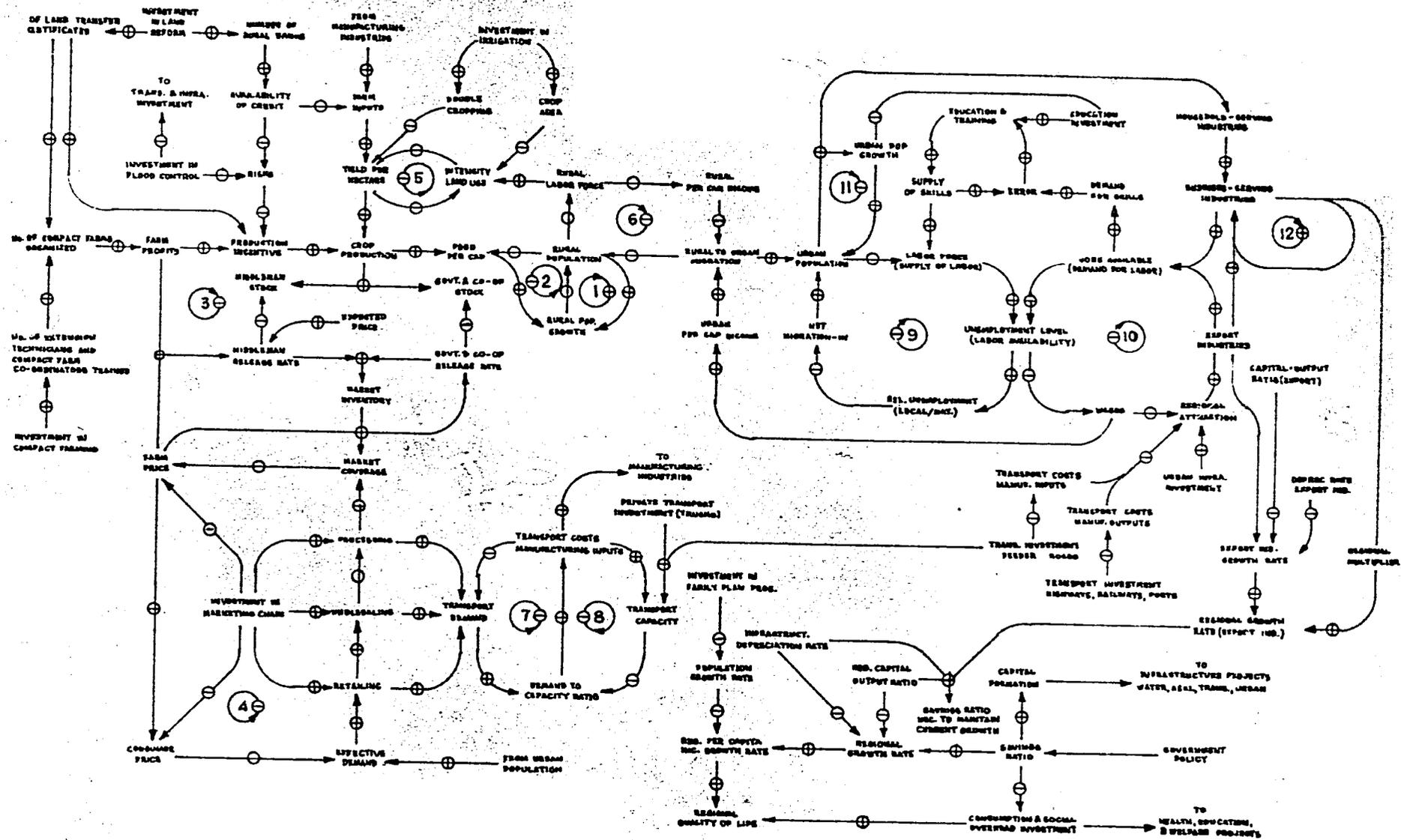
BICOL RIVER BASIN DEVELOPMENT PROGRAM  
STATUS OF FUNDS  
As of 22, September, 1975  
In P000

PRO - AG NO.	NAME OF PROJECT	BUDGET	SOURCES	R E L E A S E S			BALANCE	REMARKS
				Amount	Date	Total		
I PILOT PROJECT								
74-09	Livestock Project Phase I	₱ 61.	DA - 61.	28.35	1-22-75	.	4.5	Total expenditure reached ₱44,454.00 Delayed release due to FY 75-76 budget
75-09	Phase II	110	DA - 55	28.25	4-4-75	56.5	5.5	
			DLGCD 27.5				27.5	- do -
			DAR 27.5				27.5	- do -
74-09	On Farm Water Mgt.	75.	NEDA (PL-480)75.	29.20	10-11-75			Releases ad scheduled - do -
				22.90	1-27-75			
				22.90	3-10-75	75.00		
74-09	Land Consolidation	1200	DAR 600	600	5-7-75	600		- do -
			NEDA (PL-480)600	200	10-11-74			- do -
				200	1-27-75			- do -
				200	4-10-75	600		- do -
74-09	Crop Production Phase I	47	DA - 47	47	5-21-75	47		- do -
75-09	Phase II (modified)	24.195	DA 24.195				24.195	Delayed FY 74-75 DA Budget
75-09	Aquaculture Prcd.	165	DNR 165	129	3-26-75	129	36	Balance still on Process with DNR
75-09	Potable water supply (Franekl Filtration)	131	NEDA (PL-480) 131	131	6-11-75	131		Release as schedule
				GF147				

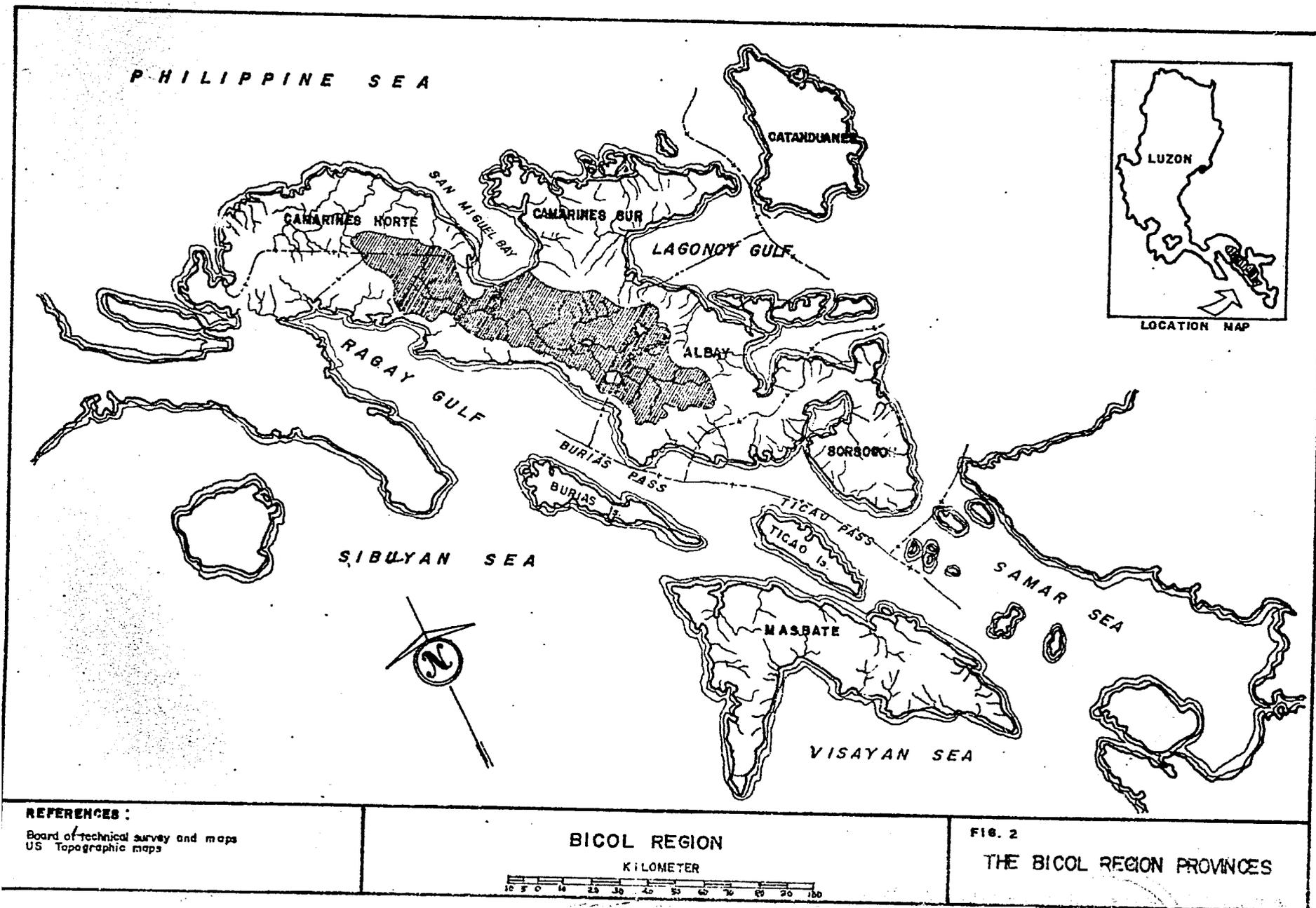
PRO-AG NO.	NAME OF PROJECT	BUDGET	SOURCES	R E L E A S E S			BALANCE	REMARKS
				Amount	Date	Total		
<b>II FEASIBILITY STUDIES</b>								
74-09	Agribusiness	300	NEDA (CF) P 50	37.5	8-24 75		P 50	Proj. Incurred only P26,000 expenditures
			DA 75	37.5	9-26-75	P 75		
			DAR 75				75	
			DPWTC50				50	
			DLGCD50	25	10-18-75	25	25	
74-09	Transport Phase I (Feeder Rds.)	300	DPWTC)	50	10-28-74			65,000for equipy. balance will be released per scheduled. 178.00 on process with DPH
			)656	50	2-14-75			
75-09	Phase II (Intermodal TPG)	356	DPWTC)	50	8-7-75			
				150	9-18-75	300	356	
		178	DPH 178				178	
74-09	Comprehensive Water Resource Study	230	NEDA (CF) 230	36.52	1-24-75	36.52	193.48	funds still with NEDA
	CWRS GOP's Operating Budget	1059.75	DPWTC(PD475) 1059.75	1059.75	7- -75	1059.75		released as schdduled
75-09	Comprehensive river basin planning seminar	300	NWRC 300					seminar already finish incurred total expenditure of P100,000.00
75-09	CSAC Upgrading	100	NEDA (CF) 100	100	4-16-75	100		release ad scheduled
75-09	Industrial Estate Feasibility Study							Project approved under PRO=AG 75-09 budget awaiting indorsement of NEDA to USAID for financing of the feasibi- lity study.

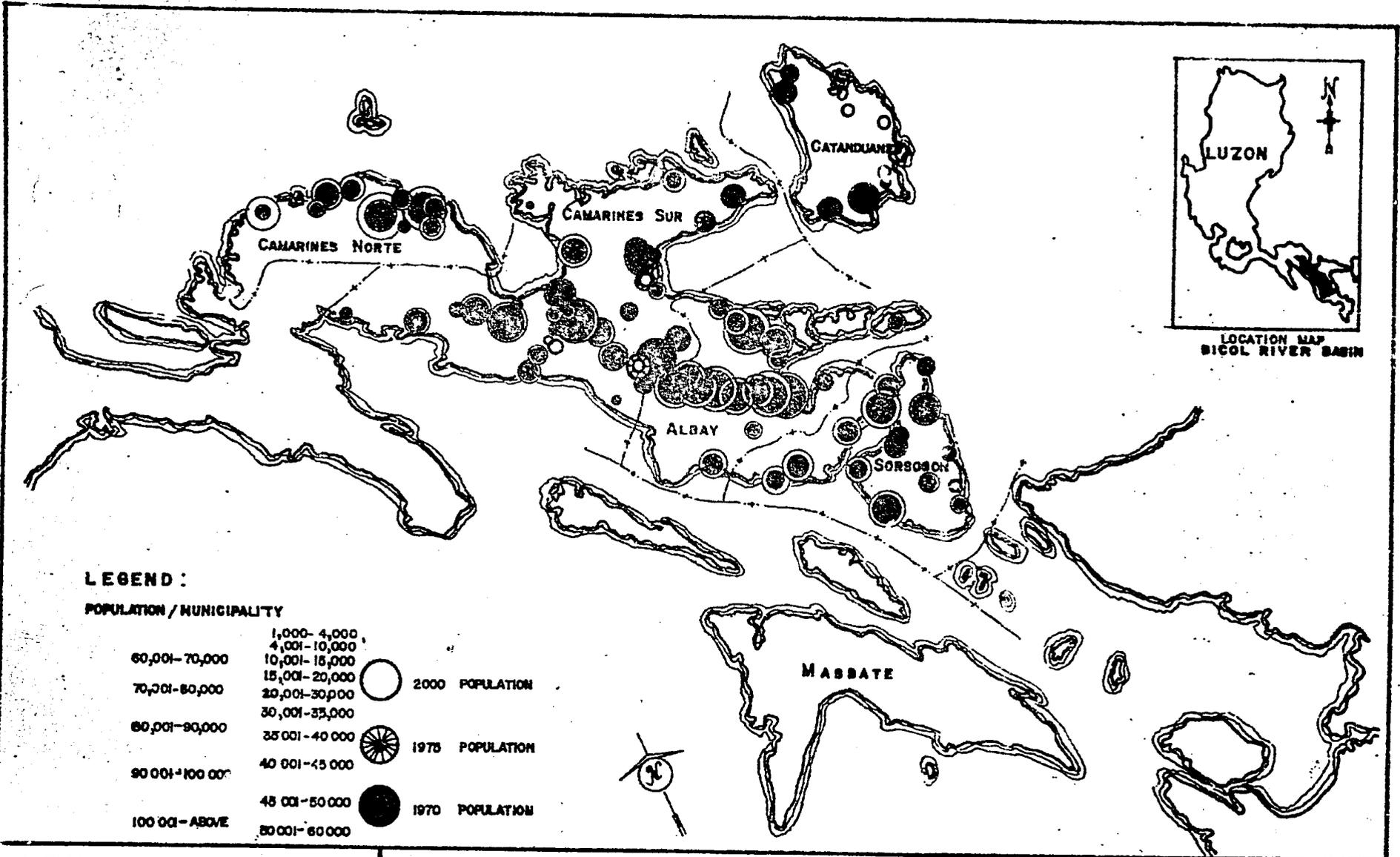
PRO-AG NO.	NAME OF PROJECT	BUDGET	SOURCES	R E L E A S E S			BALANCE	REMARKS
				Amount	Date	Total		
III DATA GENERATION								
74-09	Hydrometeorological Program	300	NEDA(PL-480)	115.662	10-11-74			
				70.453	1-27-75			
				62.035	4-10-75	248.15	51.85	P51,850 Reverted back to National Treasury
74-09	Land Classification Phase I	266	DA 33	33	5-9-75	33		Released as
			NEDA(CF)33	33	1-24-75	33		Scheduled
			NEDA(PL-480)200	100	10-11-74			-do-
				67.175	1-27-75			-do-
				32.825	4-10-75	200		-do-
75-09	Phase II	350	NEDA(IL-480)350	350	6-11-75	350		-do-
			GF-148					-do-
74-09	Topographic Mapping	2250	NEDA(PL-480)2250	1153.9	10-11-74			
				571.1	1-27-75			
				525	4-10-75	2250		-do-
74-09	Water Balance/Supply	\$23	USAID \$23					Contracted by USAID to AIT Bangkok
IV TECHNICAL ASSISTANCE/PROGRAM MANAGEMENT & EVALUATION								
74-09	Socio-Economic Survey Year I	\$29 \$19.812	USAID \$29 FORD FOUNDATION \$19.812	\$29 \$19.812		\$29 \$19.812		Released on Schedule
75-09	Year II	545	NEDA(CF)300	150	4-16-75			-do-
			USAID 245	150	9-16-75	300	100 245	Release is due next quarter USAID will make first release of P151,000 by last week of Sept.
75-09	Area Development Program	762	DA 254 DAR 254 DLGCD 254				254 254 254	Delayed released to FY75-76 Budget. -do- -do-

PRO-AG NO.	NAME OF PROJECT	BUDGET	SOURCES	R E L E A S E S			BALANCE	REMARKS
				Amount	Date	Total		
75-09	Systems Management Study	400	NEDA(CF)400	200 100	4-10-75 9-16-75	300	100	Release is due next quarter.
75-09	Bi-Annual Evaluation	100	NEDA(CF)100				100	Project Completed
75-09	Technical Assistance Group	150	NEDA(CF)150	75 75	4-16-75 9-16-75	150		Released as scheduled.
V MANPOWER DEVELOPMENT PROGRAM								
74-09	Compact Farm	P200	NEDA(CF)200	P183.48	1-24-75	P184.48	P16.52	Funds still with NEDA



**FIG. 1 SIMPLIFIED DIAGRAPH OF BICOL RIVER BASIN DEVELOPMENT**





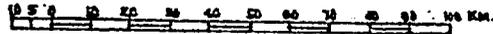
**LEGEND :**

**POPULATION / MUNICIPALITY**

1,000- 4,000	○	2000 POPULATION
4,001- 10,000	○	
10,001- 15,000	○	
15,001- 20,000	○	
20,001- 30,000	○	
30,001- 35,000	○	
35,001- 40,000	○	
40,001- 45,000	○	
45,001- 50,000	○	
50,001- 60,000	○	
60,001- 70,000	○	
70,001- 80,000	○	
80,001- 90,000	○	
90,001- 100,000	○	
100,001- ABOVE	○	
	○	1975 POPULATION
	○	1970 POPULATION

**REFERENCES:**  
 Board of Technical Survey and Maps  
 SCS  
 P.H. Maps  
 PACPWCD Development Atlas

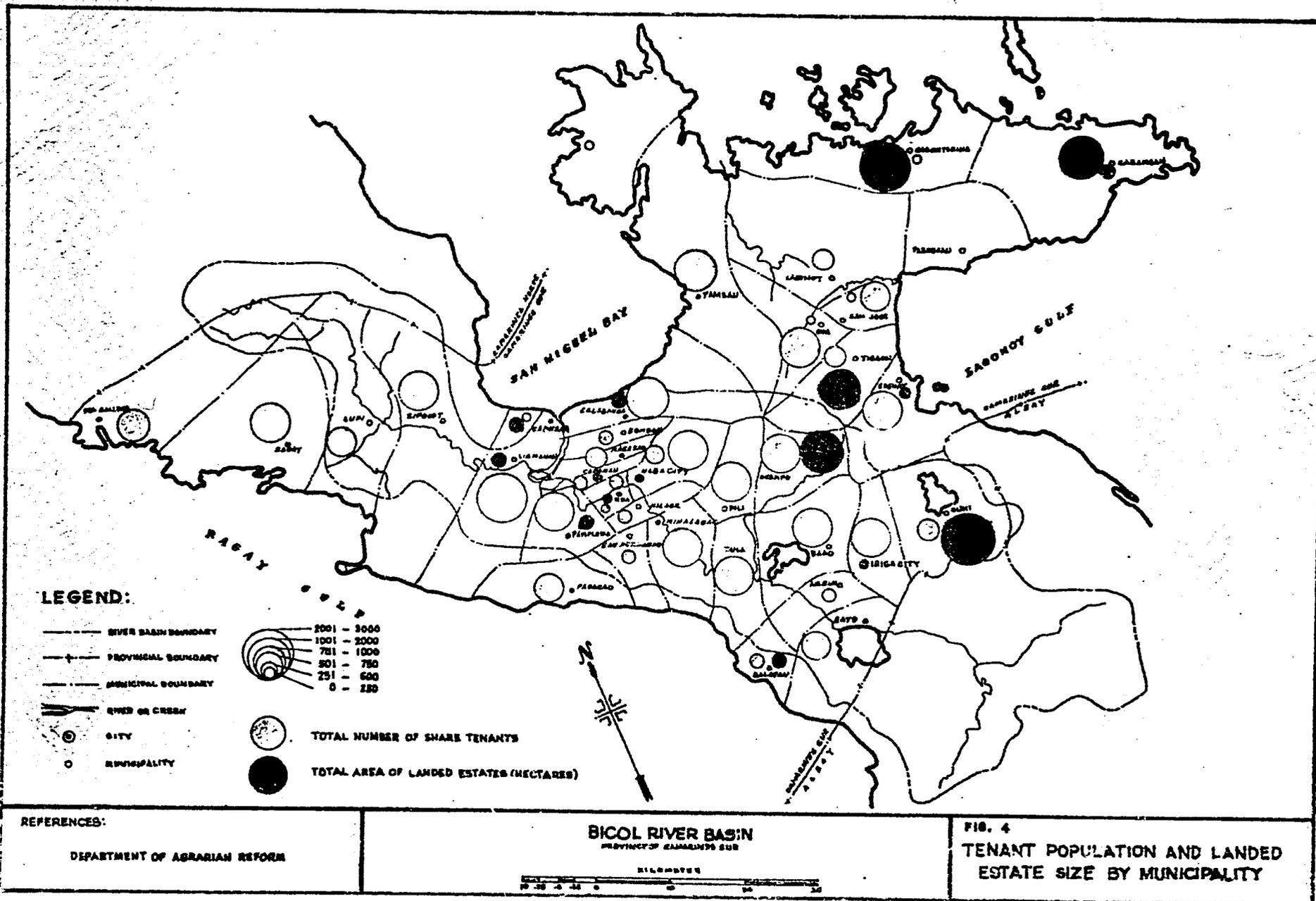
**BICOL REGION**

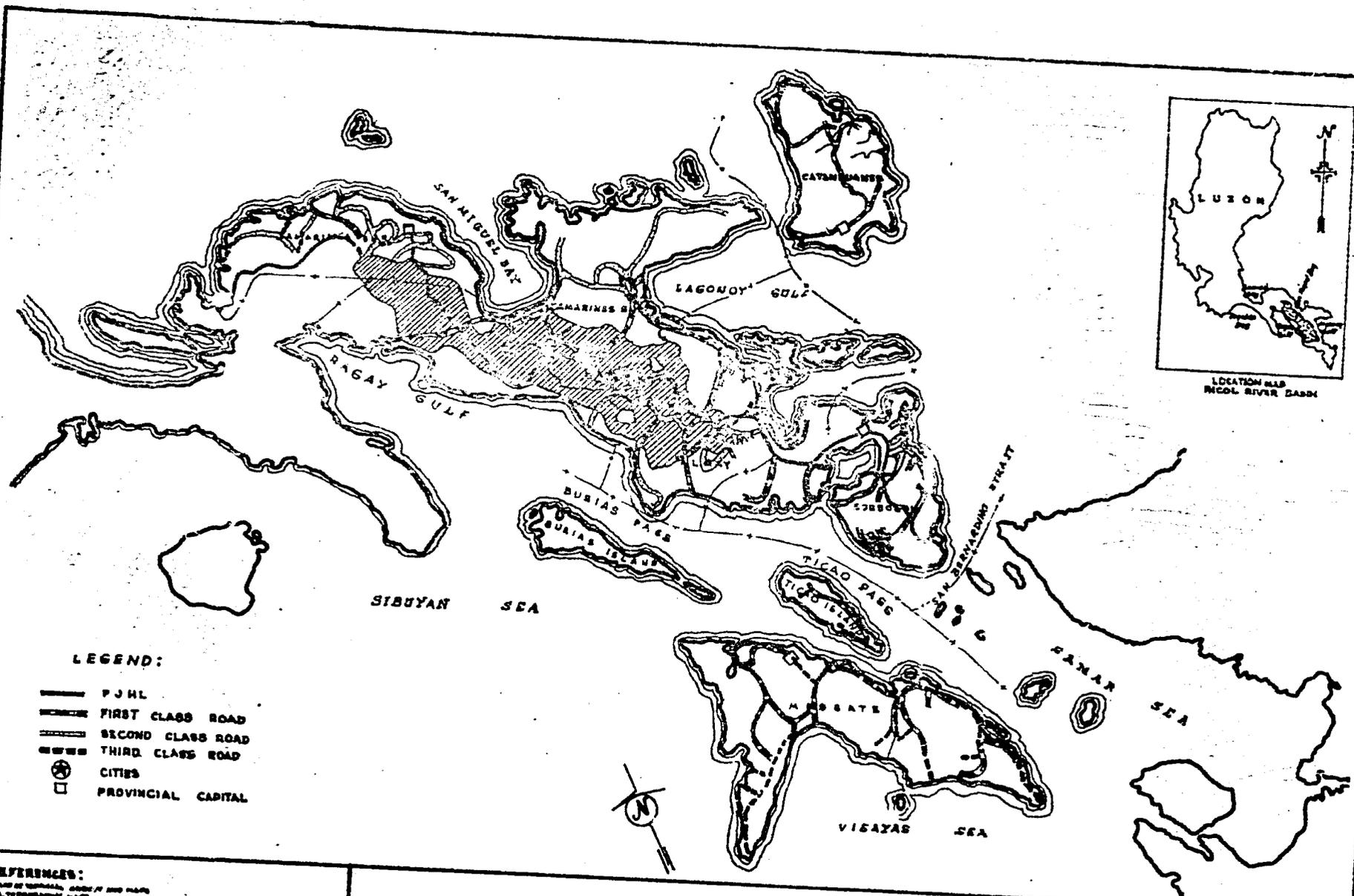


**LOCATION MAP  
 BICOL RIVER BASIN**

**FIG. 5**

**POPULATION MAP**





LOCATION MAP  
BICOL RIVER BASIN

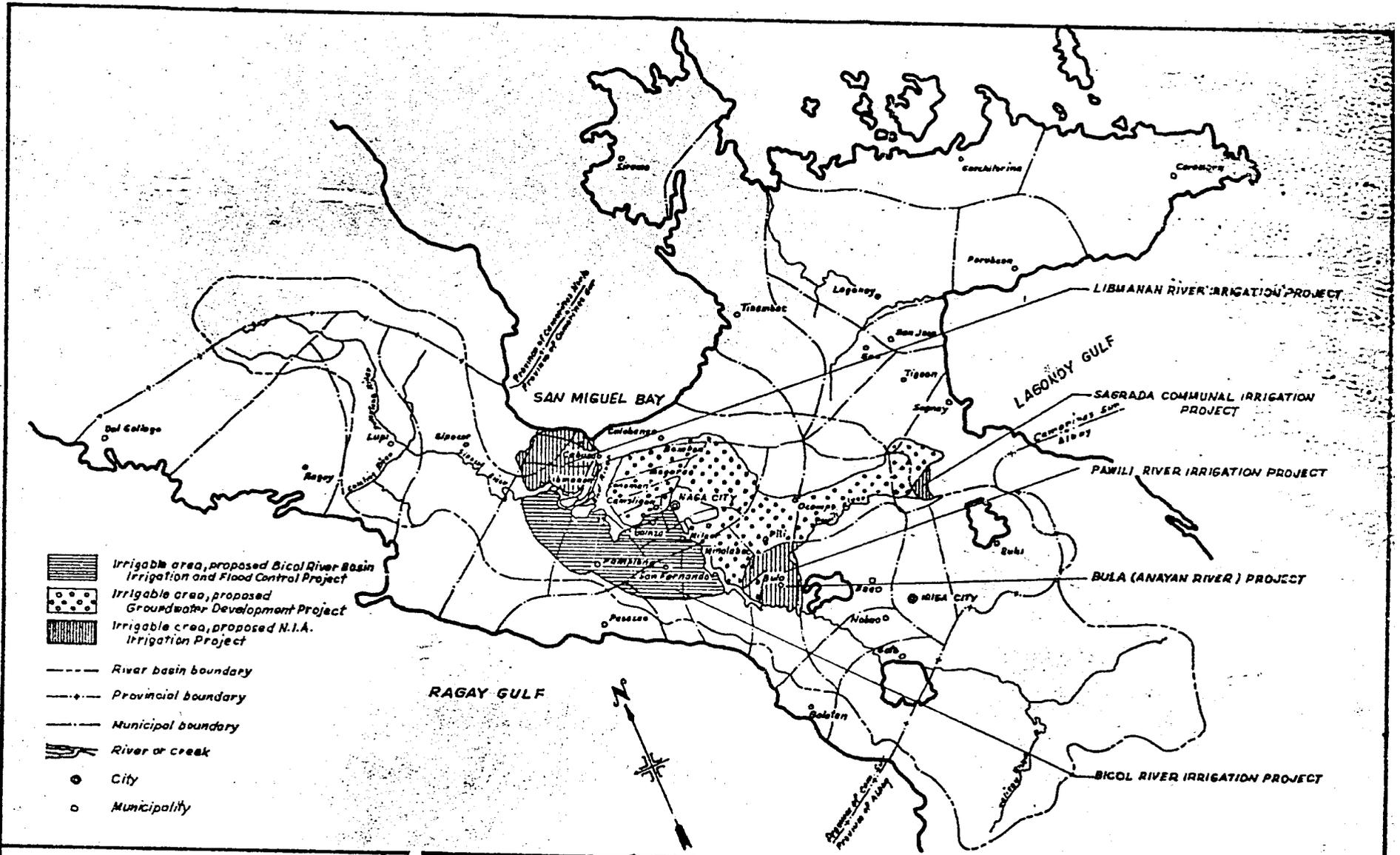
- LEGEND:**
- PJHL
  - FIRST CLASS ROAD
  - SECOND CLASS ROAD
  - THIRD CLASS ROAD
  - ★ CITIES
  - PROVINCIAL CAPITAL

**REFERENCES:**  
 BOARD OF NATIONAL GEOGRAPHIC AND MAPS  
 U.S. TOPOGRAPHIC MAPS  
 2.5 IN. SCALE  
 PUBLISHED BY NATIONAL GEOPGRAPHIC ATLAS

**BICOL REGION**

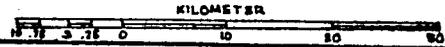


**FIG. 5**  
**EXISTING ROAD NETWORK**

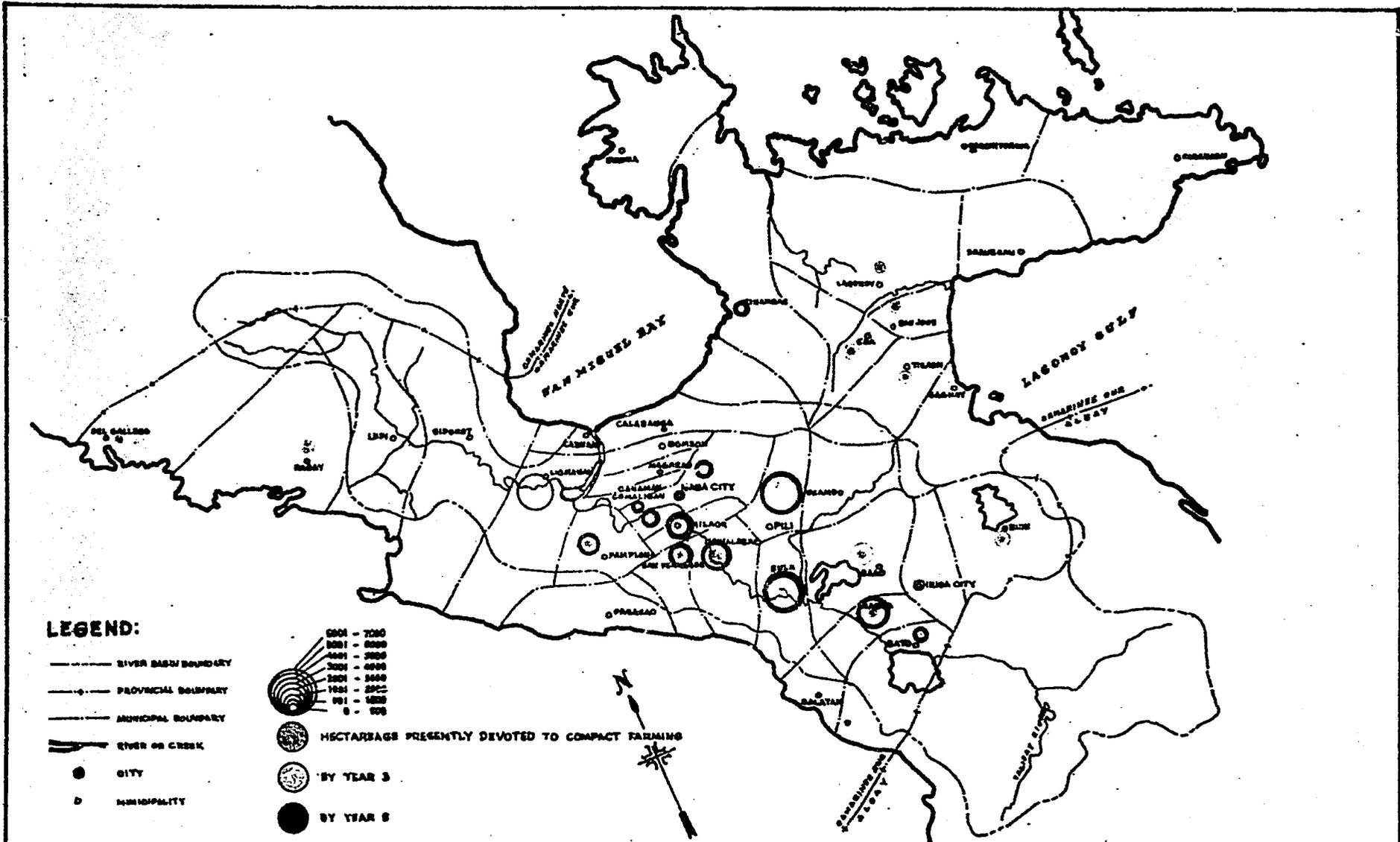


REFERENCES:  
NATIONAL IRRIGATION ADMINISTRATION

**BICOL RIVER BASIN**  
PROVINCE OF CAMARINES SUR



**FIG. 6**  
**LOCATION OF POTENTIAL IRRIGATION PROJECTS**



REFERENCES:  
COMPACT FARM DEVELOPMENT PROGRAM

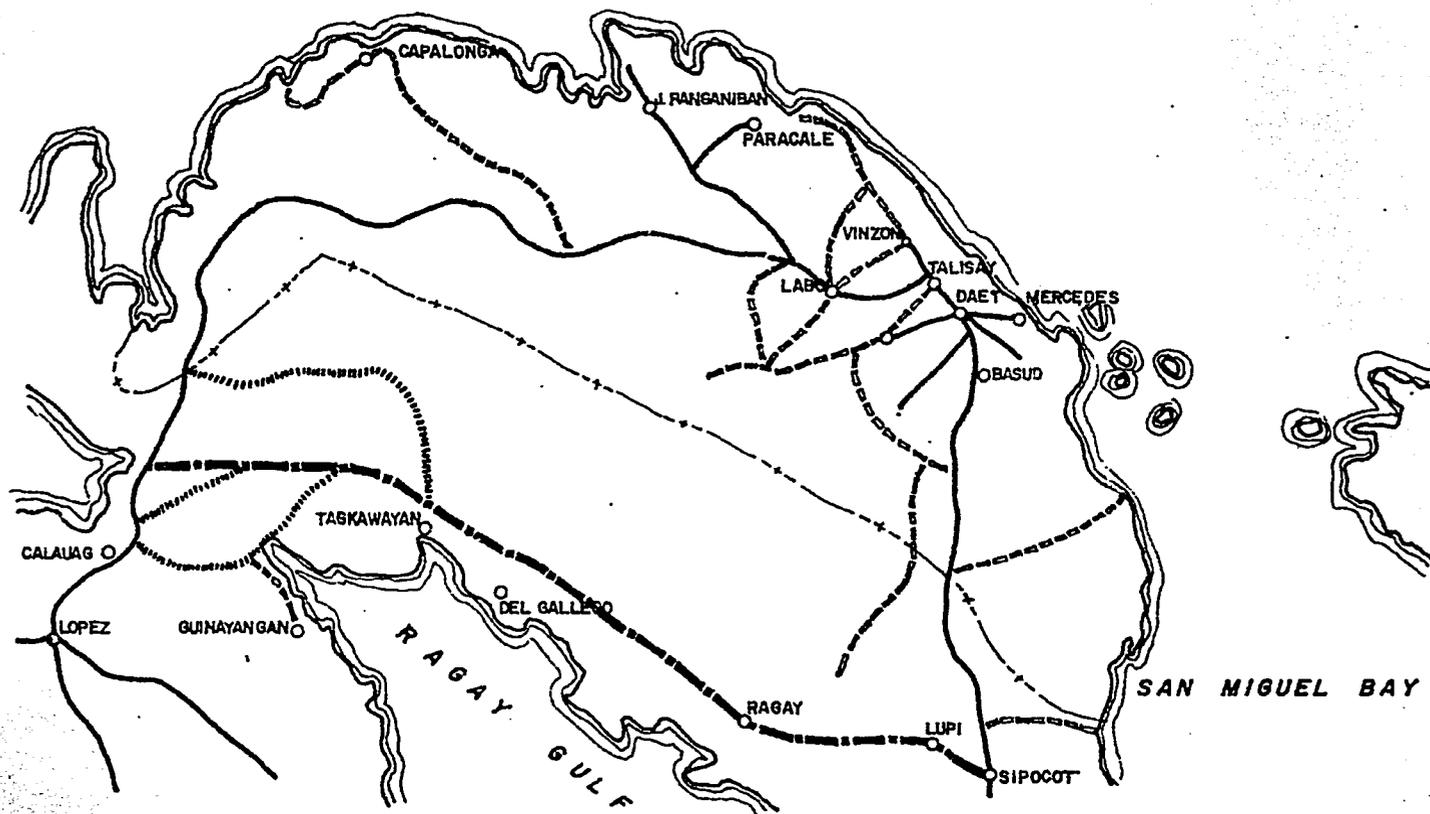
BICOL RIVER BASIN  
PROVINCE OF CAMARINES SUR

KILOMETER



FIG. 7  
SIX-YEAR EXPANSION OF COMPACT FARMING

P H I L I P P I N E   S E A



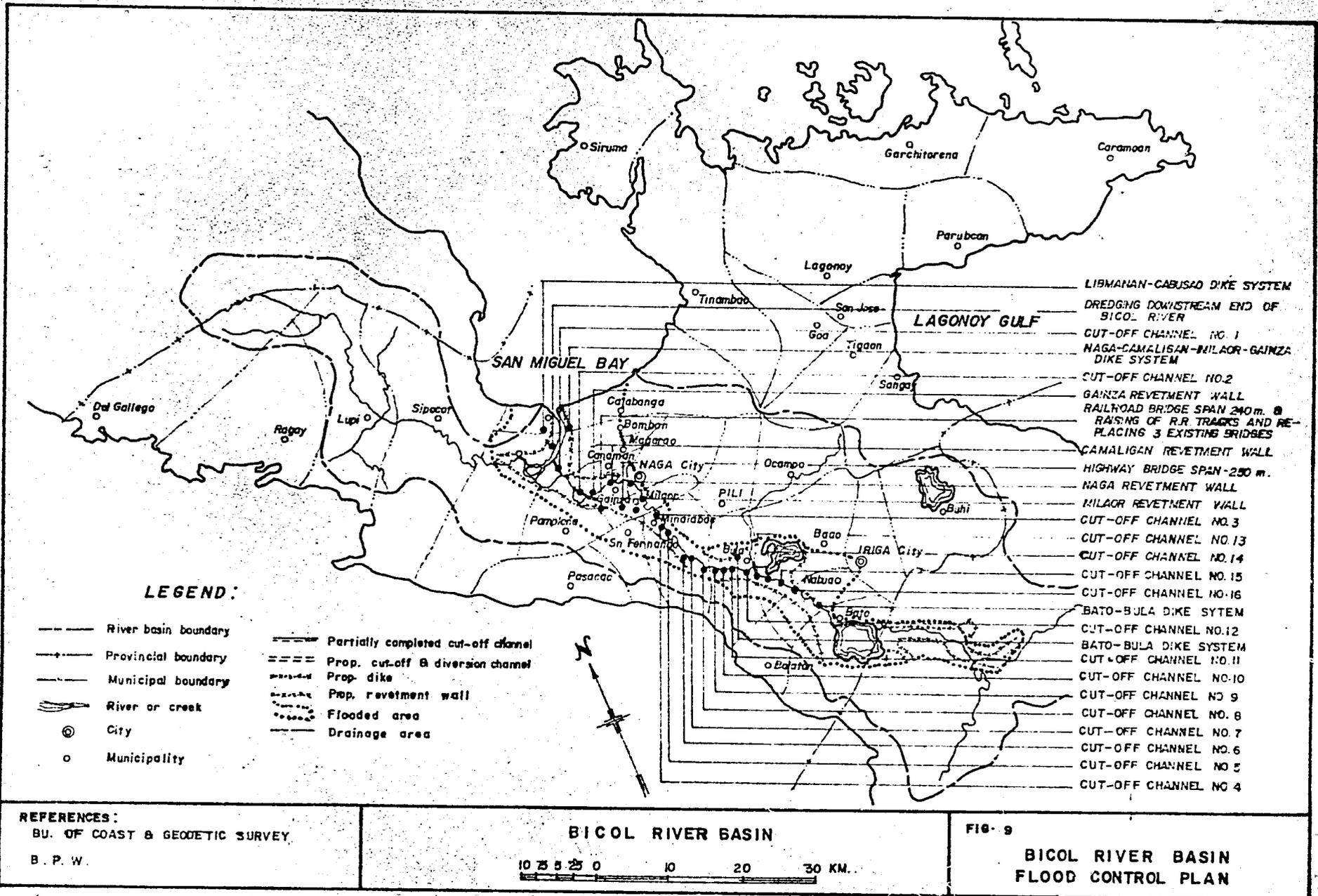
**LEGEND:**

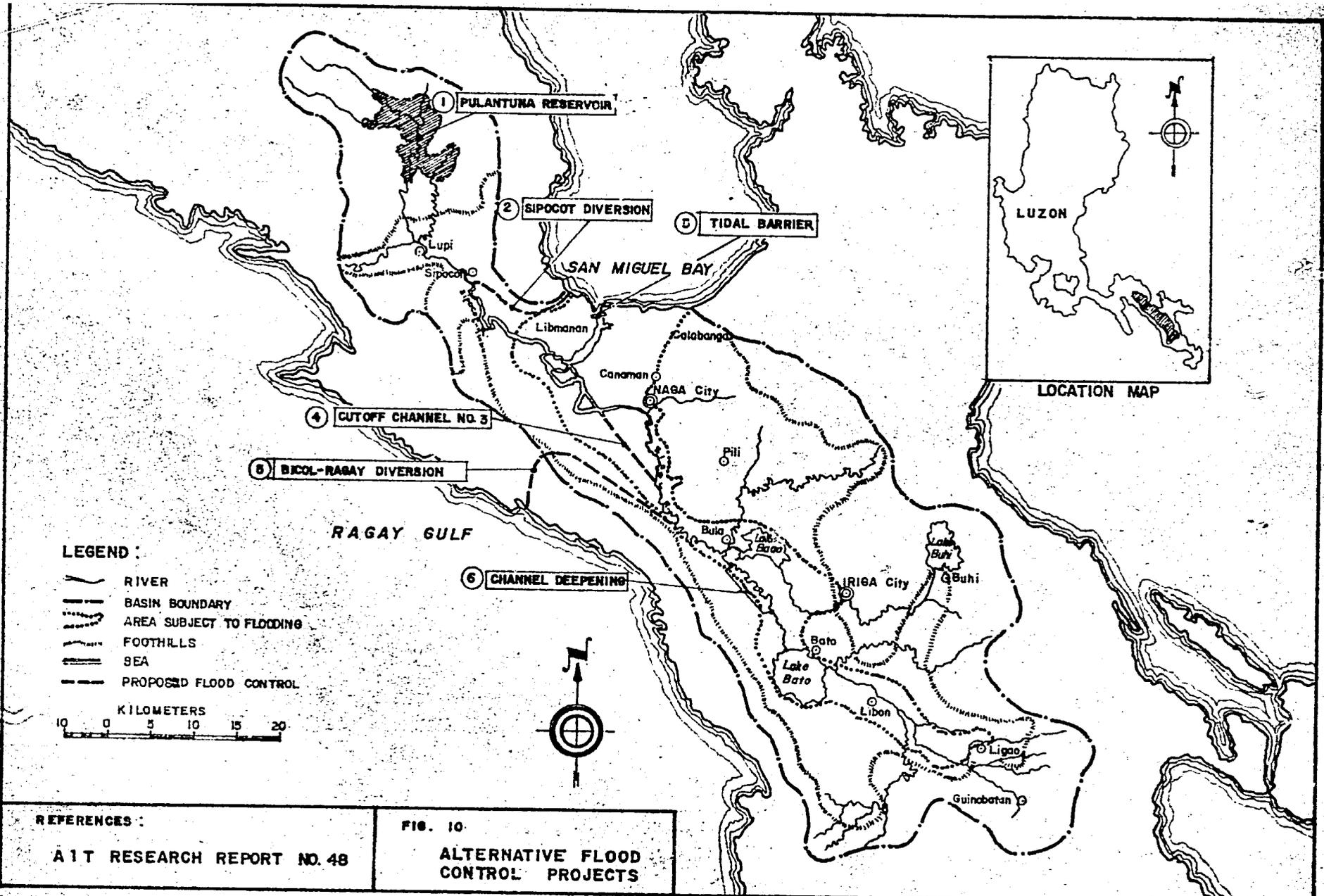
-  PROP. ALIGNMENT
-  ALTERNATIVE ALIGNMENT

REFERENCES :  
BUREAU OF PUBLIC HIGHWAY

PORTION OF CAMARINES SUR PROVINCE

FIG. 6  
LOCATION OF QUIRINO H-WAY





1 PULANTUNA RESERVOIR

2 SIOCOT DIVERSION

3 TIDAL BARRIER

4 CUTOFF CHANNEL NO. 3

5 BICOL-RABAY DIVERSION

6 CHANNEL DEEPENING



RAGAY GULF

SAN MIGUEL BAY

NAGA City

IRIGA City

Bato

Libon

Ligao

Guinobatan

Libmanan

Canaman

Pili

Bula

Lake Bato

Lake Buhi

Buhi

Lupi

Siocot

Colabanga

FIG. 11  
BICOL RIVER BASIN COUNCIL  
ORGANIZATION CHART

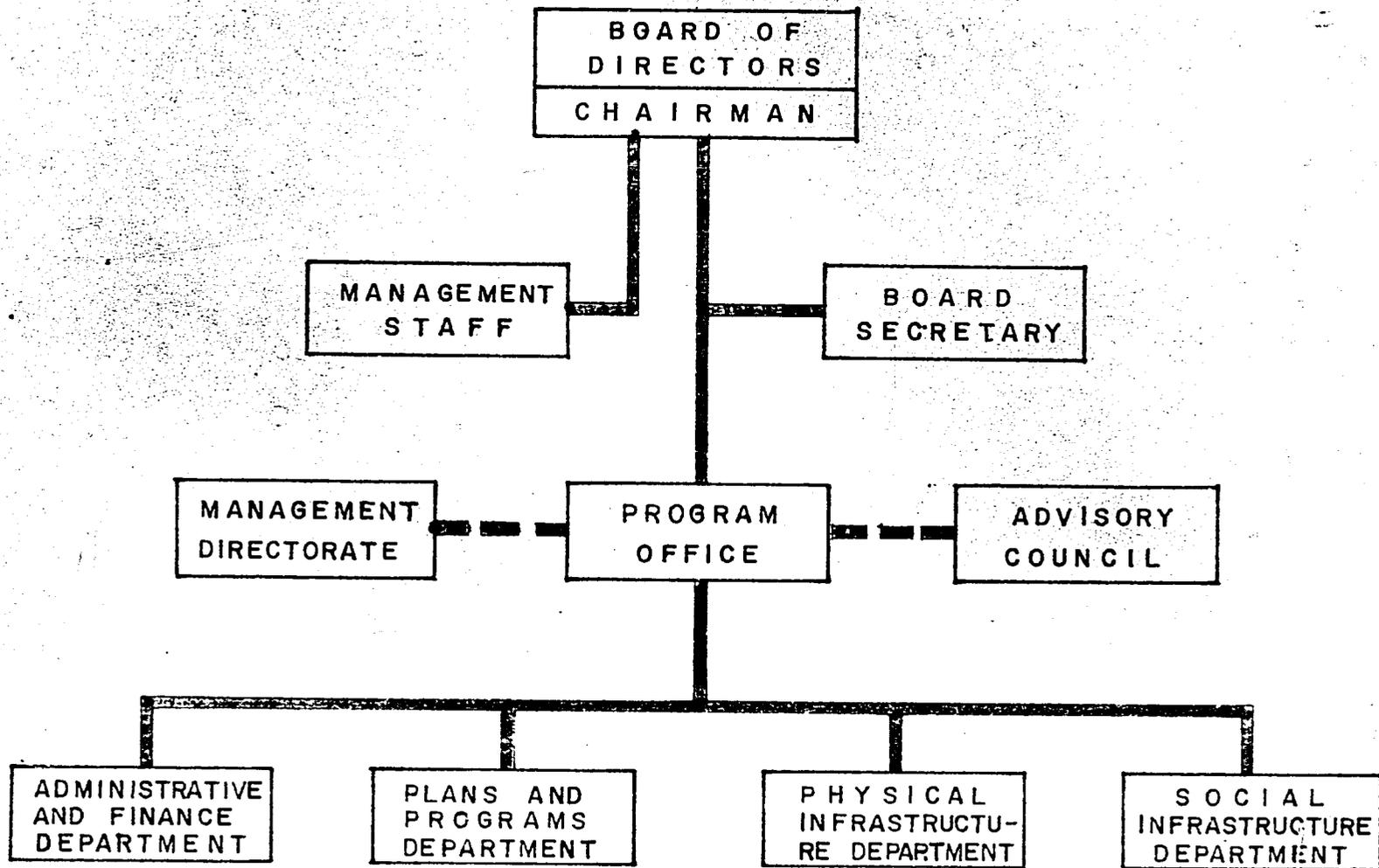


FIG. 12  
**THE BRBC PLANNING PROCESS**

