AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON, D. C. 20523
BIBLIOGRAPHIC INPUT SHEET

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Batch 59

1. SUBJECT CLASSIFICATION
A. PRIMARY: TEMPORARY
B. SECONDARY:

2. TITLE AND SUBTITLE
Urban functions in rural development: BICOL River Basin Pilot Project,the Philippines; quarterly report,Dec.1976-Feb.1977

3. AUTHOR(S)
Rondinelli,D.A.

4. DOCUMENT DATE	5. NUMBER OF PAGES	6. ARC NUMBER
1977	33p.	ARC

7. REFERENCE ORGANIZATION NAME AND ADDRESS
Rondinelli

8. SUPPLEMENTARY NOTES *(Sponsoring Organization, Publishers, Availability)*
(Data collection and analysis summaries)

9. ABSTRACT
(Urban development R&D)
PROJECT: The project objectives are to develop a plan for strengthening the contributions of urban centers (functions, activities, and services) to rural development in the Bicol River Basin, and to develop a planning process--potentially valid for application in other LDC's.
DATES: Sept. 1976-March 1978
DEVELOPMENTS: The Government of the Philippines staff collected data on the Bicol River Basin from diverse sources and previously commissioned studies of the area. The kind of data collected and partially tabulated at the time of this report includes: economic data, physical characteristics, demographic and social characteristics, and services, facilities, and infrastructure. Data sources are listed in the report. Problems in data collection necessitate an adaptation of methodologies unless more information can be collected quickly. Three sets of analyses will provide a focus for the study of existing economic and spatial systems. They are: Macro-social and economic indicators analysis, distances-access analyses, and spatial structure-functional complexity analyses. An initial design for data compilation and linkage analysis is included in this report.

10. CONTROL NUMBER
PN-AAD-637

11. PRICE OF DOCUMENT

12. DESCRIPTORS

13. PROJECT NUMBER

14. CONTRACT NUMBER
AID/ta-C-1356 GTS

15. TYPE OF DOCUMENT

AID 590-1 (4-74)

File: Bicol
x-Ira
PN-AAD-537
Rondinelli

URBAN FUNCTIONS IN RURAL DEVELOPMENT--BICOL RIVER BASIN PILOT PROJECT: THE PHILIPPINES

Second Quarterly Report: Data Collection and Analysis

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Office of Urban Development
Technical Assistance Bureau
Agency for International Development
U.S. Department of State
Washington, D.C.

January 1977

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I. Tabulated Data Compiled by Urban Functions Project Staff

II. Excerpts from SSRU Municipal Scale Study--Scale of Services and Facilities for Municipalities in Camarines Sur Province

III. Program for Workshop on "Methodologies and Techniques of Spatial Analysis"

URBAN FUNCTIONS IN RURAL DEVELOPMENT: BICOL RIVER BASIN PILOT PROJECT: THE PHILIPPINES

Second Quarterly Report: Data Collection and Analysis

Purpose of Visit: The second field visit was scheduled to monitor progress on phase I of the project: collection and analysis of data on the rural areas and urban centers in the Bicol River Basin's spatial system. In addition the U.S. Consulting team undertook the following activities: 1) provided technical assistance to the Government of the Philippines (GOP)'s Urban Functions Project staff on data collection needs and spatial analysis methodologies; 2) assisted in preparing and conducting a technical workshop on methods of spatial analysis for government officials, technical staff of national ministries and local planners working in the Bicol River Basin; and 3) assisted the GOP staff to develop a framework for Phase II of the study, identifying and analyzing linkages in the Basin's spatial system.

Participating U.S. Consulting Team:

Dr. Dennis A. Rondinelli,	Senior U.S. Consultant, Urban Functions Project, Bicol River Basin
Dr. Gerard Ruston,	Professor of Geography University of Iowa
Dr. David Sawicki,	Chairman, Department of Urban Planning University of Wisconsin--Milwaukee

Length of Visit: January 8, 1977- January 20, 1977

Places Visited: Manila; University of the Philippines---Los Banos, Laguna; Bicol River Basin (Naga City, Pili and Legaspi)

MAJOR ACTIVITIES, ISSUES AND PROBLEM AREAS

The primary activities of the US Consulting team involved interaction with and assistance to the GOP project staff in designing data collection and analysis methodologies for Phases I and II of the project, and assisting with preparation and delivery of a technical workshop on spatial analysis and location methodologies. In addition, the Senior US Consultant was concerned with monitoring project operations and providing support for subsequent phases.

Operational Progress

The start of the Urban Functions project was delayed nearly two months, until the end of November, because of problems in obtaining funds. The difficulties involved transferring funds from USAID/P to the National Economic and Development Authority (NEDA) and from NEDA to the BRBDP and to the University of the Philippines at Los Banos (UPLB). Since data collection began prior to the official start of the project, however, Phase I is nearly on schedule.

The staff is experiencing some difficulties in obtaining funds from UPLB because the university is reorganizing its budget procedures and adjusting its fiscal year. But these problems are wholly internal to the UPLB system and are expected to be resolved in the immediate future. No action was requested or required from USAID/P or AID/W.

Two vehicles, as specified in the ProAg, have been secured for the project staff; one is in operation and the other requires repairs. Logistical support to the US Consultants from USAID/P, AD/RD,continues to be excellent. The GOP project staff is in full operation and contracts are now being negotiated for specific sub-tasks, without apparent problems.

Progress on Phase I: Data Collection and Analysis

The first task undertaken by the US Consultants after arriving in Manila was a thorough review of progress on data collection for Phase I. The GOP staff emphasized that it was behind schedule on data compilation, tabulation and mapping because of the project's late start, and that this prompted their suggestion to AID/W that the January quarterly visit be postponed until February.

The review revealed, however, that a substantial amount of data had been compiled and tabulated and that there was sufficient information to proceed. A number of questions were raised concerning the extensiveness and thoroughness of data collection. Early in the project's design it was agreed that the final output or "plan" would be a policy document analyzing the spatial system in the Bicol. It would examine the existing hierarchy of central places and their linkages, analyze the potential for more effectively articulating the spatial system in order to link urban centers with rural areas in support of rural development activities, and recommend ways of locating future investments in services, facilities and infrastructure in order to increase the accessibility of rural people to functions normally performed in urban areas. Such a plan would be a policy document rather than an academic research study. Emphasis therefore would be placed on using existing data and information rather than engaging in time-consuming, large scale data collection, employing "scientific" survey designs. (See First Quarterly Report, Nov. 1976, pp. 5-6.)

It was on this basis that the GOP staff was urged to collect data from diverse sources, and compile information from previously commissioned studies of the Bicol River Basin. The information was to be collected on demographic, economic, social, political and physical characteristics of settlements within the Basin, on agricultural productivity and physical characteristics of rural areas, and on the existence and distribution of services, facilities and infrastructure throughout the Basin. By the time of the second quarterly visit, the staff had collected and partially tabulated the following types of data:

A. Economic Data:

1. Livestock Population by Municipalities; Cam. Sur and Albay, 1971
2. Poultry, Number of farms, Value and Population by Municipality, Cam.Sur and Albay, 1971
3. Warehouses; type and location, Cam. Sur
4. Aggregate Income by Municipality, Cam.Sur and Albay
5. Type, Number, Size of Agro. Industries by Muncipality, Cam.Sur
6. Number and Capacity of Rice and Corn Mills by Municipality, Cam.Sur
7. Establishments by Major Division, by Municipality, Cams.Sur and Albay
8. No of financial institutions by Municipality, Cam. Sur
9. Crop Production, Cam. Sur and Albay (1971)

10. Total Number and area of farms classified by use by Municipality, Cam.Sur and Albay, 1971
11. Number, capacity and capitalization of farm equipment
12. Number of farms, and area of farms by turnure of farm operator by Muncipality, Cam.Sur and Albay (1971)

B. Physical Characteristics

1. Total area of land in forest cover, Cam. Sur
2. Soil Characteristics, Cam. Sur
3. Water resource inventory, Cam.Sur

C. Demographic and Social Characteristics

1. Distribution of religous groups , Cam.Sur and Albay
2. Population size, change (10 years), by town/city, barrio
3. Morbidity, mortality and birth rates, Cam.Sur and Albay
4. Population density, Cam. Sur and Albay

D. Services, Facilities and Infrastructure

1. Rail linkages and cost of intermunicipal travel by train, Cam. Sur
2. Postal Offices, Cam. Sur
3. Water Supply, Cam Sur
4. Government and Private Communications Facilities, Cam. Sur
5. Government Services by Municipality, Cam. Sur
6. Water Supply, Cam. Sur
7. Transportation facilities and links, Cam. Sur
8. Health Facilities (No. of Health Units and Beds), Cam Sur

In addition, a thorough analysis of municipal services, facilities and infrastructure for municipalities in Camarines Sur was done by the SSRU in 1974 and serves as a major input for the Urban Functions project. (A summary of tabulated data collected by the GOP Staff and SSRU is at Appendix I.)

The GOP staff encountered a number of problems in data collection and analysis during Phase I of the project, including the following:

a. Accurate and complete maps delineating baranguays and towns in the Bicol River Basin are not yet available. Maps prepared from air photos, showing in detail the location of settlements and physical facilities, currently only cover 10% of the Basin. More extensive air photo mapping will be done during the life of the Urban Functions project, and additional maps will be obtained as they are completed. The project staff is preparing

a base map on which the location of major services and facilities will be recorded. Accurate location of baranguay boundaries may be difficult, however, since they are not officially described in either census documents or other government sources.

b. All data now available is "static"; it indicates numbers and levels of demographic, socio-economic and physical characteristics, but not "flows" or time series, which are essential for in-depth linkage analyses to be undertaken in Phase II.

c. Comparable analyses for all areas of the Basin will be extremely difficult, if not impossible, because the data are not reported by the same unit or at the same level of aggregation. Some data are available only at the provincial level and are not collected at smaller units; Others are reported only for municipalities and are either not available at the baranguay level or must be specifically requested from the reporting agency. Virtually no significant data other than population sizes are reported for baranguays (barrios) in the national census, making detailed spatial analysis extremely difficult. In addition, much of the information available for Camarines Sur Province is not available for Albay Province, and to collect comparable data would require extensive original surveys.

d. Much of the information needed to do an analysis of the existing spatial system (data on services, facilities, activities and functions of central places) are available only through the SSRU municipal inventory conducted in 1974 for the BRBC. But the inventory was done only for Camarines Sur and comparable information, essential for a complete analysis of the BAsin, is not available for Albay Province. The same is true for data compiled through SSRU's Transporation Inventory. Thus, major data gaps in services and facilities exist for a substantial part of the Basin.

During the course of the trip, the U.S. Consultants made various recommendations for overcoming or dealing with data limitations. It was suggested that the staff proceed with formulation of a base map, even if baranguay boundaries could not be determined exactly. Since much of the essential data was reported only at the municipal level, this could be mapped first, and more detailed maps showing population distributions for the barrios can be developed later.

The team also recommended that the entire spatial analysis exercise

begin using data for Camarines Sur, which is relatively comprehensive, and that additional data for Albay be collected only after specific methodologies and analytical techniques have been tested using the data for Camarines Sur.

Problems of comparability of data and differences in levels of aggregation must be dealt with as constraints, and methodologies must be adapted to available data unless additional information can be collected quickly. The US Consultants also recommended that the municipality be made the primary unit of analysis, since data for baranguays are extremely limited. Analysis can be extended to the baranguay level later in the project or be made a part of follow-up activities to be undertaken by the BRBC as part of its regional analysis and planning functions. Baranguay-level analysis would be done to the extent that data is currently available or easily collectable during the Urban Functions project.

The inability to analyze the spatial system in detail from the barrio level is, of course, less than ideal, but much information on the existence of services and facilities within baranguays can be imputed from SSRU Municipal and Transportation Inventories, special studies and interviews with key informants. The information collected through these sources will be used to supplement analysis of the spatial system at the municipal level.

Development of Analytical Methodologies

A second set of activities performed by the US Consultants was to assist the GOP staff in identifying and developing basic methodologies and techniques for spatial and locational analysis. Given the constraints previously described, three sets of analyses were selected for application in the Bicol River Basin:

1. Macro-Social and-Economic Indicators Analysis: This aspect of the study will attempt to collect for the Basin as a whole social and economic data that indicate: a) overall levels of social and economic "wellbeing" for the Bicol River Basin as compared to similar welfare indicators for the Philippines; b) relative levels of social and economic welfare for subareas of the Basin as compared to the Basin as a whole;

and c) baseline conditions against which future progress toward development of the Basin could be measured at a later time.

Demographic data will be compiled for 1960, 1970 and 1975 at the municipal and provincial levels and analyzed along the following dimensions:

a. Population Characteristics: including population size of municipalities and provinces by sex; dependancy ratios; schoolage population ratios; persons per household; and population density.

b. Household Income Characteristics: including household mean incomes, per capita income and total income of municipalities and provinces.

c. Employment Characteristics: including size of labor force, ratios of labor force to total population and unemployment rates.

d. Occupational Characteristics: including ratios of professional, technical, administrative and executive, farmers, fishermen and miners, craftsmen and production workers and service workers to total labor force and to total population.

e. Industrial Characteristics: including ratios of people employed in agriculture, manufacturing, transport, communication, and services to total labor force and total population.

f. Health Characteristics: including birth and death rates per 1000 total population; infant mortality rates and health workers per total population.

g. Housing Characteristics: including ratio of dwelling units to households and to total population, and ratios of units with toilets to total households; and units with strong, mixed and light construction material to total households.

h. Educational Characteristics: including literacy rates; size of school age populations and educational levels.

The format for the socio-economic indicators analysis is shown in Figure 1.

Figure 1

INDICATORS BY MUNICIPALITY, PROVINCE AND SOURCE
FOR SOCIO-ECONOMIC INDICATORS
ANALYSIS

Indicators	Municipality	Province	Source
A. Population			
1. Population totals	1960;1970;1975	1960;1970;1975	NCSO
2. Population by sex	same	same	NCSO
3. $\frac{\text{Dependents}}{\text{Independents}}$ or $\frac{\text{Popu ages (0 to 9) + ages (65 +)}}{\text{Popu ages (10 to 64)}}$	same	same	NCSO
4. $\frac{\text{Schoolage popu (6 - 25)}}{\text{total population}}$	same	same	NCSO
5. Persons/HH = $\frac{\text{Popu total}}{\text{\# of HH}}$	same	same	NCSO
6. Popu density = $\frac{\text{total popu}}{\text{Area}}$	same	same	NCSO
B. HH income			
1. HH mean income	same	same	NCSO
2. Per capita income or $\frac{\text{HH mean inc x \# of HH}}{\text{total popu}}$			
3. Total income of reporting unit	same	same	NCSO

FIGURE 1 (cont)

C. Employment

1. Size of labor force (LF)	same	same	NCSO
2. Size of LF / total popu	same	same	NCSO
3. Unemployment rate	same	same	NCSO
or			
# of unemployed / Size of LF			
4. Occupation			
a) Professional, tech + adm, exec / Total LF	same	same	NCSO
b) Farmers, fishermen + miners / Total LF	same	same	NCSO
c) Craftsmen, prod-workers / Total LF	same	same	NCSO
d) Service, sports / Total LF	same	same	NCSO
e) Combination of (a)(b)(c)(d) / Total popu	same	same	NCSO
f) Prof/tech + adm, exec / Total popu	same	same	NCSO
g) Farmers, fishermen + miners / Total popu	same	same	NCSO
h) Craftsmen, prod-workers / Total popu	same	same	NCSO
i) Service, sports / Total popu	same	same	NCSO
5. Industry			
a) Agriculture / Total LF	same	same	NCSO
b) Manufacturing / Total LF	same	same	NCSO

FIGURE 1 (cont)

c) Transport, commu / Total LF	same	same	NCSO
d) Service, sports / Total LF	same	same	NCSO
e) Combi of (a)(b)(c)(d) / Total popu	same	same	NCSO
f) Agriculture / Total popu	same	same	NCSO
g) Manufacturing / Total popu	same	same	NCSO
h) Transport, commu / Total popu	same	same	NCSO
i) Service/Sport / Total popu	same	same	NCSO
D. Health			
1. Birth rate per 1000 total popu	same	same	PHO**, Albay
2. Death rate per 1000 total popu	same	same	PHO
3. Infant mortality rate	same	same	PHO
4. Physi, surgeons + nurses, midwives / Total popu	same	same	NCSO
E. Housing			
1) No. of dwelling units (DU)	1970	1970	NCSO
2) No. of DU's / No. of HH	same	same	NCSO
3) No. of DU's / Total popu	same	same	NCSO
4) Flush/water-sealed / Total HH	same	same	NCSO
5) Strong const. material / Total HH	same	same	NCSO

FIGURE 1 (cont)

6) Mixed const. material / Total HH	same	same	NCSO
7) Light const. material / Total HH	same	same	NCSO
F. Education			
1) Literate / Total popu	1960;1970;1975	1960;1970; 1975	NCSO
2) Popu of 25 years & over	same	same	NCSO
3) Highest grade attendance	same	same	NCSO
a) No grade / Popu 25 yrs & over	same	same	NCSO
b) Elementary (1 - 7) / Popu 25 +	same	same	NCSO
c) High School (1 - 4) / Popu 25 +	same	same	NCSO
d) College (1 - 6) / Popu 25 +	same	same	NCSO

* National Census and Statistics Office

** Provincial Health Office

To the extent that data can be obtained, time series analyses will also be done for each of the indicators.

In addition, two other analyses will be performed on selected socio-economic indicators to determine relative levels of well being among municipalities and population groups within the Basin:

a. Location Quotients will be computed to obtain indicators of relative concentration of activities in municipalities in relationship to concentration of those activities in the Basin and the Philippines. For instance, the relative concentration of medical doctors in Naga City as compared to a larger reference area would be computed using the following formula:

$$LQ = \frac{\left[\dfrac{\text{\# doctors in Naga}}{\text{total LF in Naga}}\right]}{\left[\dfrac{\text{\# doctors in Bicol (or Phil)}}{\text{total LF in Bicol (or Phil)}}\right]}$$

b. Coefficients of Segregation; Gini Concentration Ratios will be computed to obtain indications of the degree to which selected services or economic characteristics are equitably distributed among population groups within the Basin.

This aspect of the study thus uses three types of variables--systemic variables which indicate attributes of subareas, such as size and characteristics of the populations in central places, individual variables which indicate attributes of individuals such as personal income, and aggregate variables such as mean income of subareas or municipalities--to provide a profile of social and economic conditions within the Basin and to serve as baseline indicators for measuring future development.

2. Distance-Accessibility Analysis: The second set of studies will focus on distance and relative accessibility of central places and selected services and facilities within the Basin. Analyses will be done of the following:

a. Accessibility of Barrios to Towns-- using both census and SSRU Transportation Inventory data the average distance of rural populations living in barrios to their nearest towns will be computed. The following formats will be used:

FIGURE 2

FORMATS FOR DISTANCE-ACCESSIBILITY ANALYSES

Accessibility of Barrios to Towns

Example:

Municipality of Cabusao

Barrios	Distance to towns(km.)	Population	Pop'n times distance
1 Barcelonita	9.1	1,751	15,924.1
2 Biong	9.3	517	4,808.1
3 Camagong	.5	483	241.5
4 Castillo	1.2	2,056	2,467.2
5 Poblacion	0	682	0
6 Pandan	4.5	896	3,942
7 San Pedro	13.7	1,095	14,941.5
8 Sta. Cruz	.9	962	8,118
9 Sta. Lutgarda	.6	696	419.6
TOTAL	xxxxxxxx	9,078	50,862

* Adt=5.603 km.

$$\text{* Average distance of Barrios Population from town} = \frac{\text{Total population times distance}}{\text{Total barrios population}}$$

Result of Barrio Level Analysis

Town	1 Average distances of barrios to town	2 Total barrios pop'n of town	3 Barrios Pop'n times distance
1			
2			
3			
4			
Cabusao	5.603	9,078	50,862
.			
.			
.			
45			
	TOTAL		

$$\text{Average distance of rural population to their nearest town} = \frac{\text{Total barrios population x distance}}{\text{Total barrios population of town}}$$

$$= \frac{\text{Total of column 3}}{\text{Total of column 2}}$$

b. Accessibility to Urban Functions--computation of the average distance of populations living in barrios, to nearest selected urban services and facilities, using the formats shown in Figure 3.

FIGURE 3

FORMATS FOR ACCESSIBILITY TO URBAN FUNCTIONS ANALYSIS

Accessibility to urban functions

Places	interplace distances or travel costs					Shortest distance to function (select minimum)	need to be served (municipal)	need times distance	Local Barrios distance to town
	1	2	3		45				
1									
2									
3									
45									
						TOTAL			

Steps in computing accessibility to an urban functions

Step 1.
1. Identify places with function, check their respective columns
2. For each row, find which of these columns has shortest distance
3. Multiply measure of need by this minimum distance
4. Add (3) above to row places' local barrios distance movement (take case when measure of need is not population to have local barrios distance movement in commensurable units).

$$\text{Average distance to closest function} = \frac{\text{total need times distance + local distance}}{\text{total need to be served}}$$

FIGURE 3 (cont)

Accessibility to functions - Regional Statistics

Functions	Number of places with function	Average distance to closest function	Maximum distance to closest function	Distribution of needs within distance levels 0	5	10	15 (km.)
1							
2							
3							
4							
.							
.							
.							
n							

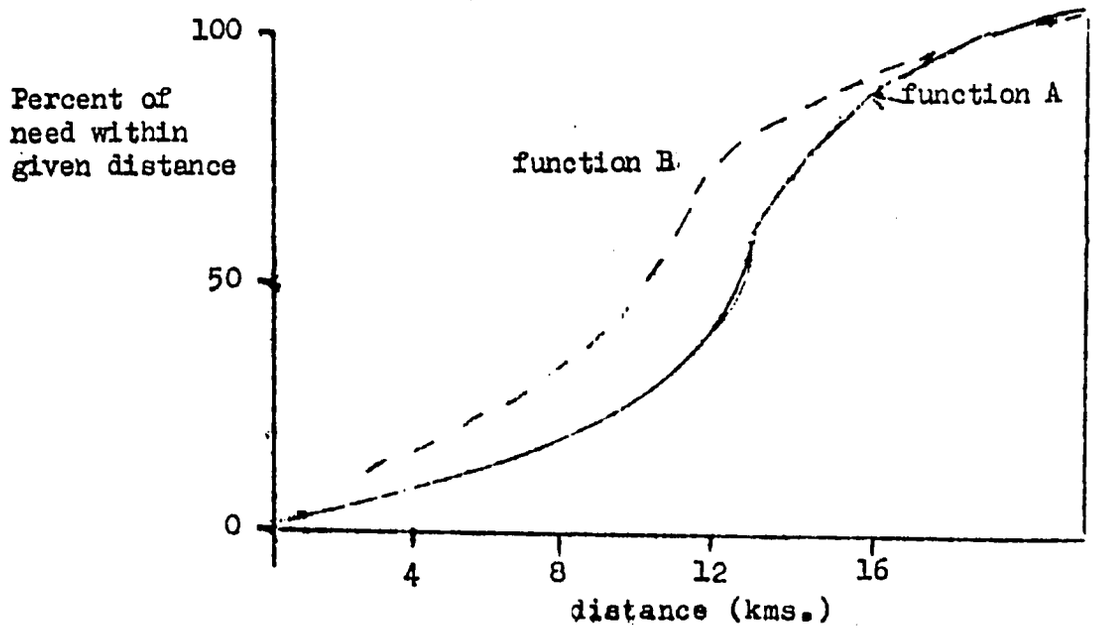

FIGURE 3 (cont.)

Summary : Distance of towns from urban function.

Distance to Urban Function (km)

Places	Functions 1	2	3	4	5	6	7	etc
1								
2								
3								
4								
.								
.								
.								
45								

Table 3 Analysis of town service areas for each function

	Average distance to place	Population (or need) assigned to place
Function A		
Places with function		
1		
2		
3		
Function B		
1		
2		
3		

FIGURE 3 (cont.)

To compute locations of function
to minimize average distance to persons.

(Can be used to suggest next location for function)

Example: Assume two existing location and the need to find a third location.

Criteria: That place should be chosen which, if selected, would give smallest total distance that people would have to travel to their nearest place with a function.

1. Assume function is now located in place 8 and 10

Places	1	2	3	4	5	6	7	8	9	10	Minimum of place 10, 8 and that indicated below							
											1	2	3	4	5	6	7	9
1	0	2	2	9	8	12	12	15	16	14	0	2	2	9	8	12	12	14
2	2	0	2	4	6	7	8	9	9	10	2	0	2	4	6	7	8	9
3	2	2	0	4	7	8	5	9	9	8	2	2	0	4	7	8	5	8
4	9	4	4	0	3	2	2	4	6	5	4	4	4	0	3	2	2	4
5	8	6	7	3	0	3	7	8	10	10	8	6	7	3	0	3	7	8
6	12	7	8	2	3	0	4	3	5	8	3	3	3	2	3	0	3	3
7	12	8	5	2	7	4	0	3	3	5	3	3	3	2	3	3	0	3
8	15	9	9	4	8	3	3	0	4	8	0	0	0	0	0	0	0	0
9	16	9	9	6	10	5	3	4	0	4	4	4	4	4	4	4	3	0
10	14	10	8	5	10	8	5	8	4	0	0	0	0	0	0	0	0	0

FIGURE 3 (cont.)

2. Weight times distance for alternative location for the new function

Measure of need to be served	Places	1	2	3	4	5	6	7	8
3	1	0	6	6	27	24	36	36	42
4	2	8	0	8	16	24	28	32	36
1	3	2	2	0	4	7	8	5	8
2	4	8	8	8	0	6	4	4	8
1	5	8	6	7	3	0	3	7	8
1	6	3	3	3	2	3	0	3	3
2	7	6	6	6	4	6	6	0	6
3	8	0	0	0	0	0	0	0	0
3	9	12	12	12	12	12	12	9	0
2	10	0	0	0	0	0	0	0	0
		47	43	50	68	82	97	96	111

Minimum is 43 for place 2 therefore place 2 is next location to be recomended for this function.

c. Minimum Distance Location Analysis-- using data derived from the Socio Economic Profile of Camarines Sur on interplace distances, indicators can be computed for location of selected functions to minimize the distance people would have to travel from their place of residence to the nearest place with a function. Formats for such an analysis are presented in Figure 4.

FIGURE 4

APPROXIMATE ROAD DISTANCES BETWEEN TOWNS AND CITIES FROM SIPOCOT TO PIO DURAN, ALBAY (IN KILOMETERS)

From / To:	Sipocot	Naga	Pili	Anayan	Baao	Iriga	Nabua	Bato	Polangui	Oas	Ligao	Guinobatan	Camalig	Daraga	Albay	Legaspi	Pio Duran
Sipocot	000	45	60	62	76	83	88	94	109	113	118	128	134	143	146	149	157
Naga	45	000	15	17	31	38	43	49	64	68	73	83	89	98	101	104	112
Pili	60	15	000	2	16	23	28	34	49	55	58	68	74	83	86	89	97
Anayan	62	17	2	000	14	21	26	32	47	51	56	66	72	81	84	87	95
Baao	76	31	16	14	000	7	12	18	33	37	42	52	58	67	70	73	81
Iriga	83	38	23	21	7	000	5	14	26	30	35	45	51	60	63	66	74
Nabua	88	43	28	26	12	5	000	6	21	25	30	40	46	55	58	61	69
Bato	94	49	34	32	18	14	6	000	15	19	24	34	40	49	52	55	63
Polangui	109	64	49	47	33	26	21	15	000	4	9	19	25	34	37	40	48
Oas	113	68	53	51	37	30	25	19	4	000	5	15	21	30	33	36	44
Ligao	118	73	58	56	42	35	30	24	9	5	000	10	16	25	28	31	39
Guinobatan	128	83	68	66	52	45	40	34	19	15	10	000	6	15	18	21	29
Camalig	134	89	74	72	58	51	46	40	25	21	16	6	000	9	12	15	23
Daraga	143	98	83	81	67	60	55	49	34	30	25	15	9	000	3	6	14
Albay	146	101	86	84	70	63	58	52	37	33	28	18	12	3	000	3	11
Legaspi	149	104	89	87	73	66	61	55	40	36	31	21	15	6	3	000	8
Pio Duran	157	112	97	95	81	74	69	63	48	44	39	29	23	14	11	8	000

SOURCE: Socio Economic Profile, Camarines Sur, 1974

FIGURE 4 (cont.)

FORMATS FOR ANALYZING MINIMUM AVERAGE DISTANCES OF FUNCTIONS TO POPULATIONS FOR THE LOCATION OF ADDITIONAL SERVICES AND FACILITIES

To identify sets of places such that all other places will be within a given distance of a place in the set.

Road distances in the Bicol: 1 indicates row place is within 25 km. of column place

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	1																
2		1	1	1													
3		1	1	1	1	1											
4		1	1	1	1	1											
5			1	1	1	1	1	1									
6			1	1	1	1	1	1									
7					1	1	1	1	1	1							
8					1	1	1	1	1	1	1						
9							1	1	1	1	1	1	1				
10							1	1	1	1	1	1	1				
11								1	1	1	1	1	1	1			
12									1	1	1	1	1	1	1	1	
13									1	1	1	1	1	1	1	1	1
14											1	1	1	1	1	1	1
15												1	1	1	1	1	1
16												1	1	1	1	1	1
17													1	1	1	1	1

FIGURE 4 (cont.)

Matrix reduction:

	1	3	4	5	7	8	9	10	11	13
1	1									
2		1	1							
6		1	1	1	1	1				
7				1	1	1	1	1		
10						1	1	1	1	1
11						1	1	1	1	1
12							1	1	1	1
17										1

	1	2	4	8	9	10	13
1	1						
2		1	1				
7				1	1	1	
17							1

Result. Four places are required

Place 1	Sipocot
Place 3 or 4	Pili or Anayan
Place 8, 9 or 10	Bato, Polanguis or Oas
Place 13	Cumalig

Distance-Accessibility analyses should be useful both in providing insights into the accessibility of services and facilities located in central places within the Basin and as one set of criteria for determining the optimal location of future investments in services, facilities and infrastructure.

The US Consultants emphasized, however, that the results of the distance-accessibility techniques must be interpreted carefully, and within the context of the social, economic, physical and cultural conditions of the Bicol River Basin. Distance as an indicator of accessibility or optimal location may have profoundly different uses and implications in developing countries, where cost of time and travel patterns are substantially different, than in developed countries. The implications of the analyses

for location policy recommendations must be modified in terms of the value of time, relative need, physical linkage, means of transportation, and social, political and economic factors that influence travel behavior in the Bicol.

3. Spatial Structure- Functional Complexity Analyses: The SSRU Municipal Inventory data will be used in a scale analysis to identify central places, levels of hierarchy among central places and functional complexity of municipalities. The SSRU has just completed a scale analysis of items included in the Municipal Inventory for 33 municipalities in Camarines Sur Province. This analysis will be used as an informational input for the scalogram analysis to be done by the Urban Functions project.

The US Consultants made a number of suggestions to the GOP staff for modifying SSRU's scale analysis, and for redesigning it for application in Albay Province. A major difference between the SSRU and the US Consultants arose over the conceptual interpretation of the scaling results. SSRU assumed that scale of complexity is correlated with level of development, and thus, that scale of complexity is equivalent to level of development. The US team suggested that functional complexity is only one of a broader set of criteria for judging how "well developed" a community is, and that inherent in the concept of a well articulated spatial system is the notion that communities of different sizes, performing differant types and combinations of functions, are all needed to promote development. The implication of the SSRU study is that functions missing from communities should be located there as a part of the development process, and that all well developed communities would have a maximum number of functions.

In addition, the US Consultants recommended that a revised data set be collected for Albay Province, one which more directly indicates the existence or lack of "developmental services and facilities" rather than the larger set of activities, functions and demographic characteristics found in the SSRU survey.

An excerpt from the SSRU Scale Analysis, indicating rank of functional complexity and the scale of items in the Municipal Inventory for municipalities in Camarines Sur, is found at Appendix II.

These three categories of analysis--social and economic indicators, distance-access analysis and scale analysis of spatial structure and functional complexity--will provide a focus for the study of the existing economic and spatial system within the Bicol River Basin. Additionally, descriptive tabulations of agricultural production data, maps and qualitative information will supplement these analyses.

Workshop Training Sessions

A third major task performed by the US Consultants was to prepare for and conduct a formal workshop on "Methodologies and Analytical Techniques." The two-day workshop was conducted on January 15-16, 1977 at the BRBDP Training Center at the Camarines Sur Agricultural College in Pili.

The purpose of the formal workshop was threefold: 1) to maintain communications with local government officials, local planners and ministry technical staff, informing them of the progress and direction of the project; 2) to provide technical training on spatial analysis methods for participants in the workshop; and 3) to obtain evaluations, recommendations and general information on the techniques, data collection procedures and overall direction of the project from those who are expected to be the major "users" of the project's results.

This first formal workshop was primarily conducted by the US Consultants with support from the GOP staff. It consisted of a general review of the status of the project and progress made thusfar and substantive presentations including: 1) a recapitulation of and reorientation on the purposes, conceptual framework and goals of the Urban Functions in Rural Development Project; 2) a review of distribution and social indicators analysis techniques, with emphasis on location quotient and coefficient of segregation techniques; 3) presentation of distance-access techniques and optimal location analysis; 4) review of scale analysis and of the SSRU scalogram analysis for Camarines Sur; and 5) discussion of the preliminary conceptual framework for Phase II of the project--Linkage Analysis.

Among those who attended were the GOP consultants from the University of the Philippines--Los Banos, staff members of the Bicol River Basin Development Program, members of the planning and development staffs of the Provinces of Camarines Sur and Albay, city planners and administrators from Legaspi and Naga Cities, representatives of NEDA Region V planning staff, GOP project staff members and the mayors of Naga City, Legaspi, Libmanan, Libon, San Fernando and Sipocot. (See Workshop Program at Appendix 3.)

The US Consultants recommended that the conduct of future workshops become the primary responsibility of the GOP project staff, and that the consultants assume a supporting role. While the consultants can assist the staff in preparing presentations, the primary responsibility for training should be with the staff. In this way, the workshops--and, more importantly, the project itself--will come to be seen as a GOP activity and an integral part of BRBDP's planning function.

Preliminary Design Discussions on Phase II--Linkage Analysis

In addition to working with the GOP staff on data collection and analysis methodologies, the US Consultants also assisted the staff with preliminary design of Phase II for analyzing the linkages among communities and among services and facilities within the Basin.

The linkage analysis has been found to be the most difficult aspect of the project. Difficulties arise from a number of sources: First, the concept of "linkage," although crucial to the overall concept of spatial articulation as a means of providing urban services and facilities in support of rural development, is one which is somewhat vague and abstract. Little can be found in either the development or spatial literature to explicate the roles of linkages in socio-economic development and few methods exist for quantifying them. Second, much of the data available for the Basin is "stock" or "static" information, rather than "flow" or "dynamic" data needed for linkage analysis. Third, many of the most important linkages among communities that are expected to strongly influence decisions and behavior, such as social interaction

patterns, political linkages and cultural practices, are difficult to quantify. Finally, many of the linkages that were identified as being crucial in the Bicol cannot be comprehensively traced. Some, such as transport links can be systematically identified and mapped, showing all physical connections among communities. But others, such as commodity flows, can only be partially traced and mapped without undertaking a full-scale marketing study of the Basin. Still others, such as social interaction patterns, which may be among the most important explanations of spatially-related decision behavior, can only be identified as critical variables. Detailed, systematic description of social linkages among all communities in the Basin is nearly impossible. Here, general description and exemplification must be used.

Keeping these constraints in mind, the US Consultants and GOP staff developed a preliminary framework for data compilation, additional information collection and linkage analysis. The initial framework will be modified as work progresses and the modified framework will be re-assessed and finalized during the next quarterly visit in May. The preliminary design identifies seven categories of linkages, several types of the most important linkages within each category, and indicators of linkages derived from already available or easily collected data.

The preliminary framework is depicted in Figure 5.

The initial design was also used as the basis for assigning priorities to additional data collection tasks. Considerable disagreement emerged in discussions among the US Consultants over how extensive additional data collection should be, and how the data collection instruments should be designed. Some of the disagreement was resolved by establishing a priority system for undertaking new studies. Critical gaps and easily collected information were given highest priorities for immediate study. Other information and data would be collected as time and resources permit. Since the project's output has been defined as a "policy plan" rather than a scientifically designed research effort, partial information, key informant interviews and staff knowledge and judgments about the region will be used to identify and describe linkages, even where quantitative data exists, but especially in cases where it cannot be easily obtained.

Prior to undertaking new surveys the staff will compile and analyze all existing data and information on indicators of linkage.

FIGURE 5

URBAN FUNCTIONS PROJECT

LINKAGE ANALYSIS

CATEGORY	TYPE	INDICATORS
A. Physical	1. Road Networks	a. Kilometrage link between municipalities b. Types and conditions of roads c. Origin-destination study d. Traffic count Passenger count e. Transport facilities per link, A to E from BRBDP Transport Study
	2. River Transport	a. Quick survey of major river stops, upstream and downstream --- goods and passengers carried, purpose of travel, river boat types and capacities
	3. Rail	a. From PNR data - types and volume of freight, passengers, distance between stations, locations of stations and stops, frequency of trips b. Quick survey on skates - types and volumes of freight and passengers, points of origin and destination, types and capacities of skates, frequency of trips per link
	4. Irrigation System	a. From NIA data - types of systems, hectarage, crops grown, production and productivity, map of system, links between systems (if any), probable expansion of system (on map), number of farms served, number of households, number of farmers, number of people, organization for system management, water fees, actual payments and delinquencies.
B. Economic	1. Market Patterns for agricultural products	a. From Transport Study - commodity flow

Figure 5 (cont.)

CATEGORY	TYPE	INDICATORS
	and manufactured commodities	b. Quick Survey on 4 major market centers (Naga, Iriga, Ligao and Legazpi) to determine origin-destination of goods sold and bought (reach of market).
		c. Periodic markets - location, market days, variety of goods, number of retailers, commodities traded
	2. Farm Inputs	a. Farm credit - sources, types, volume from Bank Reports (CB)
		b. Quick survey on fertilizer, pesticides and farm machinery - dealers, repair shops - types and location, volume (if available)
	3. Capital Flows	a. From CB - distribution of commercial credits and capital investment
		b. Quick Survey and 5 cases on informal credit (possible class project of BU or other schools.)
	4. Manufacturing linkages	a. Quick survey on manufacturing establishments - inputs, outputs, distribution of manufactured goods, location, employment, capitalization, types
	5. Shopping Patterns	a. Quick Survey of sample barrios (about 10 barrios of 20 households each) - get cross-section of goods bought by barrio people from within the barrio, from outside the barrio (poblacion, other town, city) - trace on map, quantify frequency of buying trips (scientifically acceptable sampling levels).
C. Population Movement	1. Migration	a. From NCSO special studies, 1960, 1970, 1975
	2. Journey to work	b. Check Intermodal Transport Study and SSRU Study on "Where People Go?"

FIGURE 5 (cont.)

CATEGORY	TYPE	INDICATOR
D. Technological Linkages	1. Telecommunications	a. From Bureau of Telecommunication (DPWTC) - telephone and telegram systems, franchise area, number of subscribers, links between systems, volume of long distance calls (and destination of calls), charges and rates, map calls made.
	2. Media	a. From Radio Control Board data - For radio, TV stations, location and reception areas, and listenership For printed media, type, circulation
E. Social Links	1. Visiting	a. Check SSRU study on "Where People Go?"
	2. Kinships	b. Quick Survey on about 10 barrios (5 in Camarines Sur 5 in Albay) and determine to whom barrio residents are related (location of relatives), map this to show social links, reasons why barrio people visit relatives and friends from other barrios.
	3. Marriage Patterns	a. Survey from marriage licenses filed with municipal civil register on origin of brides, of town grooms for the last 2-5 years. map information as links from that town to origin of brides.
F. Service Delivery	1. Electric Power	a. Map of electric power grid (from NEA, NPC), no. of subscribers, rates charged, source and type of power plant.
	2. Education	b. From DEC - location and type of schools, enrollment for last 5 years, service area of schools (origin of students), number of classrooms and special facilities
	3. Health	a. From DOH and Provincial Health Office - location and type of health care facilities, number of patients treated and their origins, types of diseases/sicknesses, number of beds, number of doctors and nurses.

FIGURE 5 (cont.)

CATEGORY	TYPE	INDICATOR
	4. Professional Serivces	a. From SSRU Municipal Inventory (Camarines Sur only)
	5. "Viajeros" or itinerant Wholesalers	a. Quick survey of their types, numbers, and farms areas covered (map this), and about 5 discriptive cases on their ownership, goods traded, trading practices, clientele, frequency of trading activities and short history of their development, including their problems and advantages.
G. Political, Administrative and Organizational linkages	1. Government political subdivisions, structural relationships.	a. From Local Government Code - summarize levels of formal gov't subdivisions, how they are related, their authorities decision-making powers, functions.
	2. Budgetary Flows	a. Municipal tax revenews and uses for the last 5 years; about 5 actual cases of extent on how a municipality has to depend on higher levels for budgetary assistance.
	3. Informal politicals linkages and decision-making	a. Key Informant Survey among sampled barangay Captains and Mayors on what are the key servicesand projects needed by their barangay on municipality and where they go for assistance.
		b. About five descriptive cases on actual political decision making who participates in decision-making and extent of participation such as location of projects, incorporation of barrios or towns into municipalities or cities, changing names, etc.

Preliminary draft papers will be prepared, describing linkages in as much detail as possible. For each category enough information is already available for a basic description, and for some categories detailed information will enable mapping or complete identification of linkages. In other categories, detailed description will only be possible for a subarea of the Basin. Once these preliminary drafts are completed, specific decisions will be made on additional data collection where serious gaps appear.

In conjunction with preparing preliminary draft analyses, six "quick surveys" will be made to obtain essential data:

1. A short survey will be made of the use of "skates," small handcars illegally operated on railroad tracks running through the Basin, to determine how they informally link baranguays in economic exchange, transport of commodities and for travel. Interviewers will be placed at strategic points on the railroad tracks to estimate the volume of skate traffic and to obtain, where possible, information on the types of commodities they carry, their origin and destination, and their relative importance as informal physical linkages among communities. No official data are available on skate traffic, but it is estimated that, for some commodities, skates carry more volume than the railroad.

2. A marketing survey will be conducted of six major markets in the Basin to obtain information from middlemen on the flows of selected agricultural commodities into and out of the regular, institutionalized marketplaces. The survey will attempt to determined the "reach" of the markets to producers in obtaining agricultural goods, and to consumers in selling those goods. To the extent possible, major flows will be traced backward and forward from the markets to determine the numbers and locations of intermediate middlemen. The market study is being redesigned to obtain information that will supplement that available in the BRBDP's Intermodal Transport Study.

3. A survey will be conducted, using town records, to determine the extent of spatial interaction reflected in marriage patterns. Marriage registries will be sampled to determine the places from which men in each town select their brides. Since marriage patterns are a critical social

linkage affecting economic, business, location and political decisions within and among communities, the information should provide some indications of the extent to which communities in the Basin are socially integrated through marriage relationships.

4. A survey of education records will be made to determine the "service areas" of schools by identifying the origin of students.

5. A similar survey will be made of the origin of patients for health facilities in the Basin in an effort to determine the physical "reach" of formal health facilities.

6. A survey of periodic markets will be conducted in order to determine their functions and "reach," and the degree to which they link baranguay farmers to local and regional systems of agricultural exchange.

Each of the surveys will be designed in detail and reviewed by the appropriate GOP Consultants prior to the field studies.

Finally, both as part of Phase II of the project and in anticipation of Phase III--plan formulation--the GOP staff is negotiating subcontracts for specific studies. Subcontracting for mapping and cartographic services has already been completed. The staff is now working with the University of the Philippines College of Public Administration on a subcontract to study local government structure, relationships and linkages within the Bicol River Basin, to compile and analyze national government ministry location standards for services and facilities, and to describe, analyze and evaluate the organization and processes of planning at different levels of government in the Bicol study area.