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9. ABSTRACT

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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 Philippines staff has produced a thorough and almost complete compilation of existing information on socio-economic conditions and physical resources in the Basin, organized by municipality. Analytic methods have been adopted that are simple, easy to understand, and able to be performed manually and presented visually. The methodology includes three components. Preparation of a socio-economic, demographic, and physical profile of urban and rural subareas will provide an inventory and baseline study. Secondly, analysis of centrality, functional complexity and heirarchy of settlements will be done. The third method is threshold analysis. A number of linkage studies are underway and scheduled for completion by August, 1977. These are briefly described. A preliminary list of topics, issues and analyses for inclusion in the final report is presented.

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

Third Quarterly Report: Review of Functional and Spatial Analysis

Dennis A. Rondinelli
Consultant

Contract No. AID/ta-C-1356

Office of Urban Development
Technical Assistance Bureau
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URBAN FUNCTIONS IN RURAL DEVELOPMENT--BICOL RIVER BASIN PILOT PROJECT: THE PHILIPPINES

Trip Report Summary

PURPOSE OF VISIT: The third field visit was scheduled in May to afford the U.S. Consulting Team the opportunity to monitor and review progress on Phases I and II of the project: the completion of data collection on the spatial system and linkages. The U.S. consultants undertook the following activities: 1) review of initial work of the Government of the Philippines (GOP) Urban Functions staff on the analysis of data collected during Phase I; 2) assistance in organizing and reviewing linkage data; 3) assistance to GOP staff in preparing a one-day technical workshop for local policy and technical participants c onducted at the Agricultural College of Camarines Sur; and 4) assistance to the GOP staff in preparing a preliminary outline for the project's final report and in organing a work schedule for Phase III.

PARTICIPATING U.S. CONSULTANTS

Dr. Dennis A. Rondinelli,	Senior U.S. Consultant, Urban Functions Project Bicol River Basin Program
Dr. David Sawicki,	University of Wisconsin--Milwaukee

LENGTH OF VISIT: May 21, 1977- June 3, 1977

PLACES VISITED: Manila; University of the Philippines-Los Banos, Laguna; Bicol River Basin (Naga, Pili, Legaspi)

MAJOR ISSUES, ACTIVITIES AND PROBLEM AREAS

The U.S. Consulting Team worked with the GOP project staff on three primary activities: reviewing the spatial and linkage data collected during Phases I and II of the project and suggesting appropriate methods of organizing and analyzing the information; resolving data problems and identifying information gaps; and assisting the staff in outlining the content and structure of the final project report. Initial tasks were delineated for the final phase of the project, and will be modified during the next quarterly visit.

Operational Progress

The project is progressing nearly on schedule, given the late start due to disbursement delays. Phase I, data compilation, is completed and work is being finished on surveys needed for linkage analysis in Phase II. All data collection should be completed by the beginning of August. Staff attention is now being devoted almost entirely to completion of the functional and spatial analysis of the Basin and to organizing for the preparation of the final project report.

The project's management is considering a reorganization of the junior staff, which until now has been almost entirely concerned with data compilation and tabulation, to meet the analytical and writing requirements of Phase III. Some new staff with higher level analytical skills may be needed to replace junior level personnel.

Two main operational problems still remain. Transportation difficulties continue to hinder efficient work scheduling. One of the two vehicles provided by USAID/P is in poor condition and the other is in heavy use in the Bicol. The staff still depends to some degree on temporary use of BRBDP vehicles.

A second, more serious problem has been the difficulty of obtaining second quarter disbursements. Budgeting and disbursement difficulties arose within the project staff and in processing required paperwork from BRBDP through the National Economic and Development Authority (NEDA) to USAID. Shortages of funds could cause some delay in progress. Initial attempts to resolve the problem were made by Dr. Michael McNulty of AID/W, TA/UD during the visit, and a "streamlined" request and approval system will be tested during the next quarter.

Progress on Data Collection

Phase I of the project--compilation of secondary socio-economic, demographic and physical data on urban and rural subareas of the Basin--has been completed, and the data organized into a statistical report disaggregated by municipality. The rationale of Phase I activities was that the staff would make a thorough compilation of existing data on subareas of the Basin, both to provide baseline information on the state of socio-economic conditions within the region and to avoid duplication and unnecessary expense in new data collection. The operating principle was that the analysis of urban functions in rural development in the Bicol would be based, as much as possible, on existing data rather than undertaking an extensive new collection effort.

It is important, as the project progresses and is evaluated for replication potential, to reiterate the rationale of the original project design. Given the conditions established in the ProAg--a relatively short period of time for completion of the project, limited funds for new research or data collection, and the objective of tailoring analytical methods to the existing data base--reconnaisance and compilation of existing data was a crucial element of the project. Indeed, the project was designed

on the assumption that it would be an exercise in "fitting" appropriate analytical techniques to available and easily collectable data and that quantitative analysis would be only one, and not necessarily the most important, input to the policy plan. Whatever data were collected would have to be combined with intimate knowledge of the Basin on the part of the project staff. Conclusions about the adequacy of urban functions and services, the spatial implications for rural development and the recommendations for locating future investments in services and facilities would evolve from a combination of quantitative and qualitative analyses. Although at times this objective was lost, and nearly all attention was focused on the quantitative aspects, the results of Phase I seem highly satisfactory.

The staff has produced a thorough and virtually complete compilation of existing information on socio-economic conditions and physical resources in the Basin, organized by municipality. The output represents a credible statistical yearbook on the Bicol, which until this time did not exist. All of the data collected by other projects for feasibility studies and background reports had never been systematically reviewed and organized for general planning purposes. The data compilation, in itself, is an output of the project that should be directly and immediately useful to the BRBC, local and provincial governments, and national ministries for planning and decision-making.

The data appearing in the statistical compilation are listed at Appendix A.

For analytical purposes the data have certain obvious weaknesses:

1. Nearly all socio-economic statistics are reported at either the province or municipal level and cannot be disaggregated to the barangay.

2. It is difficult, and often impossible, to make meaningful distinctions between poblacion and rural barangays in terms of socio-economic characteristics for data reported at the municipal level.

3. Much of the data collected by the National Census and Statistics Office (NCSO) were on a sample basis, making it impossible to use original field sheets to aggregate data for barangays or to attribute them to all settlements.

4. Some of the socio-economic data are reported at different units, or the unit boundaries have changed, from one census to another.

5. Time series data are not available for most socio-economic and demographic indicators, and temporal comparisons are difficult to make.

6. Some of the data compiled from special BRBC or national ministry reports were collected and analyzed for special purposes--such as project feasibility studies--and do not cover the entire Basin.

7. The data available varies from 1970 to 1976 in terms of its currency, and in some cases because of the variability data are not directly comparable.

Despite these limitations for "scientific research," the data are generally suitable for descriptive analysis. The limitations were not unexpected, and overall, the Bicol still has a larger amount and better quality data for purposes of the Urban Functions study than can be expected in most rural regions of developing countries. The fitting of available data and appropriate analytical techniques was meant to be a continuing process, and will remain an important project activity.

Functional and Spatial Analysis

Selection of methodology for analyzing data on urban and rural subareas of the Basin was guided by certain limitations inherent in the types and quality of data available and by some specific criteria recommended by the Senior U.S. Consultant. Recommendations by the U.S. Consultant were based on criteria thought suitable for policy planning in a rural region of a developing nation such as the Philippines, but more importantly, that would be appropriate and adaptable by other projects in areas less well-endowed with data and analytical talent than the Philippines. Among the U.S. Consultant's guiding criteria were the following:

1. The data that were likely to be available in economically lagging rural regions would not be of the type or quality entirely suitable for rigorous scientific research. Therefore, the methods chosen should be basically descriptive,and joined with the staff's personal knowledge of the region under study, capable of producing insights, partial evidence, and general conclusions about planning and policy implications of the location of urban services and facilities in support of rural development. The methods would be more suitable to developing policy plans than for scholarly research.

2. The methodologies chosen should be appropriate to both the general purposes of the project and the characteristics of the region under study and tailored to data already available or easily generated. Policy plans,to be useful must be done quickly and be timely; policy oriented studies cannot engage in lengthy data collection and research. One test of the appropriateness of policy analysis methodologies is that they provide useful insights quickly using as much existing data as possible. In short, the analytical techniques should not themselves impose complicated, costly

and time consuming data collection requirements on the users.

3. The analytical methods should be relatively easy to apply and not require sophisticated equipment (such as a computer) or high levels of technical skill and training. If the methods are to be institutionalized in local planning processes, they must be of a type that can be applied manually or with such equipment as desk calculators. If they are to be applied by planners and administrators with limited technical training, they should involve relatively simple and easily learned operations. If these conditions are not met it is unlikely that spatial analysis will be institutionalized in the planning processes of rural organizations in most countries, but if done at all,will be consigned to university professors or outside consultants.

4. The methods and techniques must be understandable to the rural policymakers who will be the primary users of the analysis. Even more importantly, the results of the analysis must be understood by decision-makers in the host country who may have limited exposure to or interest in spatial analysis techniques or who may be alienated by difficult or complex methods. The primary audience for the project's final reports is not likely to be experts in spatial analysis, or people who are even highly educated, but public and private decisionmakers with limited time and interest in considering methodological implications or abstract theorizing. The methodology should consist primarily of descriptive statistical techniques, maps, charts, scales and other easily understood presentation devices.

5. The project should rely on a combination of analytical methods, since no single technique is adequate to obtain the desired results. The project should not, moreover, be designed to accommodate a pre-selected set of methods and techniques. The design of the analytical methods and approaches should be part of the evolution of the project and be determined by the availability of data, preliminary analysis of the socio-economic and physical conditions within the study area, levels of staff capability,

and initial definition of regional problems and needs.

Under any conditions, heavy reliance on quantitative techniques seems questionable given the quantity and quality of data available in most developing nations. In many ways, the Bicol is unique in this regard since it does have a rich data base and highly talented personnel. Yet, even here the quality, form and reliability of data have proven to be obstacles to application of most sophisticated statistical techniques. And even in the Philippines quantitative analysis is not sufficient to achieve the objectives of the Urban Functions project. The policy plan, if it is to be useful, must result from the insights and knowledge of the project staff about the problems, conditions and spatial environment of the region, rather than from the simple manipulation of numbers. To the extent that some insights can be derived from quantitative analysis, or that numbers can be used to support general observations or hypotheses, they are useful. But they must be supplemented with "softer" methods such as case studies, participant observation, and informal surveys.

The approach taken in preparing the final report should be that used by a good lawyer building a case around issues and recommendations from bits and pieces of evidence, knowledge of the problem, and research findings, rather than that used by a scholar applying scientific research methods. In brief, the value of the final policy plan in the Bicol, or in any other region in which the project is implemented, is not likely to depend on the sophistication of the analytical techniques used as much as on the inherent logic of the arguments made, the clarity of the presentation, and the degree to which the analysis "makes sense" to decisionmakers familiar with the cultural, economic, social and physical conditions of the region under study.

Thus, given the nature of the data, the need to test methods that could be applied in other rural regions of developing nations, and the objective of preparing a final policy plan of use to policymakers, the U.S. Consultant has repeatedly advised the GOP staff to use analytical methods that are simple, easy to understand, and that can be performed manually and presented visually.

The methodology that evolved and that will be modified and adapted as the project progresses includes the following components:

1. Preparation of a socio-economic, demographic and physical profile of urban and rural subareas within the Basin as an inventory and baseline study.

The GOP staff is proceeding with this aspect of the analysis; the baseline component is completed and indicates not only levels and degrees of socio-economic and physical development among subareas (municipalities) within the region but also comparative conditions with reference to the two-province study area and the Philippines as a whole. Analysis of variations between rural and urban areas and among "urban clusters" within the Basin is proceeding. Primarily a descriptive analysis, this aspect of the study includes:

a. Percentage comparisons of municipalities by population size, density, schoolage population, dependency, literacy, educational attainment, conditions of dwelling units, municipal revenues, experienced workers, land area producing selected crops and value of production;

b. Location quotients on productivity of labor unit by selected crops, road densities by municipality and labor force employed in selected industries, as well as other indicators to be selected later;

c. Summary and background data--either in numbers or percentages--on the distribution of farms producing selected crops,

soil conditions and land uses, distribution of fishing grounds, distribution of livestock production and other data reflecting the agricultural productivity of rural subareas.

Coefficients of segregation and other distributional statistical measures will be applied, but the emphasis will be on presenting the data in maps, charts and other graphic forms.

2. Analysis of centrality, functional complexity and the hierarchy of settlements.

This component of the analysis is aimed at determining the extent and pattern of centrality within the Basin and at delineating the distribution, concentration and ubiquity of central functions and services. The methodologies include:

a. Guttman scale analysis of the 54 municipalities in Albay and Camarines Sur Provinces using 64 items (facilities and services) indicating centrality in eight activity categories. The categories and items include:

1) Economic--shopping facilities, banks and financial establishments (other than rural banks), appliance store, farm supply and agro-chemicals store, regular public market, rural bank, cottage industry, manufacturing and processing plant;

2) Social Services--nursing school, college, vocational school, high school, private hospital, operational government hospital, private clinic, drugstore;

3) Communications-- airport, port, train station, bus station, newspaper, radio station, telephone, telecommunication (teletype) station;

4) Physical Equipment Services--functioning power plant, piped water supply system, hardware supply store, farm equipment repair facility, subdivision, surveyor, construction supply store, auto repair shop;

5) Recreational--bowling alley, gynasium/auditorium, cinema with daily runs, night club, playground with facilities, cockpit, cinema with once weekly runs, paved basketball court

6) Personal Services--cemetary, funeral parlor, optometry/ optical shop, photo studio, hotel, lodging house, restaurant, xerox copying service;

7) Community Organization--"palawagan" (welfare institution), cooperative, credit union, sports association, professional organization, civic organization, labor union, farmers' association;

8) Extension and Protective Services--red cross, firetruck, police station, security agencies, BAI, BAEx, BPI, DLGCD.

While this exercise provides useful information concerning the functional complexity of municipalities in the Basin and indications of the concentration of various types of services and facilities in municipalities, its most important deficiency is that the "municipalities" are not discrete settlements, but administrative areas containing both urbanized centers and rural barrios. Thus, the municipal scale does not provide a ranking of functional complexity of settlements unless one assumes that all of the items are located in the municipality's poblacion.

To get a better indication of a hierarchy of settlements by functional complexity, the staff turned to two other methodologies: a Guttman scale of settlements and weighted centrality indexes.

b. A second scale, of urbanized or built-up areas, was done to rank settlements by functional complexity and to attempt to delineate a hierarchy of central places. The built-up areas consist of (1) poblacions and contiguous barangays with approximately the same land use characteristics as the poblacion, and (2) other barangays within the municipality with a population size of at least 50% of the poblacion. The U.S. Consultant Team recommended some modifications in the selection criteria for

settlements to provide better consistency from municipality to municipality and to include in the scaling other potential rural settlements that were not "built-up" areas.

Neither the municipal nor built-up area scales, moreover, covered barangays as discrete settlements. Indeed during discussions it became clear that many barangays might, like municipalities, be only administrative areas rather than viable settlements. And since accurate boundaries for many barangays could not be determined, population density criteria had to be eliminated. It was decided, instead, to test the Census definition of settlements: poblacions and other barrios with at least a population of 1,000 in which the occupation of the inhabitants is predominantly non-farming/fishing and which have:

> a) street pattern, i.e. network of streets in either parallel or right angle orientation; b) at least 6 establishments (commercial, manufacturing, recreational and/or personal services; and c) at least three of the following: (1) a town hall, church or chapel with religious services at least once a month, (2) a public plaza, park or cemetary, (3) a market place or building where trading activities are carried on at least once a week, and (4) a public building like a school, hospital puericulture and health center or library.

All barangays not meeting these minimum population-physical facilities criteria would be considered non-central rural places and would be treated as a group at the lowest order in a hierarchy of functional complexity. The scale will be recomputed to include all settlements that are considered to be central places.

c. Another complementary exercise to obtain an indication of centrality will be the calculation of weighted centrality indexes for all settlements. The staff devised a method of adapting Marshall's centrality index, assigning weights on the basis of ubiquity of functions.

The procedure is as follows:*

(1) Reproduce Guttman's largest scale in an inverted form with cases arranged vertically and items horizontally;

(2) Total each row and column

(3) Using the assumption that the total number of functional attributes in the entire system has a combined centrality value of 100, determine the weight or "location coefficient" of the functional attribute by applying the formula:

$$C = t/T$$

where C= the weight of functional attribute t
t= combined centrality value of 100
T= total number of attributes in the system

(4) Add one block to the table and enter the weights computed;

(5) Reproduce another table similar to that in step 1 displaying the weights calculated in step 3 and the total centrality values

(6) Sum the weights of each row to produce the indices of centrality.

Tables 1 and 2 below illustrate the calculation of the centrality index. The centrality index allows use of attributes or functions that appear as errors in the Guttman scale based on the assumption that the presence of "rare" functions in an otherwise lower scale center does contribute to its centrality.

d. Scalogram analysis was also done to supplement the Guttman scales run on municipalities and built-up areas. This is primarily a graphic and nonstatistical version of the Guttman scale that arrays functions by ubiquity and ranks settlements by functional complexity. Since the scales were calculated by a computer program, they presented two major problems for analysis in the Urban Functions project, other than

* Junio Ragragio, "The Design for the Indentification of the Hierarchy, Centrality and Thresholds of the Central Place Systems in the Bicol River Basin, " discussion paper, Urban Functions in Rural Development Project, 1977.

Table 1 Calculating for Weights of Functions

Functions

Places	1	2	3	4	5	6	7	8	9	10	Total
A	1	1	1	1	1	1	1	1	1	1	10
B	1	1	1	1	1	1	1	0	1		8
C	1	1	1	1	1	1					6
D	1	1	1	1	1	1		1			7
E	1	1	1	1	1						5
F	1	1	1	1							4
G	1	1	1								3
H	1	1	1								3
Table No. of Functions	8	8	8	6	5	4	2	2	2	1	46
Total Centrality	100	100	100	100	100	100	100	100	100	100	
Weights	12.5	12.5	12.5	16.6	20	25	50	50	50	100	

Table 2 Calculating for Centrality Indices

Value of Functions

Places	1	2	3	4	5	6	7	8	9	10	Centrality Index
A	12.5	12.5	12.5	16.6	20	25	50	50	50	100	349.1
B	12.5	12.5	12.5	16.6	20	25	50		50		199.1
C	12.5	12.5	12.5	16.6	20	25					
D	12.5	12.5	12.5	16.6	20	25		50			
E	12.5	12.5	12.5	16.6	20						
F	12.5	12.5	12.5	16.6							
G	12.5	12.5	12.5								
H	12.5	12.5	12.5								
Total Centrality	100	100	100	100	100	100	100	100	100	100	1,000

that of not meeting the objective of using methods limited to manual operation. First, the functions that seem to b of most interest for rural development--farm equipment repair shops, vocational schools, credit unions, rural banks, farm supply stores, etc.--did not scale and were eliminated in the scale scores by the computer. Second, the computer output was difficult to understand and could not be easily presented to show the distribution of functions by place.

The statistical presentation requires detailed explanation and interpretation, which technically untrained policymakers--at least those attending the Bicol technical workshops in which the method has been presented--find difficult to understand. Nor do they immediately see its relevance. The Senior U.S. Consultant recommended preparation of a graphic scale used by Fisher and others in India and Indonesia. The technique results in a graphic presentation illustrated in Table 3. The procedure is as follows:*

(i) On the left side of the worksheet list settlements as rows in descending order of their populations;

(2) Across the top as columns list the institutions found in the region in order of their decreasing ubiquity;

(3) Draw row and column lines so that the worksheet becomes a matrix in which each cell represents an institution that may appear in the settlement;

(4) Fill in with a dark color all cells which represent an institution actually found in a settlement. What results should look like Table 3;

(5) Reorder the rows and columns so as to visually minimize the the eight holes appearing in the dark pattern found in the upper left. The scalogram is complete when no shifting of a settlement row or institution column can reduce the number of holes in this pattern

(6) The final order of settlement rows identifies a ranking of settlements which can be interpreted as an ordinal centrality score.

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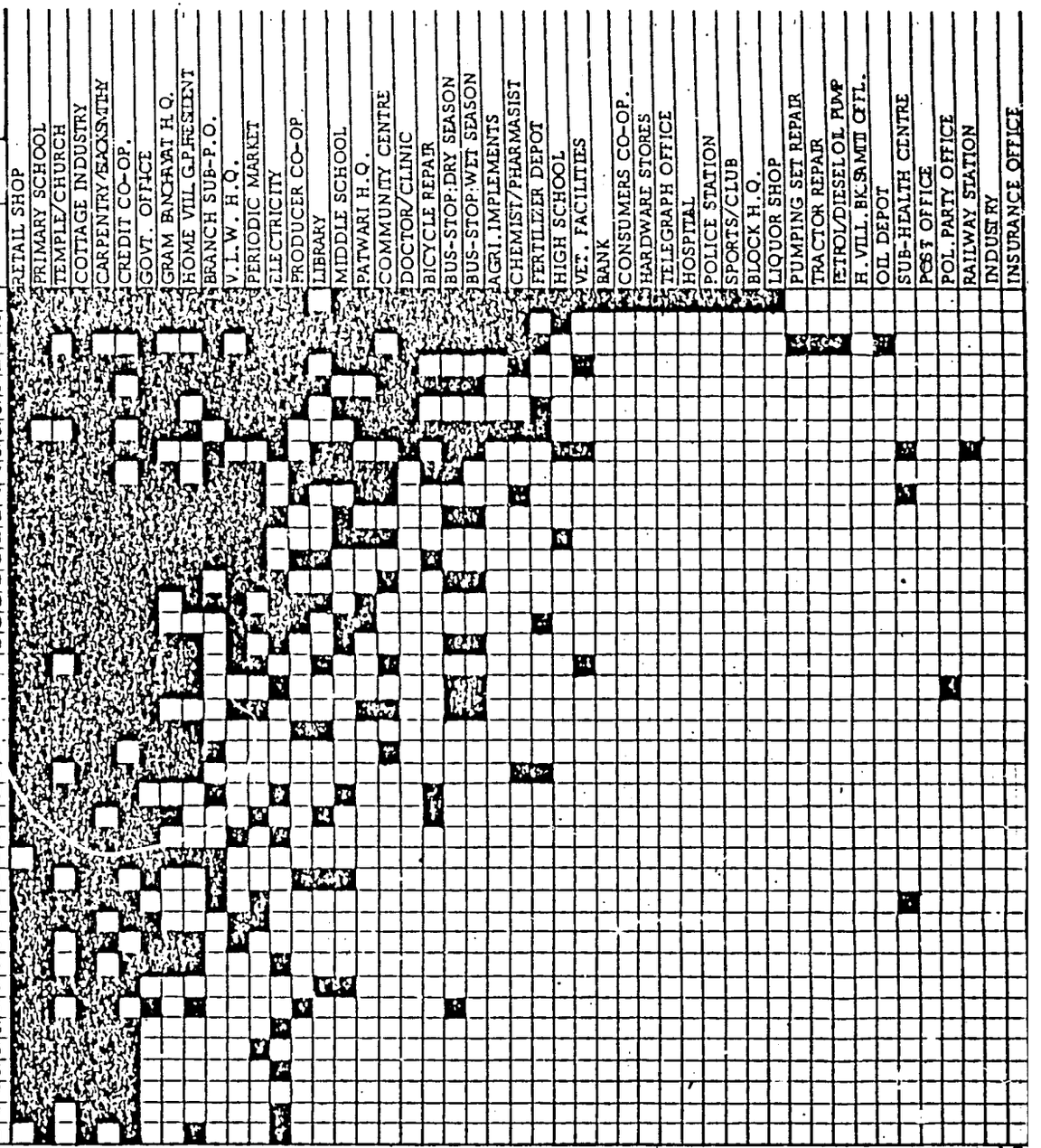
* See C.P. Andrade, S. Banerji, H.B. Fisher, G. Rushton, N.S. Saini, A. Sharma, A Graphical Approach to Settlement Planning for Integrated Area Development Planning, mimeographed, no date; and H. Benjamin Fisher, "Methods for Identification of Agro-Urban Centers at the Kabupaten and Provincial Levels," mimeographed, (Jakarta: Ford Foundation, 1975).

TURKAULIA BLOCK, BIHAR

RANK ORDER SCALE	NUMBER	SETTLEMENT NAME	POPULATION SIZE	POPULATION RANK	INSTITUTION NUMBER	INSTITUTION RANK
1	077	Turkaulia	11,742	2	35	1
2	051	Pachrukha	15,202	1	25	2
3	059	Pipra Kothi	1,589	24	22	3
4	032	Jalsingh Pur	9,131	3	20	4
5	069	Shanker Saraiya	6,377	5	19	5
6	064	Sapahi	3,865	10	18	6
7	068	Semra Tola Hat	1,303	29	18	6
8	007	Semra Tola Bhola	1,436	25	18	6
9	042	Madho Pur	2,255	13	17	7
10	072	Siswa	7,565	4	17	7
11	019	Chailaha	4,849	7	16	8
12	057	Phulwar	6,097	6	16	8
13	033	Janerwa	3,577	11	15	9
14	021	Chand Saraiya	1,035	42	15	9
15	031	Hardia	4,151	8	14	10
16	015	Bijui Pur	2,004	17	14	10
17	060	Raghunath Pur	2,293	12	14	10
18	050	Mohabbat Chapra	1,344	28	13	11
19	006	Banjaria	1,254	33	13	11
20	071	Singhia Hibban	688	54	13	11
21	001	Ajagari	3,967	9	11	12
22	028	Gamharia	1,595	23	10	13
23	005	Bahurupia	892	47	10	13
24	075	Tikaita	1,182	35	10	13
25	030	Govind Pur	1,107	39	10	13
26	013	Belwatia	1,045	41	9	14
27	072	Belwaray Narlar Pur	2,157	14	9	14
28	040	Chain Pur	724	52	9	14
29	048	Mathura Pur	1,414	27	9	14
30	011	Belwaray Bairagi	1,758	21	8	15
31	023	Chichurahia	881	40	8	15
32	047	Mathia Barlar Pur	1,242	34	8	15
33	034	Jatwa	2,072	15	8	15
34	044	Madhu Malat	1,116	37	8	15
35	010	Belwaray Khas	1,843	19	7	16
36	061	Rampur Chargaha	591	61	7	16
37	026	Chilraon	1,278	32	7	16
38	024	Chitaha	1,436	25	6	17
39	043	Madhu Chapra	909	46	6	17
40	046	Majharia	671	55	5	18



DRAWING NO 8

As Fisher notes, "the scalogram provides a visual description of the ...settlement and institutional hierarchy that is easy to read and useful as a reference in analyzing numerous issues for planning." This observation was confirmed in the presentation at the technical workshop during the field visit, where both technically trained personnel and local political leaders examined an initial version of the scalogram prepared for 122 settlements.

Among the potential uses of the scalogram in the Bicol are the following:

(1) It can be used to categorize settlements into levels of functional complexity and to determine the types and diversity of services and facilities located in individual places and in various levels of the hierarchy;

(2) The scalogram shows rough associations among services and facilities in specific locations and potential functional linkages among them;

(3) By reading any particular column one can see the ubiquity of a service or facility and the distribution of it over places in the region;

(4) For particular services or facilities requiring other support services and facilities, one can determine the existence of preconditions by examining the diversity of items present in any particular community;

(5) In conjunction with a map showing locations of the functions appearing on the scalogram, and with population-service criteria, quick approximations can be made of the adequacy of service and facilities distribution for the region;

(6) "Missing" or unexpectedly present functions are clearly

identified;

(7) Rough indicators of threshold for some items can be determined from scalograms showing the population size of settlements;

(8) The scalogram can be used as a general reference in making decisions about locating services and facilities in order to increase potential access for communities within various levels of the hierarchy.

The scalogram has definite advantages over the Guttman scale in that it is easy to construct and to interpret, requires no sophisticated training or equipment, and can be easily updated and revised using either "windshield surveys" or more systematic reporting schemes to obtain data on the presence or absence of services and facilities.

3. Threshold Analysis

In order to obtain approximate indications of population sizes required to support services and facilities in settlements of the Bicol at the present time, the staff adapted Marshall's approach to threshold analysis.

Marshall argues that "the threshold is that size of center which divides the ranked list of centers in such a way that the number of centers lacking the function above the division is equal to the number of centers possessing the function below the division." The method is especially appropriate to analysis of rural regions and to the type of data already collected for scalogram analysis, in that it requires only a ranked listing of settlements and the presence or absence of functions. Marshall suggests a modification on the general rule: "Once a threshold has been determined, this threshold (and the function to which it applies), will subsequently be disregarded unless at least half of all the centers above the threshold size possess the function in question."

The staff adapted a procedure which is illustrated in Table 4:

(1) Construct a table with a rank listing of centers according to population, a corresponding listing of population data and a listing of the presence (1) or absence (0) of every function in each of the centers listed;

(2) Apply Marshall's rule and identify each function's population threshold; and

(3) Apply Marshall's supplementary rule and disregard functions eliminated by this process. *

The staff was cautioned to take care in interpreting the results of this technique. Current threshold levels may not realistically represent the potential for populations of various sizes to support services and facilities, and may reflect locational decisions not based on market considerations or on development obstacles that have prevented services and facilities from being efficiently located in settlements that do have the required population sizes to support them. The technique does offer a "quick and dirty" means of calculating the thresholds for currently available services and facilities, however, and should be used in conjunction with other methods of estimation.

Table 4

Rank of Center	Pop.	Function A	Function B	Function C
1	10,000	1	1	1
2	8,000	0	1	1
3	6,000	0	1	1
4	5,500	0	0	1
5	3,000	0	0	1
6	2,700	1	1	0
7	1,900	0	1	1
8	1,700	0	0	0

* See John U. Marshall, The Location of Service Towns, Toronto: University of Toronto Press, 1969.

Linkage Analysis

As reported earlier (Second Quarterly Report, January 1977) analysis of linkages must remain partial and descriptive because of the large amount of original data that would have to be collected in order to do a complete mapping of physical linkages and thorough investigation of socio-political relationships in the Basin. This aspect of the analysis would require extensive research. Yet, through sample surveys and synthesis of socio-economic studies already done in the Basin, the staff has made progress on obtaining linkage information that can provide insights into how activities located in various subareas of the region are related to each other and the interaction patterns among locations within the basin.

A number of studies are underway and scheduled for completion by August 1977:

1. Transportation and Physical Linkages. The staff has compiled a thorough set of information on transportation linkages among subareas of the Basin by mode, on road networks by condition of road, and interpoint distances among barangays and between barangays and poblacions. In addition, traffic volumes, means of transportation and selected commodity flows are available through various transportation studies conducted by BRBDP. The staff has contracted for a survey of "informal" transport of goods and passengers by railroad skates. Much of the data can be mapped and should provide a detailed profile of physical linkages among subareas within the Basin. In addition, data such as interpoint distances, which had not been previously compiled, should be of use for general planning purposes.

2. Economic and Market Linkages. The staff has completed surveys of six regular markets--Naga, Iriga, Goa, Legaspi, Ligao and Tabaco--within the Basin and six periodic markets within the sphere of influence of the

major marketing centers. The objectives of the surveys were to determine the extent and origin of the flow of selected commodities into and out of major marketing centers, to approximate the physical "reach" of market centers for selected commodities, and to identify physical and functional linkages among producers, middlemen and buyers. In addition, the surveys will provide some indication of the degree to which rural areas in the Basin are linked to urban centers through marketing interaction, and the degree to which market centers within the Basin are linked to external centers of exchange. Although the surveys are not substitutes for a complete market study of the Basin, a prerequisite to thorough mapping of linkages between rural areas and urban centers, they do provide indications of linkage and raise important questions for analysis and further research. By surveying periodic markets, information was also gathered on linkages among producers, lower level intermediaries, and major market middlemen. The sample for six major markets included 100 middlemen and 50 producers, who were interviewed with prepared questionnaires. Information was obtained on the source and destination of commodities, type of seller, place of sale and volume of trading for rice/palay, corn, sugar, abaca, copra and coconuts, vegetables, poultry, livestock, fish, manufactured goods, medical products, appliances and household items, school supplies, agricultural and veterinary products, farm implements and cottage industry goods. Similar information was garnered from periodic market middlemen. The survey was limited to public markets and did not include private stalls located adjacent to the public markets.

Information on each commodity's source and destination and mode of transport was mapped, showing linkages among places within the Basin and between market centers within the Bicol and those outside.

This data will be analyzed along with data compiled from commodity flow studies done for BRBDP transportation and secondary road project feasibility studies. Information was also obtained on the location of periodic and regular markets in Albay and Camarines Sur, total market receipts for public markets, numbers of stalls, frequency of operation and market days.

3. Service Linkages. Again, it is not possible without extensive surveys of every type of service provided in the Basin to develop and map a complete set of service linkages. Short of a complete services study, the staff decided to do intensive surveys of the service areas and accessibility of two major types of services--health and education. A sample of institutions was chosen and information gathered on the origin of patients and students. Service areas will be mapped and supplementary information gathered to provide indications of the degree to which such services are used by urban and rural populations and the degree to which they are accessible in terms of physical distance and cost. These intensive surveys will be supplemented by another study of government services being conducted by the College of Public Administration for the administrative-political linkage analysis.

4. Social Linkages. The staff has identified the social linkages, including kinship patterns, marriage patterns and visiting patterns, as an important set of interactions that influence a wide variety of decisions in the Basin. Much of the information concerning social linkages, however, cannot be easily quantified. One study,of marriage linkages, is underway using town records to determine the origin of brides and grooms. The study should provide insights into the spatial linkages among places in marriage patterns, which in turn will provide information on one dimension of kinship and visiting patterns. Other indications of social linkages

will rely on secondary studies such as those conducted by the Social Science Research Unit in Naga and by Philippine sociologists and anthropologists who have conducted research in the Basin.

4. Administrative, Political and Governmental Linkages. The nature of relationships among levels of governmental units within the Bicol, formal and informal political and administrative decisionmaking, the linkages among and between governmental units in the provision of services and facilities, and the characteristics of the network of planning organizations affecting development policy within the Basin are some of the aspects of administrative, political and governmental linkages being explored in a study subcontracted to the College of Public Administration, University of the Philippines. The CPA study involves three components:*

a. Study of the Nature and Accessibility of Local Government Services and Facilities.

The access study will have two major portions. An inventory of local government services will be made at the barangay, municipal,city and province levels. Services will be listed by level of government, and the manner in which they are organized and administered will be analyzed. For each service, the number of personnel involved, its location (including sites of offices and field units), area of jurisdiction and procedures involved, will be described and evaluated. Accessibility will be judged in terms of both physical proximity to clientele and the complexity of procedures required to obtain the service. Recommendations will be made for altering both types of accessibility if they are judged inadequate.

In addition, a survey of users' perceptions will be done to

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* College of Public Administration Study, Urban Functions for Rural Development in the Bicol Region, "First Status Report," April 30, 1977.

determine actual or potential clients' views on the accessibility and quality of services and facilities. The interview guide and sample selection are underway; and translation of the interview guide into local dialect is in process.

b. Local Government Structures and the Dynamics of Political Decision-making

According to the study design developed by the College of Public Administration:

> This portion will not only describe formal structures, functions, and hierarchy of authority for provincial, city, municipal government and the barangays in the areas covered by the study. It will seek to identify the authority for decision-making, sources or emerging sources for this authority like new legislation, proposed local government code, and patterns of transaction among the different local governemnt units which will show "vertical" and "horizontal" interaction of these local units with regional offices and among units at the same level. To supplement this segment, 5 case studies of space salient functions will be prepared to capture the dynamics of decision making processes in the government sector especially as these decisions have to do with spatial decision-making, e.g. locating facilities and services, determining their jurisdiction, functional "mix" and scale. Through these cases, the capability of local units to make spatial decisions, individually or collectively, and the institutionalization of decision-making process will be highlighted. Moreover, the basis for these decisions (whether "objective" criteria and established standards are really used and whether relevant information is gathered and employed to make them suit local conditions), the effect of formal and informal relationships on the process and extent to which these decisions are finally implemented as they are or in modified form will be discussed in these cases.

The five case studies include:

(1) The case of the decision to merge the City of Daraga and the City of Legaspi--a study of the dynamics of political decisionmaking within the Bicol;

(2) Transferring the provincial capital from Naga to Pili in Camarines Sur--problems of implementing political decisions;

(3) Delivery of Health Services--a study of the deployment

of health workers;

(4) Delivery of educational services--location of schools;

(5) Location of an industrial estate project in Albay province--analysis of an area planning and management issue.

c. Study of Planning Processes and Organizations in the Bicol.

The third component of the study will be to describe and evaluate the status and dynamics of interaction among planning bodies within the region, including the Bicol River Basin Council, local governments, the Regional Development Council, provincial governments and national ministries operating within the Basin. Using a "structure-process/method-output" approach, the capability of the planning bodies operating at different levels will be studied together with their resources, administrative support, scope of functions and interrelationships. Their roles, linkages and outputs, especially as they involve spatial planning, will be assessed. Special attention will be given to their proposals for locating services and facilities, the bases for these proposals, how location and spatial recommendations are made and how they are synchronized among planning bodies in different areas and at different levels.

Because of time and resource limitations, the first two substudies will focus primarily on four sets of local government services: (1) health, (2) education, (3) agricultural extension, and (4) general government services such as registration, tax collection, licensing and certification. The client survey will initially be administered in one municipality.

Technical Workshop

A one-day technical workshop was conducted by the staff, with the assistance of the U.S. Consulting Team, at the Agricultural College of Camarines Sur, in Pili, on June 1, 1977. Participants included members of the Interagency Technical Staff of the project, mayors of Legaspi, Naga and other communities, the governors or their representatives from the two provinces, BRBDP staff, the director of the DLGCD, BRB executive director and staff members from USAID/P. The workshop included a status report on data collection and analysis, a review of the linkage studies including an in-depth report on the College of Public Administration Study, a review of Guttman scale exercises, a presentation of a preliminary scalogram for 122 built-up areas, and a summary of initial findings on the periodic and regular market studies.

Attendance at the workshop was good and interest in the project among both technical and political leaders in the Basin seems to remain high. Suggestions were received from the local Philippine consultants, technical advisory staff and political leaders on application and relevance of the methodologies and recommendations were solicited for handling information gaps and data problems.

As part of their activities the U.S. consultants also met with the staff of the College of Public Administration study in Manila to review the study design and initial activities, with the Philippine consultants for a review of progress on the Urban Functions Project, and with the planning and programming staffs of the Bicol River Basin Development Program to brief them and to obtain suggestions on planning applications of the project.

Preliminary Design of Phase III

Initial discussions began between the U.S. Consultants and the GOP project staff on preliminary design and content of the final project report. Activities were limited on this visit to outlining major topics for inclusion in the final report, discussion of a tentative format and structure, initial discussion of the relationships between data analysis and policy issues, and preliminary assignment of tasks for working papers that will become part of the final report. Detailed design will become the major activity during the U.S. Consultant's fourth quarterly visit in August. In the meantime, the GOP staff will review and modify initial plans for Phase III and develop more detailed outlines for the final report.

A preliminary list of topics, issues and analyses for inclusion in the final report was developed:

I. Introduction

A. Purposes, objectives and limitations of the urban functions in rural development study

B. Summary of contents and coverage of the report

II. Statement of the Problem: Spatial Structure, Distribution of Urban Services and Facilities and Rural Development

A. The Problem of Rural Development in The Bicol

1. Dimensions of rural poverty and underdevelopment in the Bicol River Basin; discussion of major problems and indicators of rural underdevelopment

2. Socio-economic, demographic and physical dimensions of development in the Basin relative to those in the Philippines

B. Rural Development and Spatial Structure

1. Nature of the relationship between spatial structure and rural development ; e.g.,

a. Spatial articulation and commercialization of agriculture
b. Need for linkages among rural areas and urban centers to equitably distribute agricultural inputs

and market agricultural products

c. Spatial distribution of urban services and facilities and access of rural people to economic activities, social and public services, and amenities

d. Spatial implications of the location of investments in social overhead and directly productive activities

e. Roles of settlements at different levels of the hierarchy in linking communities within the region and the region with the national economy

2. Identification of Urban Services and Facilities Crucial for Promoting Rural and Regional Development

3. Description of a particular function or set of functions that illustrates the relationship between spatial distribution and rural development--highlighting equity and access concerns

C. Current Development Policies and Programs

1. Discussion of the types of investment, location, and development programs now being considered in the Basin and the degree to which they address or are analyzed in terms of spatial issues

2. Discussion of the need for a spatial focus on development, the need for spatial analysis and the importance of spatial planning as a complement to technical and sectoral programming

D. Description of the Urban Functions in Rural Development Project in the Bicol--methods and procedures

E. Summary of Project's Findings and Recommendations

III. State of Development within the Bicol

A. Socio-economic, demographic and physical conditions of urban and rural subareas of the Basin--use of baseline data to describe variations among municipalities and urban clusters within the region

B. Distribution of Urban Functions among Municipalities

1. Hierarchies of functional complexity--use of Guttman scale analyses

2. Distribution of services and facilities among municipalities

C. Relative concentrations of economic activities, demographic characteristics, institutions and services within urban and rural subareas of the region--use of descriptive baseline data, location quotients and indexes of segregation

D. Evaluation of baseline data in terms of major development problems, support for rural programs and distribution of services and facilities -- maps

IV. Characteristics of the Settlement Pattern within the Bicol

A. Description of the Settlement System in terms of functional complexity and centrality

B. Analysis of the Settlement Hierarchy within the Bicol and its Relationship to the Spatial System of the Philippines --Scalogram, baseline data, L.Q.s, maps

1. Development of a framework for viewing the settlement system in terms of functional complexity within the overall spatial system of the Philippines, e.g.

a. Primate City--Metropolitan Region (Manila)
b. Major Metropolitan Centers (Cebu and Davao)
c. Intermediate Cities-REgional Market Centers (Legaspi-Daraga; Naga-Pili)
d. Secondary Urban Centers (Iriga)
e. Market Towns-Commercial Service Centers
f. Rural Service Centers
g. Non-central place settlements

2. Functional Roles of each level in hierarchy in terms of services and facilities, economic activity, demographic characteristics

3. Nature, characteristics and physical resources of rural hinterlands and agricultural production areas -- baseline data, location quotients, scalogram

C. Spatial Distribution of Functions and Services Most Crucial to Rural Development

1. Locational patterns, distance, concentration, dispersion

2. Clustering of functions and services--patterns of association, correlations, functional linkages, adequacy of functional support

3. Evaluation of the spatial distribution of functions and services in terms of equity and access for rural people

D. Evaluation of settlement pattern and distribution of services and facilities in terms of rural development problems, articulation of spatial system, linkage of region to Philippine economy, etc.

V. Activity Patterns, Functional Linkages and Spatial Interaction

A. Description of types of linkages among functions, settlements and population groups that influence decisionmaking about location of services and facilities and integration of urban and rural subareas of the Basin

1. Physical Linkages
2. Economic Linkages
3. Population Movement Linkages
4. Technological Linkages
5. Social Linkages
6. Service Delivery Linkages
7. Political, Administrative and Organizational Linkages

B. Nature of the Linkages among Settlements within the Bicol

1. Urban and rural areas generally
2. Rural hinterlands to urban centers
3. Among levels in the hierarchy of central places
4. Between centers within the Bicol and those outside

VI. Characteristics of Functions and Services in the Bicol

A. Threshold levels for major services and facilities

B. Comparison of existing thresholds with service and locational criteria generally being used by decisionmaking organizations within the Basin and with other areas of the Philippines

C. Mix and sequence of services and facilities entering the spatial system at different levels of funcitonal complexity

D. Physical, time and cost aspects of access and equity

E. Assessment of adequacy of number and distribution in terms of major rural development and spatial development problems

F. Assessment of "gaps" in services and facilities needed for rural development-- in terms of their existence, number, quality, adequacy and distribution

I. Implication for major rural development problems identified in Section II

VII. Impact of Current Development Programs and Policies on Provision of Services and Facilities, Overall Spatial System

and Rural Development

A. Identification and description of the types of public and private instituions making plans and policies affecting spatial development and rural development in the Bicol

B. Review and evaluation of agency plans and programs for development--NEDA, national ministries, provincial and local governments, BRBC, etc.

C. Description and evaluation of locational standards for various services and facilities used by public and private institutions

D. Implications of findings of Urban Functions project for past development decisions and current development policies and programs

VIII. Policy and Planning Recommendations

A. Substantive--those concerning adequacy of spatial system, distribution of services and facilities, linkages between urban and rural areas, linkages between Basin and Philippine economy, locational criteria for future investment in services and facilities, gaps in functions and areal organization, etc.

B. Procedural--those concerning institutionalization of spatial analysis planning in BRBC, local, provincial and ministry programs and policymaking, follow-up activities, adaptation of methods for sub-regional analysis, additional research and analyses, preparing specific projects for implementing substantive recommendations, etc.

It should be re-emphasized that this is an initial set of thoughts on the organization of the final report and will undergo modification prior to and during the U.S. Consultant's next quarterly visit to the Philippines in August.