

RP
309.26
R771

PN-AAH-244

APPLIED POLICY ANALYSIS FOR INTEGRATED REGIONAL DEVELOPMENT PLANNING IN THE PHILIPPINES

by DENNIS A. RONDINELLI

*Director, Graduate Planning Program, The Maxwell School,
Syracuse University, USA*

*'Reprinted from the Third World Planning Review,
Vol. 1, No. 2, Autumn 1979'*

APPLIED POLICY ANALYSIS FOR INTEGRATED REGIONAL DEVELOPMENT PLANNING IN THE PHILIPPINES*

by DENNIS A. RONDINELLI

*Director, Graduate Planning Program, The Maxwell School,
Syracuse University, USA*

In much of the developing world spatial development reflects the highly dualistic nature of economic growth. Investment has been heavily concentrated in one or a few metropolitan centres, usually in a 'primate city' which dominates the national economy and overshadows all other cities in the spatial system. The dispersal of economic activities to smaller towns and rural areas is retarded; and in many cases, the primate city draws resources from rural areas to maintain its own growth and expansion. In many developing societies the primate city receives the largest share of national investment — significantly beyond its proportion of population — in physical infrastructure, commercial and social services, manufacturing and industrial enterprise, and utilities, thus becoming an enclave of urban modernisation in nations predominantly rural, traditional and poor. These premier cities usually attract the most talented and skilled manpower and are favoured locations for domestic and foreign investments. Their residents enjoy substantially higher average incomes than those living in the rest of the country and have greater access to services, amenities and opportunities for improving their living standards.¹ That these large urban centres often drain their rural peripheries of much of their productive manpower, natural resources and investment capital is rather clear.² But in addition, the large streams of migration into the primate cities often overburden their physical facilities and social services and strain severely their capacity to provide jobs for unskilled labour. Thus, large numbers of unskilled and unemployed rural migrants living in squatter settlements on the fringe of the urban economy remain in poverty.

Dualistic economic growth also creates and maintains a highly skewed settlement pattern, especially in former colonies of industrialised nations. The primate city not only constrains the growth of other metropolitan centres, but also limits the number and distribution of middle size cities that might support industrial and other economic and social activities in poorer regions of the country. Thus, many developing nations now have

* Research for this paper was supported in part by the Urban Development Office of the US Agency for International Development, under contract No. AID ta-C-1356, through which the author served as Senior US Consultant to the Bicol River Basin Urban Functions in Rural Development Project. Opinions and conclusions are, however, those of the author and do not necessarily reflect USAID policy.

children and of those of future generations? Are these data valid, relevant and reliable? And finally, if the answer to both the above is affirmative; is our decision and action likely to influence favourably the health, the education, the future employment, the happiness of our children? If so, then let's proceed; if not, let us think, think again whether there is anything more precious and more important for the future than our children and let's reconsider our decision.

NOTES AND REFERENCES

1 See Doxiadis, S. (Ed.), *The Child in the World of Tomorrow—A Window into the Future* (Proceedings of the Athens International Symposium), Oxford, Pergamon, 1979

2 Glass, D. V., 'Population Perspectives for the Balance of the Century', paper presented at the Athens International Symposium on The Child in the World of Tomorrow, July 1978

3 Harfouche, J. K., Summary of joint WHO UNICEF Workshop 'Innovative Approaches to Meet the Basic Needs of the Young Child in Developing Countries', Athens, June 1978

4 Cravioto, J., 'Effects of Early Malnutrition and Stimuli Deprivation on Mental Development', paper presented at the Athens International Symposium on The Child in the World of Tomorrow, July 1978

5 Selowsky, M., 'The Economic Dimensions of Malnutrition—a Survey of Issues', paper presented at the Athens International Symposium on The Child in the World of Tomorrow, July 1978

6 Orrego de Figueroa, T., 'The Impact of Women's Work on the Child in Latin America and the Caribbean', paper presented at the Athens International Symposium on The Child in the World of Tomorrow, July 1978

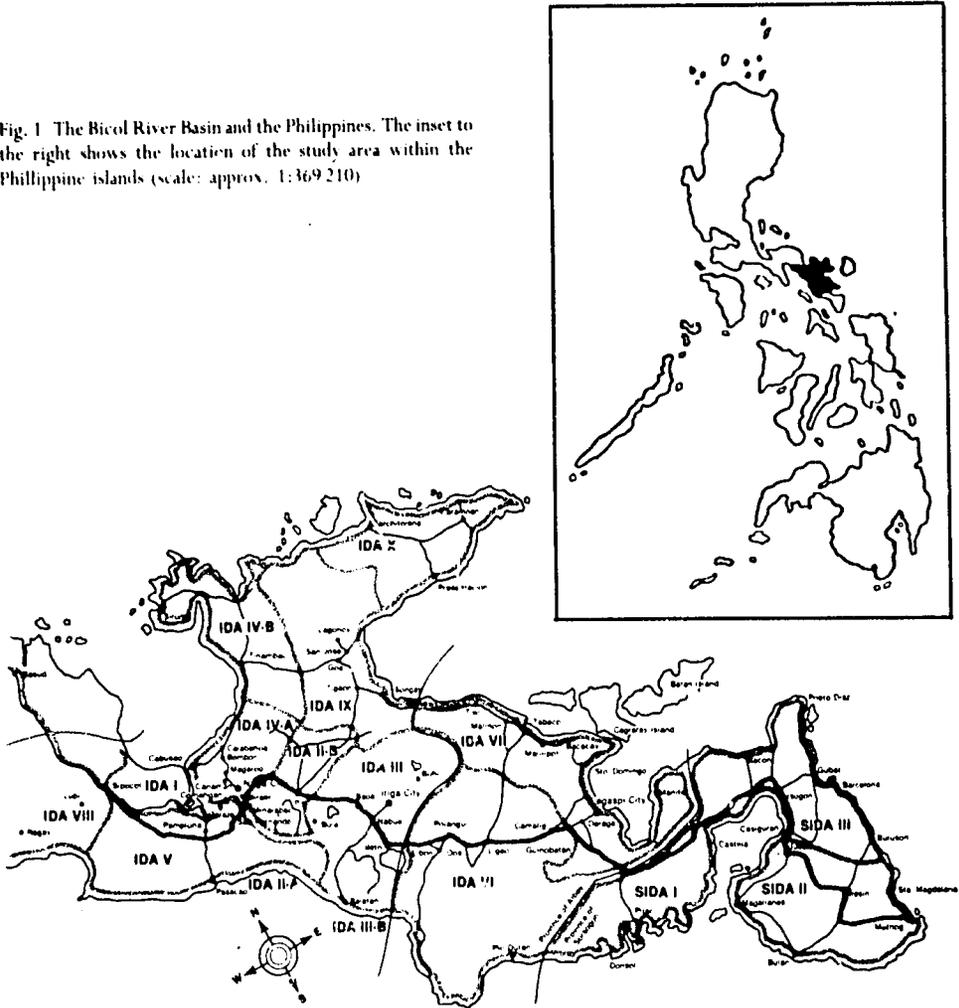
7 WHO, *Primary Health Care. Report of the International Conference on Primary Health Care, Alma-Ata, USSR, 6-12 September 1978*, Geneva, 1978

8 From *Primary Health Care*, a joint report by the Director-General of WHO and the Executive Director of UNICEF, Geneva and New York, 1978 p. 7

9 Haggerty, R. J., 'Who Provides Health Care for Children?', paper presented at the Athens International Symposium on The Child in the World of Tomorrow, July 1978

10 These problems were discussed at the WHO Conference on *The Child and the Adolescent in Society*, Athens, September 1978. Recommendations have been published by WHO in *EURO Reports and Studies*, No. 3, Copenhagen, 1978

Fig. 1. The Bicol River Basin and the Philippines. The inset to the right shows the location of the study area within the Philippine islands (scale: approx. 1:369 210)



INTEGRATED DEVELOPMENT AREA (IDA)

- I Libmanan-Cabusao IDA Project (AID Loan)
- II Pili IDA
 - A Bula IDA II Project (AID Loan)
 - B Other Pili
- III Rinconada IDA
 - A Rinconada Buhí (Prop Aid Loan FY)
 - B Proposed Lake Bato Storage & Flood Protection
- IV Naga-Calabanga IDA IV A and B
- V Balikay San Vicente IDA
- VI Quinal IDA Project
- VII Agro Industrial Development Area
- VIII Sipocot Del Gallego IDA
- IX Partido IDA
- X Caramoran IDA

SORSOGON

- SIDA I Sorsogon, Bacon, Castillo, Pilar and Donsol

- SIDA II Irosin, Juban, Magallanes, Bula, Matnog and Sta. Magdalena
- SIDA III Casiguran, Gubat, Prieto Diaz, Bulusan and Barcelona

MULTIPLE IDA COVERAGE

- (Camarines Sur & Albay Provinces)
- Bicol Secondary & Feeder Road Project (AID Loan)
- Bicol Integrated Health, Nutrition & Population (Proposed AID Loan FY)
- Rural Water Supply Systems

spatial systems in which middle-level cities and market towns—with sufficiently large populations to support services and facilities needed to meet basic human needs, provide outlets for the sale of agricultural goods, produce agricultural inputs, and provide off-farm employment for surplus agricultural workers—are neither numerous enough nor adequately distributed geographically to serve the rural poor or to stimulate regional development.¹

The classical pattern is clearly reflected in the spatial development of the Philippines,

where the Manila Metropolitan area in 1970 had less than one third of the country's population, yet accounted for 65 per cent of family income, 79 per cent of all people employed in manufacturing, 81 per cent of total manufacturing production, 63 per cent of transportation vehicles and over 80 per cent of electrical power production and consumption. Average family income in Manila is double that of the Philippines. By 1975 Manila had grown to over 10 times the size of the next two largest cities, and only a little more than a dozen cities in the country had grown in population size to more than 100 000. Most of these are commercial-service centres with relatively little productive activity.⁴ A similar pattern of concentration appears in rural regions of these developing countries. Again, one or two provincial capitals or regional centres amass most of the services, facilities and productive activities. The overwhelming majority of the population, however, is scattered in small villages or on individual farmsteads, with little or no access to town functions.⁵

International assistance agencies and governments in developing countries have increasingly recognised in the past few years that if they are to ameliorate rural poverty and more equitably distribute the benefits of economic growth they must promote a more spatially balanced pattern of development. This would require extensive investment in physical infrastructure, services and productive activities in rural regions, located strategically in intermediate size cities, smaller towns and rural market centres. The growth of 'rural service centres', linking towns to rural hinterlands, must also be encouraged to increase the access of the rural poor to basic services and facilities.⁶ The investments, moreover, would have to be located in such a way as to create an articulated and integrated national spatial system capable of: (1) expanding markets for increased agricultural production, thereby raising income in rural areas; (2) extending services such as health, education, family planning and vocational training, the technical inputs needed for increased agricultural production such as new seed varieties, appropriate technology, farm-to-market roads, and electrification, as well as communications and transportation to rural regions; (3) offering new rural employment opportunities, especially in agro-processing, agribusiness, small-scale manufacturing and cottage industries; and (4) slowing the rate and altering the pattern of rural to urban migration.⁷

The pattern and composition of spatial systems and the roles of various types of settlements differ drastically among developing nations and any serious effort to shape spatial systems to promote more equitable and widespread development requires extensive analysis. In the past such analysis has been constrained, however, by three major problems: the lack of recognition of the importance of integrated spatial planning in national development strategies and policies; the lack of an operational framework for integrated spatial planning analysis; and the paucity and unreliability of data in rural regions for formulating development policies.

This paper describes and evaluates a pilot project undertaken in the Bicol River Basin of the Philippines (Fig. 1) to address these problems and develop an operational framework for integrated spatial analysis and planning. It describes the background and rationale of the project, outlines the principles for selecting applied research methodologies tested in the Philippines, describes the methods and techniques used and the results of the analyses, and evaluates the methodological and behavioural problems of implementing the project.

The Bicol project is of general interest to development planners and policy-makers for

three reasons: first, the analyses employed in the Philippine project are potentially replicable for integrated spatial development planning in rural regions of other developing nations; secondly, the problems of designing applied policy analyses in Bicol are quite common in much of the developing world; and finally, the results of the analysis provide insights into urban-rural relationships and the spatial dimensions of rural poverty, potentially useful in reformulating national investment strategies.

Concept and Background of the Urban Functions in Rural Development Project

The Bicol River Basin in the Philippines was chosen as the site for the first of three pilot projects to be undertaken by the Urban Development Office of the US Agency for International Development (USAID) in order to 'strengthen urban analysis, activities and functions which are complementary to rural development.'⁸ In designing the overall programme, Office of Urban Development analysts contended that the spatial dimensions are crucial to the success of the Agency's 'new directions' in development policy, which is aimed at assisting the 'poor majority' in the Third World primarily through intensified rural development. Moreover, they argued that functions of urban centres are essential to stimulate the growth of rural economies. 'In addition to being the loci of opportunities for off-farm employment, urban centers provide marketing, storage, processing, supply, credit, health, educational and other services to the rural areas they serve.' They concluded that 'rural areas without easy access to such centers and services cannot prosper and those without access to fully functional and efficient [urban] centers are denied their full development potential.'⁹

The projects would both gather additional information about the nature of the relationship between urban and rural development and test analytical and planning methodologies. Analysts in the Office of Urban Development pointed out that:

'The linkages between rural development and urban centers are clear, and the existing literature identifies and provides considerable insight into the kinds of general services and functions required at the level of the rural market town to support rural development. Less progress has been made in identifying similar facilities and services at other levels of the urban hierarchy—i.e., in the regional and supraregional centers—and little has been written of a comprehensive nature. More understanding is needed of the mix, magnitude and timing (i.e., order of priority) and location of facilities and services at all levels and for different types of agricultural patterns. In addition, practical information is needed on alternative ways of providing the required services and facilities.'¹⁰

The ultimate outputs of the three pilot projects would be a process of analysis and a 'package' of analytical techniques and methods for planning that would assist USAID and developing country planners to design policies and programmes for strengthening the role of urban centres in rural development. The methods tested and proven effective in these three developing countries would be disseminated to USAID missions throughout the world.

THE CONCEPTUAL FRAMEWORK

The importance of the spatial dimension to USAID's 'new directions' in development policy was strongly confirmed in preparatory research conducted for the Office of Urban Development in 1976.¹¹ The study found that spatial development in most developing countries was not conducive to equitable growth in rural areas. Although metropolitan centres and smaller cities could play an important role in stimulating rural economies, in most less developed countries (LDCs) they were not well-dispersed, and were often poorly linked to rural hinterlands. In most countries the rural poor lacked access to the services, facilities and productive activities found in urban centres of any size, and as a result the cities did not provide inputs needed to increase agricultural production or meet basic human needs in rural regions.

The report proposed a general framework for analysing rural areas and determining the degree of articulation and integration of the settlement system, and the linkages between urban and rural areas. Functional analysis of settlement systems in developing countries could help determine the types of 'urban' services and facilities needed at each level of the spatial hierarchy and the means of providing better access for the rural poor to those functions. The study pointed out, however, that any analytical framework would have to be modified in application, adapted to local conditions, and tested in a number of developing countries. The scarcity of data and general unreliability of statistics in LDCs, and the need for analytical techniques that could be easily applied by planners and readily understood by policy-makers in rural regions, mandated substantial testing through experimental and pilot projects.

The report suggested that the pilot projects focus on three areas of analysis:

1. *Analysis of Rural Resources and Activities:* including such factors as physical characteristics of the region, land and resource uses, cropping patterns, volume and diversity of agricultural production, population distribution and rural settlement patterns, services and facilities distribution, non-agricultural and commercial activities, and subsistence system characteristics;
2. *Analysis of Central Places:* including the location of market towns, small cities, intermediate or regional centres; the size, composition and density of towns, the location, concentration and dispersion of central functions, changes in the size and concentration of social and economic activities over time, and the labour force and income distribution characteristics of settlements; and
3. *Analysis of Regional Spatial Linkages:* including physical, economic, population movement, technological, social service delivery, political and institutional interaction patterns among settlements within the region, and linkages with external centres.

A number of specific analytical techniques, and the types of information needed to apply them, were delineated. The report emphasised, however, that the pilot projects should be tailored to the needs and constraints found in the region under study. A pre-designed package of methods could not be imposed; methodology should be designed in collaboration with planners and researchers in the country chosen for study only after initial data inventories and surveys of available information were conducted.

Selection of the Bicol River Basin

The Bicol River Basin, in the Southern Luzon region of the Philippines, consists of two provinces: Camarines Sur and Albay. It has long been an economically depressed area with high levels of poverty, an extremely skewed income distribution, low agricultural productivity, an adverse climate and virtually no significant manufacturing activity. Physical infrastructure is sparse and communication and transport linkages within the region and with other areas of the Philippines are poor. At the same time, the Basin's rich alluvial soil is potentially capable of high levels of agricultural production under proper irrigation and cultivation; the region has important underdeveloped natural and mineral resources; and the national government had already committed itself to an extensive programme of regional development.¹²

The Basin was chosen not only for its relatively high levels of poverty, but also because a regional planning and development agency—the Bicol River Basin Development Program (BRBDP)—was willing to undertake the study, and because of the relatively good data base found in the Philippines. Highly trained local manpower was available and capable of implementing the project successfully. Moreover, the BRBDP had a detailed plan of development, had undertaken a number of resource and baseline analyses, and through funding from the US Agency for International Development, the Government of the Philippines and various bilateral and multilateral lending agencies, would be coordinating a substantial amount of investment in the Basin in the immediate future. The interest of USAID's Philippine Mission and the cooperation of the Philippine government in providing support, were also strong considerations in the selection.

The 16-month project would be designed and implemented by the Center for Policy and Development Studies (CPDS) at the University of the Philippines at Los Banos through a contract with BRBDP. CPDS would maintain a field office in Bicol during the data collection phases of the project and move the staff to Manila and Los Banos for the analysis and planning stages.

Indigenous design and implementation of the project, as opposed to implementation by a USAID contractor, was important for two reasons. First, although the Bicol had a relatively good data base, much of the crucial information was not expected to be available in the forms needed, and the knowledge and experience of local planners would be essential in designing realistic surveys and interpreting results. Secondly, the planning process was to be institutionalised in the Bicol River Basin Development Program, requiring that its staff and consultants be intimately involved in the entire study. Project design assistance, technical aid in selecting and adapting methodology, review and evaluation of working papers and the final report and assistance with training would be provided by USAID consultants, who would also monitor the project for the Urban Development Office. The consultants would be available at regular intervals during the project, but would not reside fulltime in the Philippines. Final responsibility for all phases and for completion of the project was vested in the Philippine staff.

Principles of Organisation and Methodology Selection

The project was organised and decisions were made about design and methodology on the basis of specific principles related to the need for analytical techniques that could easily be

applied in rural areas, to the characteristics of policy-makers in rural areas where the project was likely to be replicated and to the availability of data in the Bicol River Basin. Some of the principles were inherent in the design of the overall 'Urban Functions' programme, some were recommended by the USAID consultants and others emerged from experience with the project as it progressed. The project was divided into four phases—first, an extensive inventorisation of data, information and existing studies to formulate a statistical profile of rural areas, settlements and urban centres in the Basin; secondly, a functional complexity analysis of the region's settlement system to determine the distribution of services, facilities and productive activities among settlements and to delineate the settlement hierarchy; thirdly, an analysis of linkages among settlements within the region, and with places outside Bicol; and finally, an analysis to determine the access of the rural poor to services and facilities located in urban settlements, to evaluate the adequacy of the distribution of urban functions for rural development and to formulate a spatial policy for planning the future development of the Basin.

Among the operating principles used in the project were the following:

1. *Creation of an on-going planning process as well as production of a spatial development plan.* The objective of the project, as noted in the grant agreement between USAID and the Philippine Government was twofold: first, 'to develop a planning process—potentially valid for application elsewhere in the Philippines and in other countries,' and second, to develop 'a plan for strengthening the contributions of urban centres to rural development in the Bicol.'¹³ Thus the project was not only to test an analytical and planning procedure but also to institutionalise the process in the Bicol River Basin Development Program so that the analyses could be revised on a continuing basis.

Although the CPDS staff made extensive efforts to fulfill both objectives—primarily through eliciting the participation of technical personnel, BRBDP planners and Philippine consultants in the project's operations, and informing local political leaders through training and workshop sessions—staff time and attention inevitably focused on analysis and plan formulation, often subordinating tasks related to institutionalising the planning process. Workshops held quarterly in Bicol proved to be an effective way of keeping a core of technical personnel and political leaders informed of activities during the first months of the project, but participation fell off as the project progressed. The pressures of time and conflicting commitments for political leaders made their attendance at workshops sporadic. Once staff activities were moved from Bicol to the University of the Philippines at Los Banos it became more difficult to provide information and elicit participation. Moreover, as pressures began to build on the staff to complete various stages of the project on time, more expedient and less participatory procedures were adopted.

2. *Design of the spatial analysis and development plan to be policy-orientated and adjunctive in nature.* The plan or spatial analysis would be orientated to the decision-making requirements of the Bicol River Basin Development Program, regional offices of national government agencies and provincial and local governments that would be making investment and location decisions in the Basin over the next ten years. As the regional director of the Department of Local Government and Community Development expressed it during an early organisational workshop, the outputs of the Urban Functions in Rural Development project should be 'inputs' for the planning efforts of other

organisations. The plan would not be a comprehensive regional development scheme per se, since the National Economic and Development Authority (NEDA), the major cities, and the BRBDP already had comprehensive development plans. Instead, the Urban Functions report would provide a spatial dimension useful for making locational decisions and for revising comprehensive development plans. Planning would be adjunctive, and the data and analysis could be used to supplement technical criteria used by various organisations in making investments in the area.¹⁵

3. *Use of applied research methods and analytical techniques easily performed by rural planners and easily understood by policy makers.* The analytical techniques used in the project would have to be appropriate for applied policy analysis and to the planning capacities found in rural areas. The USAID consultants believed that conditions found in most developing nations imposed tight parameters on the complexity of applied policy analysis. Policy plans must be produced quickly and be timely if they are to have an impact on investment decision-making. Thus, policy studies cannot usually depend on time-consuming data collection and highly sophisticated research techniques. They cannot, moreover, use techniques that impose overly complex, costly or time-consuming requirements on users. They should be relatively easy to apply and not require sophisticated equipment or high levels of technical skill and training, which are not usually found in rural regions. If the methods are to be institutionalised in local planning and decision-making processes they must be of a type that can be applied manually or with easily acquired and operated equipment such as desk calculators. If they are to be applied by planners and administrators without advanced technical training in spatial analysis, they should involve relatively simple and easily learned operations.

In addition, it was considered crucial that the methods and techniques be understandable to rural policy makers and that the results of the analyses be clearly presentable to local officials who would have limited exposure to or interest in spatial analysis methodologies, and indeed, who might be alienated by complex methodology. The primary audience for the analysis would in most cases be government officials and political leaders with limited education and technical training. The analytical techniques most easily understood by them would be descriptive statistics, analytical mapping, scaling and charting.

Although most participants in the project eventually accepted the general principle, strong tendencies to deviate from it were apparent in the early stages. Some of the staff members (most of whom had masters degrees), the University of the Philippines' professors who acted as consultants and some of the BRBDP planners often showed more interest in relatively sophisticated methodology and often viewed the project as scholarly research rather than as an exercise in applied policy analysis. Staff members worried that the results derived from more simplified descriptive techniques would not carry the 'authority' of those generated by sophisticated statistical methods and computer analysis. However, as the project progressed, and the limitations of available data, the requirements of collecting additional information to fit complex analytical methodologies, the difficulties encountered in explaining more sophisticated techniques to political leaders and technical personnel in government agencies, and the constraints on operationalising computer-based analyses became more apparent, the principle was accepted more readily.

4. *Use of as much existing data as possible; limit new data collection to areas where significant 'information gaps' appear.* Because a number of studies had been previously conducted in the Bicol and because the Philippines had extensive census and statistical materials, the planning and analysis methodologies were tailored as much as possible to using existing data, turning to methods requiring additional data collection sparingly and only when crucial information gaps were identified. In any case, limitations of time and money made large-scale data collection and extensive original research impossible. The Urban Functions study would draw as heavily as possible on census materials, previous resource and social survey studies of the Basin and the specialised feasibility and technical studies performed by and for the BRBDP.

Although the Bicol River Basin was relatively 'data rich' for an economically depressed region, it soon became obvious that much of the available data were not collected or reported in forms appropriate for spatial analysis. Among the weaknesses of the existing data base were:

a. Nearly all socio-economic data were reported at either the province or municipal level and could not be disaggregated to the *barangay* (village) settlement level.

b. It was often difficult or impossible to make valid distinctions between *poblacions* (town centres) and rural *barangays* with socio-economic data reported at the municipal level.

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

d. Some of the data were reported at different units over time, or the unit boundaries changed from one reporting period to the next, making time series or temporal comparisons difficult.

e. Much of the data available from technical reports, special BRBDP studies and national ministries were collected for specific purposes and communities and did not cover the entire Basin. Thus, many aspects of the analysis had to be based on 'sample' studies of sub-areas within the Basin.¹⁵

Moreover, there were other limitations to the information available. Accurate maps delineating towns and *barangays* did not exist when the project began, and a good deal of time had to be devoted to locating and mapping settlements. Air photos were available for only about 10 per cent of the Basin, and neither time nor money was available to complete the photo surveys. Thus, information concerning the location of boundaries of settlements had to be collected through field and key informant surveys. The excellent social surveys conducted by the Social Science Research Unit of Ateneo de Naga University—especially municipal and transport inventories and programme evaluation studies—provided strong insights into various aspects of underdevelopment in the Basin, but they covered only Camarines Sur province. Some of the studies had to be updated or extended in Albay Province in order to obtain complete coverage of the Basin. In addition, the lack of family income and employment data at municipal and *barangay* levels created serious analytical problems that were never fully overcome. Finally, except for some data found in the transport studies, virtually none of the existing information was useful for linkage analysis; transport linkages, market and social interaction patterns, service linkages and governmental relationships all had to be determined through original studies done on a

sample basis by the project staff or its subcontractors.

5. *Use of a combination of analytical methodologies, and reliance on staff knowledge of the area under study.* It became clear early in the project that, given the constraints of time and money and the need to develop a useful policy document quickly, it would not be possible to undertake a comprehensive statistical analysis of the Bicol River Basin. Where comprehensive coverage could not be attained using existing or easily collected data, partial analysis, sample studies, and sub-area analysis were done. Formal statistical analysis was supplemented, where appropriate, with 'softer' methods: case studies, participant observation and interviewing of key informants. The staff was encouraged to be creative in developing analytical methodologies suited to the conditions and needs of the area. To the extent that the output of the project was to be a policy plan rather than a scholarly research study, the staff was urged to use a wide variety of techniques for obtaining information, and to cultivate and use their own knowledge of the region in arriving at judgements and conclusions concerning crucial development issues.

Although a large number of possible analytical techniques were suggested in USAID's initial conceptual report, the project was not designed to test a pre-selected set of methods. Design of the analytical methods and techniques evolved during the project as opportunities and constraints became apparent, and were selected on the basis of criteria outlined earlier. Under any conditions, heavy reliance on multivariate statistical techniques seemed questionable given the types and quality of data available and the purposes of the study.

The staff accepted the necessity of using a variety of formal and informal, 'hard' and 'soft' analytical methods, and the application of their own judgement to the study, although they were initially sceptical and somewhat uncomfortable without a pre-selected and designed approach. Their initial reaction was that one or two statistical techniques would provide the 'answers' and that conventional regional analysis methods should simply be applied in Bicol. Indeed, in the early stages of the project, statistical methods were often used as 'crutches'. Manipulation of numbers was often substituted for hard thinking and conceptualisation about spatial systems in the Basin. To some extent both reactions were mitigated as the project progressed and the staff saw the limitations inherent in each statistical technique they tested, and the need to use methods of analysis as a way of testing conceptions and preliminary judgements rather than to provide unequivocal 'answers' and irrefutable conclusions.

In retrospect, there was no alternative to managing the project as an experimental venture and to designing the methodologies and techniques to meet the needs and conditions found in the Bicol River Basin. No pre-selected package of techniques would have fit the conditions in the Basin. Many analytical techniques that were thought to be important for analysis at the outset had to be discarded either because of lack of available data or because they yielded inappropriate or useless results. Even simple location quotients could not be calculated, for instance, because of the lack of employment or production statistics; coefficients of segregation and Gini concentration ratios could not be determined for many socio-economic indicators, and distance-accessibility analysis was found to be not very useful in the context of rural underdevelopment in the Basin. Even some standard techniques of analysis such as centrality indexing were not helpful; computer calculated Guttman scales proved futile given the limited capacity of Philippine

computers and lack of trained manpower. In each instance, the staff had to fall back on descriptive and manually-calculated techniques. Overall, however, this provided a strong learning experience for most of the staff; doing short field surveys, hand-calculating results, manually constructing scalograms and testing alternative statistical techniques forced the staff to think seriously about the types of data needed, their real worth, the cost-effectiveness of gathering more, and the meaning of the results in terms of the conditions they observed in the Bicol River Basin.

Moreover, the initial exercise of making an inventory of all existing data prior to designing analytical techniques and collecting additional information—although it required much more time than originally estimated—yielded an important output: the first statistical compendium of social, economic, demographic and physical information, disaggregated to the municipal level, that had been done in the Bicol. It categorised data from myriad sources that heretofore had been scattered in specialised technical reports. This compendium alone would provide an important planning tool for the BRBDP and other government agencies within the Basin, and eventually can be used to assist in making private sector investment and location decisions. Finally, the exercise yielded the first comprehensive settlement map of the Bicol River Basin which identified and located barangays. Again, this would provide BRBDP planners with a valuable tool for future planning, and when combined with the analyses of municipalities, functional complexity of settlements and indicators of linkage, can be used to make more informed and effective location decisions.

Analytical Methods and Planning Procedures

Following the general principles outlined earlier, and considering data availability and the limitations on extensive new data collection, the types of analyses described in the following sub-sections were used in the Bicol project.

PREPARATION OF A SOCIO-ECONOMIC, DEMOGRAPHIC AND PHYSICAL PROFILE OF MUNICIPALITIES WITHIN THE BASIN AS AN INVENTORY, COMPARATIVE ANALYSIS AND BASELINE STUDY

Data were compiled and disaggregated to provide a comparative profile of social, economic, physical, institutional and demographic characteristics of Bicol's 54 municipalities. Primarily descriptive, this aspect of the study made use of data on population size, density and composition, levels of dependency, literacy, educational attainment, conditions of dwelling units, size of municipal revenues, land area, crop production, value of production and experienced work force. Also included were comparative analyses of changes in population sizes of barangays, per cent distribution of population by municipality, number and per cent of households with lighting and toilet facilities, strength of construction of dwelling units, distribution of market receipts by municipality and distribution of agricultural resources. The types, numbers and distribution of productive and commercial establishments were compared by municipality as were the numbers and capacities of hospitals, educational institutions and service establishments.

Changes between 1970 and 1975 were calculated for selected indicators. For some

data, location quotients were calculated, but lack of data on employment by industry limited the use of location quotients in analysing the economic base of municipalities.

Municipalities then were categorised by level of development based on three derived analyses - ranking by levels of socio-economic and demographic characteristics; ranking by share of establishments and ranking by transportation access. Quartile analyses were done for selected socio-economic indicators and weighted rank calculations were used to cross-check the results with the other analyses in arriving at three 'development' categories for municipalities.

The analyses verified that although the entire Bicol River Basin is predominantly rural, municipalities differ significantly in their socio-economic characteristics. The distribution of services, facilities, infrastructure and productive and social organisations among municipalities is extremely skewed. If these socio-economic variables are used as indicators of development, municipalities in the Basin can be classified into three major levels: developing municipalities; less developed municipalities; and underdeveloped municipalities.

Developing municipalities include the six most 'urbanised', encompassing the two provincial centres of Naga and Legaspi, the city of Iriga and the town of Tobaco. Services, facilities and productive activities are highly concentrated in these six municipalities, especially in Naga and Legaspi cities. The developing municipalities contain about one-quarter of the population (386 000 people or 22 per cent) but account for more than 40 per cent of the 'urban' population, raise 45 per cent of the Basin's municipal revenues and have significantly higher percentages of households served by piped water and electricity. Most of the Basin's educational and vocational training institutions are concentrated within them as are most of the major health care institutions. The developing municipalities contain nearly a third of all high school and 45 per cent of all college graduates in Bicol. They are the financial centres of the Basin, with nearly half of all financial institutions and more than 85 per cent of deposit and loan assets. More than one third of all corn mills, agricultural warehouses, farm supply stores and farm machine and tool establishments, and nearly half of the cottage industries, and commercial, financial and service establishments are within their boundaries.

Less Developed Municipalities are ten that lie at or near the Manila South Road within the central plain of the river basin. They are closer in socio-economic and physical characteristics to the underdeveloped municipalities than to the developing ones. But they are distinguished from the former primarily by the fact that their access to the Manila South Road or provincial arteries connecting them to the major cities of Naga and Legaspi has generated some diversification of economic and social activities in their poblacions, and that they contain the potentially richest agricultural land in the Basin. This group of municipalities accounts for slightly more than 26 per cent of the population and has concentrations of services, cottage industries, infrastructure and facilities slightly larger than its share of population. The rural areas of these municipalities are largely underdeveloped: less than 20 per cent of households are served by piped water, they have few educational or health institutions, commercial establishments are rare and scattered. Perhaps because of their physical proximity to the major provincial centres, these areas have not become highly specialised and seem to depend on the larger centres for marketing and trade.

Underdeveloped Municipalities include 38 predominantly rural, subsistence agricultural areas forming the periphery of the Basin. Slightly more than half of the population of the Bicol River Basin lives in these municipalities, which, by all socio-economic characteristics, are the poorest and least developed. These 38 municipalities have a far smaller proportion of facilities, services, educated manpower, financial resources and productive economic activities than their share of population. Their residents are scattered in rather small barangays. Only eight per cent of households receive water and less than six per cent have electrical power. Only five of the 38 municipalities have post-secondary educational or vocational training institutions; nearly 40 per cent have no markets of any kind and 8 contain no financial institutions. These municipalities collect less than two-fifths of all municipal revenues and, on the average, depend on the national government for nearly a third of their municipal income. Some of the municipalities obtain more than half of their revenues from the national government and have few sources of internal income. The financial institutions in these underdeveloped municipalities have less than 10 per cent of the deposit and loan assets in the Basin. As a group, these municipalities contain less than one-quarter of the manufacturing, commercial, financial and service establishments, only a little more than a third of agro-processing, storage and commercial establishments and one quarter of the health facilities.

Thus, the analyses revealed that a majority of the population in the Bicol River Basin lives in municipalities with few services or facilities needed to meet basic human needs or to increase agricultural production and expand non-agricultural employment opportunities. Moreover, they are generally isolated from or have extremely poor access to the municipalities in which services, facilities and markets are most highly concentrated.

ANALYSIS OF CENTRALITY, FUNCTIONAL COMPLEXITY AND HIERARCHY OF SETTLEMENTS

This component of the analysis was aimed at determining the extent and pattern of 'centrality' within the Basin and at delineating the distribution, concentration and ubiquity of central place functions and services.¹⁶ The methodologies included:

a. *Functional Scaling of Municipalities*: Guttman scale analysis of the 54 municipalities in Albay and Camarines Sur provinces used 64 items (services, facilities and organisations) in eight functional categories: economic, social services, communications, physical equipment and services, recreational, personal services, community organisations and extension and protective services.¹⁷ The items were those that a municipal inventory of towns and barrios in Camarines Sur province showed existed and the inventory was later checked in field studies for Albay.

While this exercise provided useful information concerning the functional complexity and concentration of various types of services and facilities in municipalities, its most important deficiency was that the municipalities are not discrete settlements, but administrative areas. To get a better indication of the hierarchy and functional complexity of settlements, the staff turned to two other methodologies: a Guttman scale of settlements and weighted centrality indexes.

b. *Functional Complexity Analysis of Central Places*. A second scale, of urbanised or

'built up areas', was prepared 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 per cent of the poblacion.

Neither the municipal nor built-up area scales, however, distinguished barangays as discrete settlements. Indeed during the surveys it became clear that many barangays, like municipalities, were only administrative areas rather than 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 1000 in which the occupation of the inhabitants is predominantly non-farming fishing and which have specified physical characteristics.¹⁸

All barangays not meeting these minimum population-physical facilities criteria were considered to be non-central rural places and would be treated as a group at the lowest order in a hierarchy of functional complexity. A survey was later done of all barangays, which confirmed the validity of this judgement. A scale was then computed for all settlements.

c. *Weighted Centrality Indexing for all Settlements.* Another complementary exercise to obtain an indication of centrality was 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:¹⁹

- (1) Reproduce largest Guttman 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 illustrate the calculation of the centrality index. The centrality index allowed 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 centre does contribute to its centrality.

d. *Scalogram Analysis.* Scalogram analysis was also done to supplement the Guttman scales of municipalities and built-up areas. This is primarily a graphic and nonstatistical scale that arrays functions by ubiquity and ranks settlements by functional complexity. The Guttman scales calculated by a computer program, presented two major problems

TABLE 1 *Calculating weights of functions*

Places	Functions										Total
	1	2	3	4	5	6	7	8	9	10	
A	1	1	1	1	1	1	1	1	1	1	10
B	1	1	1	1	1	1	1	0	1	0	8
C	1	1	1	1	1	1	0	0	0	0	6
D	1	1	1	1	1	1	0	1	0	0	7
E	1	1	1	1	1	0	0	0	0	0	5
F	1	1	1	1	0	0	0	0	0	0	4
G	1	1	1	0	0	0	0	0	0	0	3
H	1	1	1	0	0	0	0	0	0	0	3
Total Functions	8	8	8	6	5	4	2	2	2	1	46
Total Centrality Weights	100	100	100	100	100	100	100	100	100	100	
	12.5	12.5	12.5	16.6	20.0	25.0	50.0	50.0	50.0	100.0	

TABLE 2 *Calculating centrality indexes*

Places	Functions										Total
	1	2	3	4	5	6	7	8	9	10	
A	12.5	12.5	12.5	16.6	20.0	25.0	50.0	50.0	50.0	100.0	349.1
B	12.5	12.5	12.5	16.6	20.0	25.0	50.0		50.0		199.1
C	12.5	12.5	12.5	16.6	20.0	25.0					99.1
D	12.5	12.5	12.5	16.6	20.0	25.0		50.0			149.1
E	12.5	12.5	12.5	16.6	20.0						74.1
F	12.5	12.5	12.5	16.6							54.1
G	12.5	12.5	12.5								37.5
H	12.5	12.5	12.5								37.5
Total Centrality	100	100	100	100	100	100	100	100	100	100	1000.0*

* Total does not add due to rounding.

for analysis in the Urban Functions project. First, the functions that seemed to be 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. Secondly, the computer output was difficult to understand and could not be easily presented to show the distribution of functions by place.

The statistical presentation required detailed explanation and interpretation, which technically untrained policymakers—at least those attending the Bicol technical workshops in which the method had been presented—found difficult to understand. Nor did they immediately see its relevance.

A graphic scale used successfully in India and Indonesia was adapted for the Bicol

- (4) Fill in with a dark colour all cells which represent an institution actually found in a settlement.
- (5) Reorder the rows and columns so as visually to minimize the light holes appearing in the dark pattern found in the upper left. The scalogram is complete when no shifting of a settlement row or functions 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.

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.'²¹ This observation was confirmed in the presentations at technical workshops, where both technically-trained personnel and local political leaders examined an initial version of the scalogram prepared for the 120 settlements at the 'top' of the hierarchy.

Among the potential uses of the scalogram in regional planning are the following: it can be used to categorise 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; the scalogram shows rough associations among services and facilities in specific locations and potential functional linkages among them; and by reading any particular column one can see the degree of ubiquity of a service or facility and its distribution over places in the region. For particular functions requiring supplementary support services and facilities, one can determine the existence of preconditions by examining the diversity of items present in any particular community. Moreover, 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. 'Missing', or unexpectedly present, functions are clearly identified. Rough indicators of threshold for some items can be determined from scalograms showing the population size of settlements. Finally, 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 for application by rural planners 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.

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.²²

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

TABLE 4 Calculation of threshold levels for central place functions

Central Place in Descending Order of Rank	Population Size	Function		
		1	2	3
A	10 000	1	1	1
B	8 000	0	1	1
C	6 000	0	1	1
D	5 500	0	0	1
E	3 000	0	0	1
F	2 700	1	1	0
G	1 900	0	1	1
H	1 700	0	0	0

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 centres according to population, a corresponding list of population data and the presence (1) or absence (0) of every function in each of the centres 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.²³

There were, however, definite limitations on the use of this technique. Current threshold levels may not realistically represent the potential for settlements of various sizes to support services and facilities, and may reflect locational decisions not based on the 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 was used in conjunction with other methods of estimation.

The functional complexity and scale analyses showed quite clearly that the Bicol River Basin is a sub-region in which services and facilities necessary for fulfilling basic human needs and generating economic development for the rural poor are not only inadequate but also highly concentrated in a few small central places, which are not easily accessible to people living outside of their immediate boundaries. The hierarchical distribution of settlements is strongly skewed and the spatial system is neither well articulated nor tightly integrated. Of the 1419 discrete settlements located in the basin—120 'built up' areas and more than 1200 barangays—little more than half contained any of the 64 functions. Nearly 90 per cent of all functions appeared in less than 20 per cent of the settlements. Most of the

TABLE 5 *Distribution of functions among settlements in Bicol River Basin, 1977*

Range of Settlements with Functions	Number of Functions	Type of Functions (Per cent of Settlements with Function)
80-100%	0	
60-79%	0	
40-59%	1	Agro-Processing Facility (41.1)
20-39%	3	Farmers Association (38.9) Cottage Industry (26.7) Civic Organisation (26.7)
10-19%	3	Sports Association (13.6) Paved Basketball Court (13.5) Piped Water Supply (12.5)
5-9%	2	High School (7.8) Agricultural Extension Station (6.1)
2-4%	18	Photo Studio (4.8) Ministry of Local Government Office (4.1) Professional Organisation (4.1) Animal Industries Extension Office (3.9) Plant Industries Extension Office (4.3) Auto Repair Shop (4.1) Private Medical Clinic (3.8) Cockfighting Pit (3.6) Farm Supply-Agro Chemical Store (3.4) Construction Supply Store (3.4) Regular Public Market (3.2) Hardware Supply Store (3.1) Farm Equipment Repair Shop (2.9) Playground with Facilities (2.9) Rural Bank (2.8) Housing Subdivision (2.8) Labour Union (2.3) Cooperative Organisation (2.2)
1-1.9%	19	Drugstore (1.8) Police Constabulary Station (1.8) Restaurant (1.8) Nightclub or Bar (1.7) Credit Union (1.8) Surveyor (1.7) Train Station (1.7) Gymnasium/Auditorium (1.6) Appliance Store (1.6) Private Hospital (1.5) Bus Station with Repair Facilities (1.5) Vocational School (1.3) Lodging Place (1.3) Power Plant or Station (1, 2) Telecommunications Station (1.1) Bank or Financial Establishment (1.1) College (1.1) Optometry/Optical Shop (1.1) Funeral Parlour (1.0)
Less than 1.0%	18	Telephone Exchange (0.9) Xerox Copy Service (0.9) Cinema with Daily Run (0.8) Paluwagen (Welfare Society) (0.7) Operational Government Hospital (0.7) Fire Station with Trucks (0.7) Shopping Centre (0.6) Cinema with Less than Daily Run (0.7) Cemetery (0.6) Port or Pier (0.5) Radio Station (0.4) Nursing School (0.4) Newspaper Publisher (0.3) Security Agency (0.3) Red Cross Office (0.2) Hotel (0.3) Airport (0.1) Bowling Alley (0.2)

other functions that appear in more than 20 per cent of the settlements are either highly localised services or social organisations with little or no productive capacity. And even among the built-up areas functions are unevenly distributed. Nearly 60 per cent of all central functions appear in less than 20 per cent of the built up areas, with one-fifth of these places containing no functions at all (see Table 5).

Only two central places—the Naga-Camaligan and Legaspi-Daraga urban areas—contained most of the functions found in the Basin's settlements. These two places represent less than one per cent of all communities and contain about 10 per cent of the Bicol's population (see Table 6). At a second level are 11 settlements, which as a group seem to function as local service centres with from 31 to 54 functions. These centres perform a few area wide and a larger number of local commercial and administrative functions. Most are clustered along the national highway or at a junction of provincial roads. A third level of about 43 settlements, representing 3 per cent of all communities and about 10 per cent of the Basin's population, act as small rural service centres, in which from 10 to 28 functions appear. But most of these are highly localised activities accessible only to people living in the immediate vicinity of the barrio. The overwhelming majority of settlements—over 1300 or about 96 per cent of the total—are residential non-central places. They are villages of a few hundred families engaged in subsistence or near-subsistence agriculture or working as tenants or on small family owned plots. All communities in this category have less than 9 functions; most contain only a few or none at all. The only activities consistently found in these barrios are ubiquitous local functions serving a neighbour-hood or cluster of houses. Most of the settlements have populations smaller than necessary to support most functions found in the Basin.

Spatial Linkage Analysis

Analysis of linkages, an important part of the study for judging the accessibility of rural people to urban functions, remained partial and descriptive because of the large amount of original research that would have to be done in order to do a complete mapping of physical linkages and thorough investigation of socio-political relationships in the Basin. Yet, through sample surveys and synthesis of socio-economic studies already done in the Basin, the staff made substantial progress on obtaining information that provided useful insights into how activities located in various settlements are related to each other and the interaction patterns among settlements within the basin.

The studies showed that the adverse effects on the rural poor of Bicol's highly skewed distribution of services and facilities are aggravated by extremely weak economic, physical, service and social linkages among settlements. Although some of the functions included in the scale could not be expected to be widely distributed—they are central functions requiring high population thresholds—most were basic commercial, administrative or service functions essential to meeting human needs and accelerating rural development. If they are not widely distributed in settlements throughout the Basin, then equity criteria would suggest that those living in rural areas should at least have easy access to places where they are located. But central places within Bicol are not easily accessible to most rural areas, and the urban and rural settlements are not strongly linked.

TABLE 6 *Functional complexity of levels of settlements in Bicol River Basin, 1977*

Level of Hierarchy	Functional Characteristics	Number of Settlements	Settlements	Range of Functions	Per cent of All Settlements	Per cent of Basin Population	Average Population Size
I	Provincial Service Centres	2	Naga-Camaligan Lagaspi-Daraga	60-61	0.14	10.6	89 892
II	Local Service Centres	11	Iriga, Tabaco, Goa, Tigaon, Pili, Nabua, Baa, Guinobatan, Libmanan, Ligao	31-54	0.77	7.3	11 107
III	Rural Service Centres	43	37 Poblacions 6 Barangays	10-28	3.03	10.5	4 196
IV	Non-Central Places	1 363	2 Poblacions 1 361 Barangays	0-9	96.06	71.6	922

TRANSPORTATION AND PHYSICAL LINKAGES

The staff compiled information on transportation linkages among sub-areas of the Basin by mode, on road networks by conditions of road, and inter-point distances among barangays and between barangays and poblacions. In addition, information on traffic volumes, means of transportation and selected commodity flows was made available through various transportation studies conducted by BRBDP. The staff contracted for a survey of 'informal' transport of goods and passengers by railroad 'skates'. Much of the data were mapped and provided a detailed profile of physical linkages among sub-areas within the Basin.

Transport studies showed that more than 70 per cent of all roads in the Basin are of poor quality and need upgrading. Only the national highway cutting through the centre of the Basin, and a few provincial roads, are of all-weather construction and passable during the rainy season. Farm-to-market roads are few and of poor construction. Many rural barrios can only be reached by small boat or on foot. The inadequacy of regular transport linkages is reflected in part by the use of non-motorised vehicles, animal-drawn wagons, use of illegal 'skates' along the railroad tracks and small boats and barges, and in part by the fact that the majority of trips taken within the Bicol River Basin are on foot. The railroad provides a limited service to points outside the Basin and the major centres are linked to Manila by infrequent bus and air services.

Roads are used by 95 per cent of the passengers taking trips within the Bicol River Basin and to transport over 80 per cent of agricultural commodities. But as physical linkages among communities, the roads provide rather poor service. Most of the rural population lives in settlements not easily accessible by road, and transport is difficult and expensive in most of the Basin. The cost of transporting commodities in interior rural areas is up to six times more than in areas connected by roads passable by motorised vehicles. Farmers from rural areas must often walk for hours to the nearest road and carry their produce on their backs or on slow-moving carabao or horses. Even after they reach a provincial road, the waiting times for a jeepney or bus are long and the costs so high that marginal profits are sometimes completely wiped out. Rural farmers must wait an average of 30 times longer for transportation at secondary roads than at places adjacent to the Manila South Road and in some more remote sections of the Basin they may wait as long as three or four hours. Because of the cost of transportation and difficulty of travelling, 85 per cent of all trips taken within the Basin are among places within the same municipality and 99 per cent are within the same province. Relatively little travel—for shopping, work, trade, social interaction, or any other purpose—is inter-municipal and there is little interaction on a regular basis between the Basin's two provinces.

ECONOMIC AND MARKET LINKAGES

The staff completed surveys of six regular and six periodic markets to determine the origin and destination of selected commodities through major markets, to estimate the physical 'reach' of marketing centres for those commodities and to identify spatial and functional linkages among producers, middlemen and buyers. Although the sample surveys were not an adequate substitute for a complete market study, they did provide indications of linkage and raised important questions for further marketing research. In each of the six major

markets 100 middlemen and 50 producers were interviewed with prepared questionnaires. Information was obtained on source and destination of commodities, type of seller, place of sale and volume of trading. Similar information was garnered from periodic market middlemen. The survey was limited to public markets and did not include private stalls located adjacent to public markets.

Information on each commodity's source, destination and mode of transport was mapped, showing linkages among places within the Basin and between market centres within Bicol and those outside. The studies clearly demonstrated that market linkages, which should form a major network of commercial interaction within and among rural areas, are extremely weak in Bicol. The greatest amount of market interaction occurs through central markets in Naga and Legaspi cities. A significant portion of the Basin's population lives in settlements too small to support even a periodic market, which adversely affects their ability to sell agricultural surpluses, raise their income levels, obtain household goods or buy inputs needed to increase agricultural output.

Analysis of the commodity flows indicate that markets within the Bicol River Basin are primarily local exchange centres serving residents of the places in which they are located; that they have limited 'reach' or service areas and are not well integrated into a network of area-wide exchange and trade. The survey indicated that a 'nested' hierarchy or articulated network of markets, characteristic of more economically developed regions, does not exist in Bicol. Markets within the Basin are primarily undifferentiated agricultural exchange points trading almost exclusively in six commodities (rice and palay, coconut, copra, fresh and dried fish, poultry and livestock) with some larger regular markets also providing limited amounts of household goods. Bicol River Basin markets, even in larger towns, have insignificant external trade linkages and the periodic markets are generally isolated, highly localised and virtually unintegrated collection and exchange points, most of which are barely accessible to rural people beyond 10 or 15 kilometres from the village in which the market is located.

SOCIAL LINKAGES

To the extent that the integration of settlements within a region occurs through social interaction among residents — through kinship ties, visiting among kin and friends, inter-village marriages, and for recreation and ritual — social linkages reflect the degree to which people perceive a region as a coherent and unified unit of society. Surveys of selected social interaction show relatively little social linkage among settlements within various sub-areas of the Bicol River Basin. A sample survey of marriage records showed that an average of less than 19 per cent of all spouses were chosen from outside the same municipality during a three year period during the mid-1970s. Over 80 per cent of all men and women in Bicol, during that period, tended to choose spouses from within their own municipality, and in most cases, from within the same or a neighbouring barangay. Since social interaction patterns in the Philippines are shaped strongly by family visiting, marriages among people from different towns and municipalities would be expected to increase social interaction among those places. But the inter-modal transport studies confirm the indications of marriage pattern studies, that relatively few inter-municipal trips are for social purposes.

ADMINISTRATIVE, POLITICAL AND SERVICE LINKAGES

The nature of relationships among levels of government within the Bicol, formal and informal political and administrative decision-making, the linkages among and between government units in the provision of services and facilities, and the characteristics of the network of planning organisations affecting development policy within the Basin were some aspects of administrative, political and governmental linkages explored in a study sub-contracted to the College of Public Administration at the University of the Philippines.

It was found that formal government linkages among levels are dominated by national ministries operating within the Basin and that formal structure is highly centralised. Most local officials are appointed by and responsible to national ministries. Municipal officials generally are not under the authority of the mayors, themselves holdover appointees under martial law, who have few resources to solve local problems. Most municipalities in the Basin are dependent on the national government for part of their revenues and most of their authority. Decisions are often made through highly personalised relationships.

Studies of government structure and services in Bicol indicated that services provided by all levels are highly localised. Health, education, and other public institutions generally extend services only to populations living in the immediate vicinity of their sites or to the few who can afford to travel from rural barangays to obtain them in the larger cities. Even the post-secondary schools in the larger centres primarily only serve the local area. Health, education and agricultural extension services are far below standards set by national ministries.

Conclusions and Results

The Bicol River Basin Urban Functions in Rural Developmental Project yielded a number of important outputs in addition to those envisaged in its design. From various functional and spatial analyses, the staff was able to identify a set of appropriate services and institutions needed at each of three levels of settlement - rural service centres, market towns and regional urban centres - adequately to meet basic human needs, articulate the settlement system and stimulate regional economic development (see Table 7). The functional complexity and scalogram analyses indicated the types of functions each level of settlement could support, as well as functional and spatial 'gaps' in the distribution of services and facilities.

The final report recommended that BRBDP consider developing 'minimum packages' of investments for each type of settlement in order to promote functional specialisation, meet unfulfilled economic and social welfare needs and integrate communities into a more cohesive economic and spatial system. To achieve greater spatial integration the BRBDP would have to plan for the creation of a network of all-weather and farm-to-market roads as a pre-condition for extending services to rural people, locating agro-processing facilities in rural areas, inducing non-farm production in rural villages and providing access to town-based facilities. The paucity of markets and market towns within the Basin would also require the immediate attention of BRBDP policymakers. The staff noted that future investments in services, facilities and infrastructure must be located strategically in

TABLE 7 *Services, facilities and infrastructure proposed for each settlement level, Bicol River Basin*

General Functions	Rural Service Centres	Market Towns and Centres	Regional Urban Centres
Transport and Communications	<p>Surfaced, All Weather Roads Farm Access Roads Bus Stop Regular Bus or Jeepney Service to Rural Collection Points Gas Station Telegraph Service Postal Service</p>	<p>Asphalted, All-Weather Roads Bus Terminal Trucking or Bulk-Distributing Services Regular Bus or Jeepney Service to Rural Service and Regional Urban Centres Gas and Service Station Auto Spare Parts Retail Store Telegraph-Radiogram Service Telephone Station Postal Services</p>	<p>Concrete Highway to Major Urban Centres Bus Terminal with Major Repair Facilities Auto & Machine Repair Shops Vehicle and Machine Spare Part Shops Regional and Interregional Trucking and Bus Services Gas and Service Stations Railroad, Port and Air Terminals Telegraph, Telegram, Telex Services and Facilities Telephone Exchanges linked to Major Urban Centres and Market Towns Postal Distribution Centres</p>
Marketing, Trade and Shopping	<p>Periodic Market Facilities Farm Implements and Agricultural Supply Shop Marketing Cooperative Outlet Storage Facilities General Store or Sari-Sari Stores Milling Facilities</p>	<p>Daily Market Facilities Retail Outlets for Farm Supplies Wholesale Outlets for Farm Implements Cold Storage and Warehouse Facilities Grocery Shops Household Goods Retail Shops Grading and Bulk Assembly Facilities</p>	<p>Diversified Daily Market Distribution Outlets and Sales Offices for Farm Machines Farm Supply Wholesalers Cold Storage and Warehousing Agricultural Commodity Brokers and Distributors Outlets Diversified Commercial Retail and Wholesale Establishments Retail Outlets for Consumer Goods, Household Goods Consumer Specialty Shops</p>
Industrial and Manufacturing	<p>Cottage Industry Small Scale Craft Shops Small Machine Repair Shops and Metal Shops</p>	<p>Bulk Commodity Processing Facilities Agricultural Processing Plants Small Scale Consumer Goods Manufacturing Facilities Small Machine, Implement and Metal Shops</p>	<p>Agro-Industry and Agribusiness Facilities Commodity Processing and Packaging Rural Goods Production and Distribution Facilities Small Tool and Implement Production Facilities</p>

Finance	Rural Bank	Commercial and Savings Bank Facilities	Development and Commercial Bank
	Credit Cooperative	Rural Bank with Nonagricultural Loan Programmes Credit Cooperatives Moneylenders and Pawnshops	Branch Savings and Loan Associations Insurance and Financial Establishments Urban and Rural Credit Coops Brokerage Firms Chambers of Commerce Small Industry and Business Incentive Programmes
Public Utilities	Piped Water Supply Point Small Water Filtration Facilities Residential Electricity	Electrical Energy Station Residential Piped Water Supply Residential and Commercial Area Drainage Systems	Electric Supply Grid Piped Water System Sewerage and Drainage System Waste Disposal System
Administration	Municipal Service Office Barangay Government Office Police or PC Sub-station Municipal Court Branch Agricultural Extension Station	Municipal or Barangay Govt. Office IAD Team Headquarters Office Police or PC Station District Offices of Agricultural Extension Judicial Facilities National Ministry Programme District Offices	Provincial Government Offices Municipal Hall and Administrative Offices Regional Planning and Development Agency Offices Municipal and Provincial Court Branch Offices of National Ministries Regional Office Headquarters
Recreation and Social	Paved Basketball Court Multi-Purpose Community Centre	Paved Basketball Court Small Gymnasium Auditorium Restaurants and Coffee Shops Cinema Playground with Facilities	Paved Basketball Courts Parks and Plazas Cinema with Daily Run Hotel with nightclubs Restaurants Gymnasium Auditorium Multipurpose Community Centre Diversified Social Activities
Education	Primary Schools Vocational Education Facilities	Primary Schools High Schools Vocational Schools Extension and Home Economics Classes Agricultural Demonstration Facilities	Primary and Secondary Schools Small Colleges and Technical Schools Specialised Vocational Training Programmes Regional Agricultural Research Station
Health	Dispensary-Clinic Maternal/Child Care Service	Multi-Purpose Clinic Area Health Office Physicians, Dentists Drugstores	General Hospital Public Health Offices Physicians, Dentists, Surgeons Retail Pharmaceutical Outlets

existing and incipient rural service centres to stimulate the growth of markets. Without a well-dispersed, integrated and easily accessible network of market centres in rural hinterlands it would be unlikely that farmers could increase production to levels projected by the BRBDP.

Beyond establishing a planning process for spatial analysis and policy recommendations for integrating urban and rural development, the project also generated:

1. The first comprehensive statistical compendium of social, economic, demographic, institutional and physical characteristics of municipalities and settlements in the Bicol River Basin that should provide an important statistical base for future analysis and planning;
2. An inventory of available data sources on various aspects of social, economic and physical development in the Basin;
3. A number of small sample surveys and original research studies on various aspects of interaction and linkage among communities within the Basin, including a survey of selected markets, analysis of transport access, delineations of service areas of major centres for various types of social services and facilities, a cultural history of Bicolanos and a cultural analysis of sub-areas within the Basin, a profile of government organisation and the dynamics of political interaction, and an analysis of travel patterns in relationship to economic interaction, and an analysis of travel patterns in relationship to economic interaction among settlements, all of which can be useful to planners in broadening their understanding of the region and its people;
4. A series of analytical maps and overlays for various developmental variables and linkage indicators that can be used as baseline and comparative analytical tools for planning the location and distribution of services and facilities;
5. The first comprehensive map identifying and locating settlements below the municipal and poblacion levels, including all barangays within the Bicol River Basin;
6. Construction of a scalogram of major services, facilities, organisations and infrastructure for all barangays within the Basin that can be used in making allocation and location decisions, selecting existing and incipient centres for development, and developing 'minimum packages' of investments for various communities;
7. A core of trained manpower capable of applying, revising, modifying and updating the spatial analysis methodologies and techniques used in the project for future planning in the Bicol River Basin and for their replication in other regions of the Philippines;
8. Institutional capability within the CPDS of the University of the Philippines--Los Banos to apply spatial analysis for integrated spatial development;
9. A body of literature, generated by the *Urban Functions in Rural Development* conceptual study, a series of 'spinoff' and working papers on various aspects of integrated urban-rural development, Bicol working papers and staff reports, and a series of statistical studies on the Bicol, much of which has already found its way into training programmes and graduate courses in various programmes within the University of the Philippines, and which will be used in the education and training of Philippine social scientists, planners and administrators for a number of years into the future; and
10. Increased awareness and sensitivity among BRBDP planners, USAID Mission staff

in the Philippines, technical personnel of national ministries working in Bicol and local political and governmental leaders, of the importance of taking deliberate action to integrate urban and rural areas in regional development programmes, and the significance of urban functions in rural economic, social and physical development.

The task of institutionalising spatial analysis and planning procedures in the operations of the Bicol River Basin Development Program continues. But the experiences and approaches of the Philippines Urban Functions in Rural Development Program will be further tested and refined in other economically depressed regions in the search for applied policy analysis processes that are appropriate and useful for integrated regional development planning in Third World nations seeking economic growth with greater social equity.

NOTES AND REFERENCES

- 1 The literature is reviewed in detail in Rondinelli, Dennis A. and Kenneth Ruddle, *Urbanization and Rural Development: A Spatial Policy for Equitable Growth*, New York, Praeger, 1978
- 2 The argument is made most strongly by Lipton, Michael, *Why Poor People Stay Poor: A Study of Urban Bias in World Development*, Cambridge, Mass., Harvard University Press, 1977; other evidence is offered by John Friedmann and Robert Wulff in *The Urban Transition: Comparative Studies of Newly Industrializing Societies*, London, Edward Arnold, 1975
- 3 See Johnson, F. A. J., *The Organization of Space in Developing Countries*, Cambridge, Mass., Harvard University Press, 1970
- 4 See Rondinelli, Dennis A., Joseph Lombardo Jr. and Gar-On Anthony Yeh, 'A Decentralized Urbanization Policy for Migration and Population Growth Planning in Asia', *The Asian Economic and Social Review*, Vol. 3, Nos. 1-4 (1978)
- 5 See Johnson, Lipton, *op. cit.* for a discussion of this aspect of the problem
- 6 Rondinelli, Dennis A. and Kenneth Ruddle, 'Coping with Poverty in International Assistance Policy: An Evaluation of Spatially Integrated Investment Strategies', *World Development*, Vol. 6, No. 4 (April 1978), pp. 479-498
- 7 These objectives are clearly stated in the policies of international funding institutions; see United Nations Economic Commission for Africa, *Integrated Approach to Rural Development in Africa*, New York, United Nations, 1971; United Nations African Development Institute, *An Approach to Evolving Guidelines for Rural Development*, Discussion Paper No. 1, Bangkok, UNADI, 1975; 'US Congress, House Committee on International Relations, *Implementation of "New Directions" in Development Assistance*, report prepared by US Agency for International Development, Washington, Government Printing Office, 1975; and World Bank, *Rural Development Sector Policy Paper*, Washington, International Bank for Reconstruction and Development, 1975
- 8 US Agency for International Development, Office of Urban Development, 'Urban Functions in Rural Development Project Paper', Washington, USAID, 1976, mimeographed, pp. 6-7
- 9 *Ibid.*, p. 4
- 10 *Idem.*
- 11 The original report, *Urban Functions in Rural Development: An Analysis of Integrated Development Policy*, Washington, USAID, 1976, processed, was later revised by the authors for publication. See Rondinelli and Ruddle, *op. cit.*
- 12 See US Agency for International Development, Office of Urban Development, *Bicol River Basin Urban Functions in Rural Development Project: Summary and Evaluation*, Washington, USAID, 1978, processed, pp. 10-14

13 US Agency for International Development, Office of Urban Development, 'Project Agreement: Bicol River Basin Urban Functions in Rural Development Project', Washington, USAID, 1976, mimeographed

14 The concept is explained in Rondinelli, Dennis A., 'Adjunctive Planning and Urban Development Policy', *Urban Affairs Quarterly*, Vol. 7, No. 1 (September 1971), pp. 13-39

15 USAID, *Bicol River Basin Urban Functions in Rural Development Project: Summary and Evaluation*, op. cit., p. 38

16 'Central place functions' are those services, facilities, economic activities or institutions that are located in urban centres and that serve and supply their hinterlands. In the Bicol survey some 'residential functions' such as piped water supply, paved sports and recreation facilities and housing sub-divisions that are indicators of 'levels of development' in the Philippines were included as functional complexity measures

17 The existence of these functions in Bicol municipalities had been determined through a municipal inventory of Camarines Sur Province in 1974; See Social Science Research Unit, *SSRU Municipal Inventory, Naga City, Bicol River Basin Development Program*, 1975

18 The physical characteristics include: '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 cemetery, (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.' See Republic of the Philippines, National Census and Statistics Office, *Philippines 1970 Census of Population and Housing, National Summary, Vol. II, Manila, NCSO, 1974*, p. xiii

19 Ragragio, Junio M., 'The Design for the Identification of the Hierarchy, Centrality and Threshold of the Central Place Systems in the Bicol River Basin', Project Discussion Paper, College, Laguna, Center for Policy and Development Studies, University of the Philippines - Los Baños, 1977, mimeographed

20 See Andrade, C. P., C. Banerji, H. B. Fisher, G. Rushton, N. S. Saini and A. Sharma, *A Graphic Approach to Settlement Planning for Integrated Area Development Planning*, New Delhi, The Ford Foundation, not dated, mimeographed

21 Fisher, H. Benjamin, 'Methods for Identification of Agro-Urban Centers at the Kabupaten and Provincial Levels', Jakarta, The Ford Foundation, 1975, mimeographed

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

23 Ragragio, op. cit.