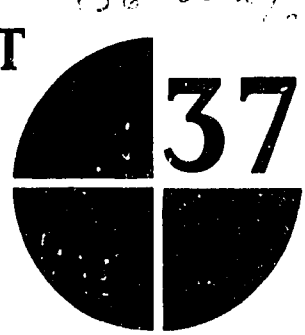
RESEARCH REPORT



SERVICE PROVISION AND RURAL DEVELOPMENT IN INDIA: A STUDY OF MIRYALGUDA TALUKA

Sudhir Wanmali

February 1983

INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE

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FOREWORD

The International Food Policy Research Institute is building a substantial body of knowledge on how technological change in agriculture can contribute to growth in income, employment, and overall economic development. This emphasis is based on several considerations: first, the importance of increased food supplies among the low-income people of the world; second, the need to generate new employment opportunities among the poor in order to raise their effective purchasing power; third, the high employment content of the multiplier effects of the new agricultural technology; and finally, the high investment requirements of accelerated economic growth. Several research reports stemming from these efforts have already been published by the Institute. They include *Agricultural Growth and Industrial Performance,* Research Report 33, by C. Rangarajan; *Intersectoral Factor Mobility and Agricultural Growth,* Research Report 6, by Yair Mundlak; and *Agriculture and Economic Growth in an Open Economy: The Case of Argentina,* Research Report 36, by Domingo Cavallo and Yair Mundlak. Other ongoing efforts at the village and regional levels are attempting to apply this analysis to the development of specific policy needs.

Technological change in agriculture puts money in the hands of landowning families, who typically spend between 30 and 40 percent of their increments to income on locally produced nonagricultural goods and services. Public and private efforts to provide such goods and services not only help to improve rural living standards, but also serve to increase income and employment opportunities for the rural poor.

This study by Sudhir Wanmali represents an important effort at understanding how various public and private mechanisms affect the growth and income multiplier effects of accelerated agricultural growth. By focusing on the impact of government efforts to introduce a wide range of socioeconomic facilities into a rural area in India, it calls much-needed attention to the critical role that government policy plays in stimulating the multiplier effects of agricultural development. According to the study only the government was willing at the outset to provide the additional goods and services demanded by farmers in Andhra Pradesh after the implementation of a major irrigation project. A number of salient policy recommendations concerning the type and extent of rural services that the government should be expected to provide at different levels of development emerge from this finding.

Wanmali's analysis is of considerable value to IFPRI's continuing effort to understand the process of agricultural growth linkages at the village level, and it represents an important building block for the future study of such linkages at the household level.

John W. Mellor

Washington, D.C.
February 1983

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This research report is an outcome of a project on location theories and distribution of rural services in India, which was funded by the Social Science Research Council of the United Kingdom. The project was based at the Centre of South Asian Studies, University of Cambridge, England, and was supervised by its director, B. H. Farmer.

When I joined IFPRI in October 1981, I was encouraged to write a research report based on my work in Cambridge. I am most grateful to John Mellor for that encouragement and, indeed, for his interest in the work. His comments on an earlier draft of this report have been very useful in revising the text.

While writing this report, I have greatly benefited from discussions with a number of people. Due to limitations of space not all can be mentioned, but the following are gratefully acknowledged: Raisuddin Ahmed, B. H. Farmer, R. N. Haldipur, Peter Hazell, Nabil Khaldi, Waheeduddin Khan, V. Ramana Rao, Y. Venugopal Reddy, J. S. Sarma, B. P. R. Vithal, and the anonymous referees. Grateful thanks are also due to Ch. Gopala Krishnamoorthy, Mohammed Haroon, A. V. K. Sarma, and J. B. Ramkumar for their help during the field work.

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Sudhir Wanmali

1

SUMMARY

This report traces the development of the regional economy and the provision of services by the government and the private sector for both dry and irrigated tracts in a rural area of India. It is based on empirical evidence from Miryalguda, an administrative unit (taluka) of Andhra Pradesh. The taluka is situated in the command area of Nagajunasagar Irrigation Project (NSP) on the River Krishna. A part of the area, however, remains dry. Changes brought about by the irrigation project can be examined because data are available from a study of the same region conducted 10 years earlier.

The study is divided into three sections: the policy and theory of service provision in rural India, the empirical evidence, and the policy implications of the findings.

Current models of regional development in India are excessively preoccupied with urban and industrial development as a means of developing rural India. They are based on assumptions about the functioning of the Indian regional economy that are untenable on the basis of more recent evidence showing that the benefits of urban and industrial development frequently do not filter down to rural areas because the interconnecting systems are weak. This study indicates that growth of rural areas can be better achieved by planning for the development of the agricultural sector. Service provision is a crucial aspect of this planning.

The study analyzes the irrigation, cropping patterns, and population of the regional economy. It identifies the services provided by the government (the rural services) and those provided by the private sector (the retail services). It considers the distribution of these services among service centers, the size of the service areas, and the number of people served. It examines the spatial impact of service provision, which measures the incidence per square mile of rural, retail, and total services; the effects of service provision on the agricultural sector; and the development of the region from a spatial or geographical viewpoint.

Miryalguda Taluka was drought prone until the completion of the NSP irrigation facilities in 1967. The total area irrigated increased from 8,580 acres in 1967/68 to 87,830 acres in 1978/79. The cropping pattern of the study area has changed as a result of irrigation. Previously a dry-crop economy growing rainfed paddy (unhusked rice), jowar, groundnuts, castor, and pulses, it now grows sugarcane and seasonal vegetables as well. Crops are grown over a more extensive area and more than once a year. The area sown with crops increased from 102,000 acres in 1968 to 185,000 acres in 1978. Considering that most of this area is now double cropped, the growth of agriculture has been impressive.

The extension, intensification, and diversification of the cropping pattern was facilitated by the simultaneous provision of education, health, credit, banking, transport, marketing, storage, communication, and input distribution facilities. The employment generated and the higher incomes earned were responsible for the demand for various retail services, including stores for general provisions, cloth, hardware, fertilizers and pesticides, and restaurants, weekly markets, and pharmacies.

All of these services had spread impressively by 1978, and several new services had been instituted as well. There were 23 settlements in the taluka (out of 150) in 1968 that did not have any services at all; this number had decreased to 12 in 1978. The number of settlements that did not have any rural services in 1968 was 26; this was down to 17 in 1978. But the most spectacular growth was observed in the retail services. In 1968, 104 settlements did not have any retail establishments; in 1978 there were only 34.

Only 4 service centers were identified in the taluka in 1968. Of these, the towns of Miryalguda and Vijayapuri had most of the services. Recognizing this imbalance in service provision, the 1968 study located 18 potential service centers throughout the taluka. The 1978 survey studied all 22 of these settlements to see if they had developed as planned and if the services offered differed from those recommended. All 22

had indeed become service centers, but there were changes in the services provided and in their rate of growth. Some of the service centers in the dry tracts were not able to sustain some of the higher-order services.

The government initially had to provide the basic services because the private sector was unwilling to invest in what might prove to be an uneconomical proposition. The government recognized, however, that the full benefits of the irrigation projects could only be realized if services such as transport, communications, supply of agricultural inputs, banking and credit, marketing, animal husbandry, and health facilities were available to farmers. Eventually, the private sector began to provide complementary services in some of these areas, as well as providing the retail services. The private sector, however, has primarily located its services in the irrigated areas, where they are more likely to be profitable. Similarly, the government has had to take the lead in developing agro-processing industries such as rice mills, flour mills, and oil extraction mills in service centers.

The location of services is linked to the growth of population. When the population of a settlement becomes large enough to support a certain service, that service emerges. This point is called the threshold of population.

When a new service is introduced in a center, other centers providing that service usually lose service area and service population, but this is not uniform for all services or for all service centers. The general trend is for the size of the service area to decline as the service becomes more widely available.

In 1968 the index of total services provided was 4.63 for the taluka, 4.50 for the irrigated tract, and 4.71 for the dry tract. This pattern of higher values for the dry tract is maintained even when the total services are disaggregated into rural and retail services. In 1978 the index of service provision for total services was 9.94, that for the dry tract was 5.86, and that for the irrigated tract was 13.90. The earlier pattern is completely reversed, and it is the irrigated tract that is better provided with services, which indicates a locational bias in favor of the irrigated tract.

A number of lessons can be learned from the Miryalguda experience. Over the years, policies have been formulated based on two false assumptions: first, that people are equally mobile, and second, that services are used with equal frequency throughout the year. In reality, poorer people in rural areas often find it difficult to reach services located far from the vicinity of their own villages, and the use of services varies greatly from one month to another. Providing mobile services that rotate among settlements, perhaps in conjunction with market days, would make services more accessible to the people and would also be more economical to provide.

It is evident that the development of agriculture can be facilitated by properly selecting locations for service centers and by integrating service provision into the hierarchical settlement system of a region. This study shows that service center planning based on analysis of relevant local factors can be a useful tool in the hands of planning agencies.

The linkages between irrigation, agricultural development, and provision of rural and retail services are evident in Miryalguda Taluka at the village level. Although household data are not available, it seems likely that the proliferation of services has led to an increase in employment, incomes, and demand for urban consumer goods. Further study at the household level is urgently needed to gain insight into how people use services and to help refine policies for service provision in rural areas.

2

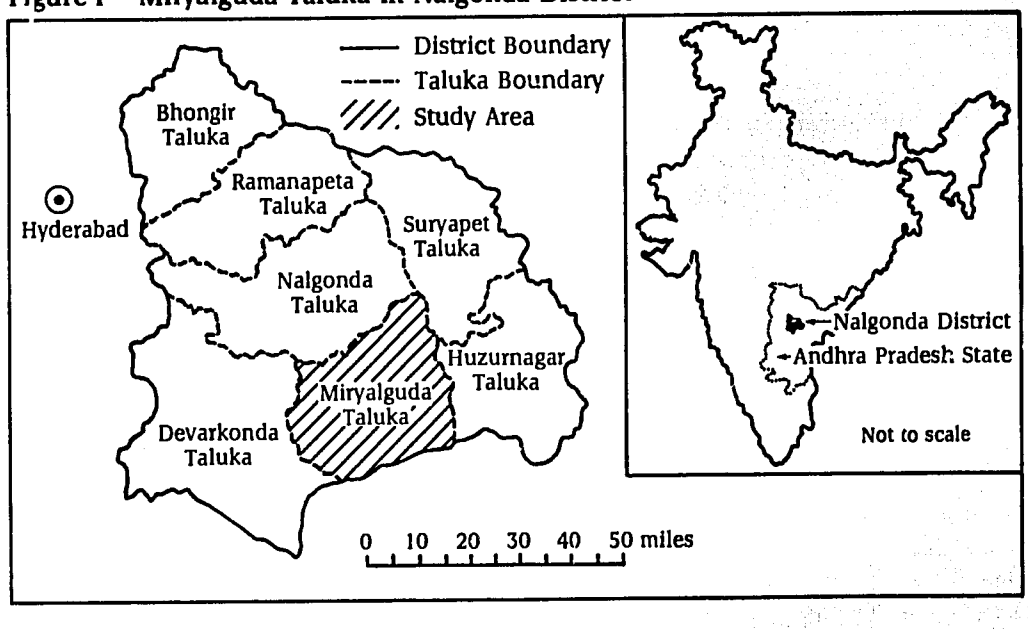
INTRODUCTION

The Miryalguda Taluka in Andhra Pradesh was provided with irrigation in 1967/68 by the NSP canal system on the River Krishna about 150 miles southeast of Hyderabad (see Figure 1). Simultaneously, attempts were made to provide those services thought necessary for agricultural development. Based on field studies, plans called for the selection of 18 centers in addition to the 4 that were already functioning to provide specific services such as transport, marketing, supply of inputs, credit, banking, animal husbandry, communications, health, and education.

As the taluka has been surveyed twice in recent years, in 1968/69 and in 1978/79, a rich data base exists on the regional economy, sectoral allocation of resources, and on service provision and use—all at the village level. Data also exist on some other changes that took place in the study area during the years 1968-78.

There are instances in the literature on rural development where a system of services is planned to facilitate the cultivation of export crops alone or to cater to the demand for agricultural services of a particular region.[1] There are other examples where planning is limited to providing only one service or a few basic needs. In almost all cases, these service structures tend to be outside or parallel to the existing politico-administrative framework, which tends to create friction in the whole system.[2] For Miryalguda, however, an attempt has been made to evolve a system that does not ignore these politico-administrative realities, and it is hoped that such a system can be replicated elsewhere. In addition to planning

Figure 1—Miryalguda Taluka in Nalgonda District



[1] See Uma Lele, *The Design of Rural Development: Lessons from Africa* (Washington, D.C.: The Johns Hopkins University Press, 1975).

[2] Ibid.

for the services in financial terms (in five-year or annual plans), the Miryalguda plan tells where to locate them. This integration of the sectoral and spatial aspects of a plan is unusual in India and probably in most Third World countries.

The study evaluates the urban- and industrial-based models of spatial development in India and the modified growth pole hypothesis of Misra, Sundaram, and Rao.[3] It describes the study area, analyzes the regional economy, examines service provision in the area and its spatial impact, and, finally, looks at the policy implications of the spatial planning of services.

It has been generally and somewhat uncritically accepted in the literature on economic development that industry and not agriculture is the prime source of growth. This view has been reflected in the development strategies of many Third World countries. Today, however, there is a greater awareness among those concerned with the development process that investment in agriculture can provide a strong impetus to general economic growth, providing this investment increases agricultural productivity.[4] The increase in agricultural productivity tends to influence the regional economy through a series of linkage effects. Two types of linkage mechanisms that produce these effects are recognized: resource transfers made up of flows of food, raw materials, capital, and labor from agricultural to nonagricultural sectors; and demand linkages, made up of demands for farm inputs, marketing, storage, and transport, as well as rural household demands for goods and services.

Such linkage effects appear to exist in the study area. However, there is one major difference between this and other studies of linkages. This entire study is based on village data; household data are not examined. Despite this significant difference, it cannot be denied that agricultural development provided a strong impetus to economic development and to the provision of services.

The aim of this study is to demonstrate the role played by service provision in increasing agricultural production. It must be emphasized, however, that the role of services is that of a facilitator. Rural services such as transport, marketing, storage, credit, finance, animal husbandry, and input distribution encourage production both before and after harvest, whereas retail services of various kinds are provided to meet demand once incomes in the region increase as a consequence of increased agricultural production.

[3] R. P. Misra, K. V. Sundaram, and V. L. S. P. Rao, *Regional Development Planning in India: A New Strategy* (New Delhi: Vikas, 1974).

[4] John W. Mellor and Uma Lele, "Growth Linkages of the New Foodgrain Technologies," *Indian Journal of Agricultural Economics* 28 (No. 1, 1973): 35-55; B.F. Johnston and P. Kilby, *Agriculture and Structural Transportation* (London: Oxford University Press, 1975); John W. Mellor, *The New Economics of Growth: A Strategy for India and the Developing World* (Ithaca, N.Y.: Cornell University Press, 1976).

3

THE NATIONAL PLANS AND SPATIAL POLICIES

Regional development and planning mean different things to different people. To some, they mean only urban and industrial development. To others, they include rural development with proper emphasis on irrigation facilities, development of agriculture, and provision of rural services. According to the objectives of the national plans, economic growth was to be achieved through full employment, higher national output, and improvement in the general standard of living. In the First Plan (1951-56) the vehicle for achieving economic growth was overall rural development; in the Second Plan (1956-61) it was heavy industry; in the Third Plan (1961-66) it was application of science and technology to agriculture with emphasis on the development of medium-size industries. The Fourth Plan (1969-74) and Fifth Plan (1974-79) used these vehicles but with different emphases.[5] But the early plans rarely contained specific suggestions or policies for spatial development.[6]

However, this does not indicate a complete lack of awareness of the spatial aspects of planning. Spatial planning cropped up in the deliberations of the departments or the ministries whose development programs had a definite spatial angle, notably the Department of Urban Development in the Ministry of Works and Housing and the Ministry of Industrial Development.[7] In addition, the National Council of Applied Economic Research (NCAER), the Town and Country Planning Organization (TCPO), and the Office of the Registrar General of India were also deeply aware of the spatial implications of the national plans.[8]

The following observations about the spatial nature of the Indian economy are gleaned from the literature of those ministries and organizations: first, there are different levels of economic development in India; second, these levels of development are mainly determined by the processes of urbanization and industrialization; third, the urban centers (which include metropolitan cities, urban agglomerations, and towns of various sizes) need to be strengthened by improving their overall infrastructure, which when completed would facilitate a smooth urban-rural integration; fourth, the industrial centers are capable of integrating their rural hinterlands; and fifth, the existing infrastructural gaps in the urban and industrial centers need to be filled quickly in order to achieve urban-rural integration and to facilitate the trickle-down process. This in turn would help attain the twin objectives of economic growth and social justice.

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[5] India, Planning Commission, *First Five Year Plan* (Delhi: Publications Division, 1952); India, Planning Commission, *Second Five Year Plan* (Delhi: Manager of Publications, 1956); India, Planning Commission, *Third Five Year Plan* (Delhi: Manager of Publications, 1961); India, Committee on Plan Projects, *Report on Industrial Townships* (Delhi: Manager of Publications, 1961); India, Planning Commission, *Fourth Five Year Plan* (Delhi: Manager of Publications, 1970); and India, Planning Commission, *Fifth Five Year Plan* (New Delhi: Controller of Publications, 1976).

[6] John P. Lewis, *Quiet Crisis in India* (Washington, D.C.: The Brookings Institution, 1962).

[7] India, Ministry of Industrial Development, *Report of the Industrial Licensing Policy Inquiry Committee* (Delhi: Manager of Publications, 1969); India, Ministry of Industrial Development, *Report of the Working Group on the Identification of Backward Areas* (Delhi: Manager of Publications, 1969); India, Ministry of Industrial Development, *Report of the Working Group to Recommend Fiscal and Financial Incentives for Starting Industries in Backward Areas* (Delhi: Manager of Publications, 1969).

[8] National Council of Applied Economic Research, *Market Towns and Spatial Development in India* (New Delhi: NCAER, 1965); India, Town and Country Planning Organisation, *Planning Regions of India* (Delhi: Manager of Publications, 1968); India, Town and Country Planning Organisation, *Report on Damodar Subarnarekha Sub-Region* (New Delhi: Controller of Publications, 1971); Town and Country Planning Organisation, *Regional Imbalances in India: Some Policy Issues and Problems* (New Delhi: Controller of Publications, 1971); P. Sengupta and G. Sdasyuk, *Economic Regionalisation of India: Problems and Approaches*, Census of India Technical Paper (Delhi: Manager of Publications, 1968).

Metropolitan Cities and Urban Agglomerations

Metropolitan cities, urban agglomerations, and large towns have been described in Indian planning literature as agents for transforming the rural countryside. Urban agglomerations are urban areas which have more than one urban core (city). For instance, Hyderabad-Secunderabad is an urban agglomeration because the two cities are a part of an urban unit. The Hyderabad metropolitan region includes the urban agglomeration and a number of villages.

The Registrar General published a detailed account of economic development, which notes that there are large areas of India near urban centers that are devoid of basic civic amenities.[9] Early planners assumed that if urban centers had the necessary industrial and socioeconomic infrastructure, the surrounding countryside would benefit. Thus, for many years the strengthening of the urban core (the area within municipal limits) and the urban system (a number of urban cores and their surrounding rural areas linked together by trade and functions) with adequate facilities was considered a viable strategy.[10]

Generally, a few metropolitan planners have been able to distinguish at the planning stages the difference between the problems of an urban core and those of a region as a whole. At the stage of implementation, however, there have been spectacular failures. In Delhi the failure was due to the lack of coordination of the planning objectives of the metropolitan area and those of the surrounding towns. In Calcutta, the idea of linking together the development of the hierarchy of towns throughout the Calcutta Metropolitan District was abandoned in favor of individual area development plans for some towns. In addition, it was not recognized that metropolitan problems differ from one area to another, that urban agglomerations are not the same as metropolitan areas, and that the objectives of metropolitan planning are not identical throughout India.

There were also problems of coordination between urban and rural sectors within a metropolitan plan, between the local and regional aspects of development schemes, between interdistrict and sometimes interstate administrations, and between state and national governments. All of these problems were related to administrative control and financial authority. As a consequence, planning in the metropolitan areas has not been able to solve even the basic regional problems. A number of studies have demonstrated that many of the basic regional amenities, such as education, health, communications, trade, banking, transport, agricultural inputs, retail services, and veterinary services are physically inaccessible to most of the villagers in a typical metropolitan region.[11] Moreover, no efforts have been made to improve this situation. On the other hand, such urban (in-town) amenities as roads, water supply, electricity, parking facilities, shopping centers, residential areas, recreational facilities, education, health, and transport are continually being improved within the urban municipal limits of the same metropolitan regions.[12] It must be acknowledged, however, that even if there were an efficient integration of administrative and financial responsibilities, the spatial integration of an urban core with its rural

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[9] Ashok Mitra, *Levels of Regional Development in India*, Census of India Technical Paper (Delhi: Manager of Publications, 1961); Sengupta and Sdasyuk, *Economic Regionalisation.*

[10] National Council of Applied Economic Research, *Market Towns;* India, Town and Country Planning Organisation, *Planning Regions;* India, Town and Country Planning Organisation, *Regional Imbalances;* E. A. J. Johnson, *The Organization of Space in Developing Countries* (Cambridge, Mass.: Harvard University Press, 1970); Misra, Sundaram, and Rao, *Regional Development Planning;* K. V. Sundaram, *Urban and Regional Planning in India* (New Delhi: Vikas, 1977); R. P. Misra, ed., *Million Cities of India* (New Delhi: Vikas, 1978).

[11] Sudhir Wanmali and Waheeduddin Khan, "Role of Location in Regional Planning with Particular Reference to the Provision of Social Facilities," *Behavioural Sciences and Community Development* 4 (1970): 65-91; S. M. Alam and W. Khan, *Metropolitan Hyderabad and Its Region: A Strategy for Development* (Bombay: Asia Publishing House, 1972); Sudhir Wanmali, "Popular Participation and Organisation, Distribution and Consumption of Social Services and Facilities in Rural Human Settlements: An Indian Experience," New York, Social Development Division of the United Nations, Institutional Development and Popular Participation Section, 1976. (Mimeographed.).

[12] Alam and Khan, *Metropolitan Hyderabad;* Misra, *Million Cities;* N. Harris, *Economic Development, Cities and Planning: The Case of Bombay* (Bombay: Oxford University Press, 1978).

periphery would still be a difficult task for the reasons described earlier.

Industrial Centers

Industrialization was also considered a means of transforming rural India.[13] A 1961 economic development study noted that some areas in India were rich in resources but were very poor industrially.[14] As a result, new basic and heavy industries were located in these areas. New industrial towns and townships were established for manufacturing industrial products such as steel, copper, chemicals and petrochemicals, aluminum, machine tools, uranium, atomic energy, and engineering, electrical, and defense products. The ease with which factor and product links were identified and established in these industries added to the myth that these units are also capable of integrating their geographical regions quickly. But what these new industrial locations achieved for regional development (apart from a spectacular growth in overall industrial production) was a rudimentary form of integration with the surrounding geographical regions.

First, during the period of construction of these industrial centers, a large part of the rural population was employed as labor on the building sites. Second, the rural areas provided the inhabitants of these new industrial centers with vegetables, fruits, milk and milk products, meat, poultry, and foodgrains. The nonfood producing population of the industrial centers represented a captive demand for these goods. The new industrial centers were good company towns, having excellent facilities for education, health, communications, transport, banking, and wholesale and retail trade, but they were rarely used by anyone except the employees of the industrial units. Although these were the very services that were needed to effect a quick integration of a center and its rural hinterland, the industrial centers tended to keep these services to themselves, preventing the rural areas from integrating with them. Whatever the reasons, the industrial centers often did little to serve the rural areas around them.[15]

Agro-based industries, on the other hand, were fairly evenly distributed in rural India. These ranged from small processing units rooted firmly in their agricultural regions to complex finished-product units in big cities. The links between the small and the large units date back to the turn of the century. The new agro-processing units were encouraged to locate in large- and medium-sized towns. The trading and commercial links of these towns with their immediate rural surroundings became very strong.

A Critique of Urban and Industrial Models

In the analyses of the spatial impact of urban and industrial development and, indeed, in the new National Urbanization Policy, urban centers, urban hierarchies, and urban-rural relationships have played an important part.[16] It was assumed by the exponents of the urban-based models of spatial development that there exists in India an interconnected system of metropolitan cities that is supported by a system of large- and medium-sized towns. Rural areas within these two systems were assumed to be geographically disorganized.[17] The planners felt, therefore, that if all growth and development inputs were located in metropolitan and other urban areas, their

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[13] Mitra, *Level of Regional Development;* Sengupta and Sdasyuk, *Economic Regionalisation;* India, Ministry of Industrial Development, *Report on the Identification of Backward Areas;* India, Ministry of Industrial Development, *Report to the Working Group to Recommend Fiscal and Financial Incentives;* India, Ministry of Health, *Report of the Rural-Urban Relationship Committee* (Delhi: Manager of Publications, 1969).

[14] Mitra, *Levels of Regional Development.*

[15] Sudhir Wanmali, *Periodic Markets and Rural Development in India* (New Delhi: B. R. Publishing Corporation, 1981); Sudhir Wanmali and A. Ghosh, "Pattern of Distribution of Consumer Goods in Rural India," *Management and Labour Studies* 1 (1975): 74-94.

[16] India, Ministry of Works and Housing, *National Urbanisation Policy* (New Delhi: Controller of Publications, 1975).

[17] National Council of Applied Economic Research, *Market Towns;* Johnson, *The Organization of Space.*

interconnected nature would help the distribution and diffusion of these inputs in the rural areas.[18] This distribution was to have been achieved within a metropolitan and urban region from the metropolis and the town outward and downward to the rural hinterlands in a hierarchical manner, and within a system of metropolitan and urban regions, from higher-order metropolitan and urban regions downward to lower-order metropolitan and urban regions.

There is enough empirical evidence, however, to suggest that urban-based models of spatial development would not follow this pattern for a number of reasons. First, there exist wide demographic, functional, and spatial gaps in the urban systems of India.[19] Second, these gaps effectively prevent the outward and downward spread of development inputs. Third, there is "functional friction" between the urban and rural sectors of metropolitan areas that has prevented the rural hinterlands from deriving the benefits of a metropolitan economy.[20] Fourth, the growth in heavy and basic industries does not diffuse to all the centers in the surrounding region but primarily to those where the factors of production are located. Fifth, the types of development inputs that are in high demand in the rural areas are services such as education, health, transport, communications, trade, agricultural supplies and services, retail outlets, and veterinary service.[21] These appear to be located in the urban centers, which in turn are largely inaccessible to the rural areas. Finally, the metropolitan and urban regions in India are not hierarchically well connected.[22]

Thus, the spatial impact of urban and industrial models on the rural countryside during the period was rather limited. Another reason for this was the disinclination on the part of the development planners to consider agriculture as a growth sector of the economy. There was also little attempt made until the Fourth Five-Year Plan to identify and strengthen the infrastructural base for a planned development of the agricultural sector.

Spatial Impact of Rural Development

Policies of rural development also rely heavily on budgetary allocations and such time horizons as five-year plans and annual plans as means of achieving their planned objectives. As long as differences exist between states and districts within states and in budget allocations, the spatial impact of the development programs will differ between and within states.

Community Development Program

The First Five-Year Plan saw the introduction of the community development program in rural India. It was the first comprehensive attempt to solve the problems of rural India after Independence. The program itself was a mere listing of priorities of rural development. It was launched in

[18] National Council of Applied Economic Research, *Market Towns;* Johnson, *The Organization of Space;* Misra, Sundaram, and Rao, *Regional Development Planning;* Sundaram, *Urban and Regional Planning.*

[19] Sudhir Wanmali, "Regional Development, Regional Planning and the Hierarchy of Towns," *Bombay Geographical Magazine* 15 (1967): 1-30; Sudhir Wanmali, "Urbanisation and Regional Policy," *Management and Labour Studies* 1 (1975): 6-15; Wanmali, *Periodic Markets;* Waheeduddin Khan and Sudhir Wanmali, "Impact of Linguistic Reorganisation of States on City-Size Distribution in Peninsular India," in *Economic and Socio-Cultural Dimensions of Regionalisation,* ed. V. V. Poksheskivsky and B. K. Roy Burman (New Delhi: Controller of Publications, 1972), pp. 451-472.

[20] Sudhir Wanmali, *Regional Planning for Social Facilities: An Examination of Central Place Concepts and their Application: A Case Study of Eastern Maharashtra* (Hyderabad: National Institute of Community Development, 1970); Wanmali, *Popular Participation;* Wanmali and Khan, "Role of Location;" Alam and Khan, *Metropolitan Hyderabad;* Harris, *Economic Development.*

[21] Wanmali and Khan, "Role of Location;" L. K. Sen et al., *Planning Rural Growth Centres for Integrated Area Development: A Study in Miryalguda Taluka* (Hyderabad: National Institute of Community Development, 1971); Alam and Khan, *Metropolitan Hyderabad;* Misra, Sundaram, and Rao, *Regional Development Planning;* Sudhir Wanmali, "Rural Service Centres in India: Present Identification and Acceptance of Extension," *Area* 7 (1975): 167-170.

[22] G. P. Chapman and Sudhir Wanmali, "Urban-Rural Relationships in India: A Macro-Scale Approach Using Population Potentials," *Geoforum* 12 (1981): 19-44.

October 1952 on a pilot scale, including 52 blocks. By the end of the Plan period, however, the entire country was covered with a network of 5,004 community development blocks. The program aimed at changing the attitudes of the people in rural areas and preparing them for an era of rural development and planning.[23]

Realizing that the community development program was not providing the necessary impetus to the foremost national objective—increased food production—the government chose to give higher priority to the development of agriculture in the Second Five-Year Plan. This also meant a change in the administrative and organizational structure of the community development program, which was expected to be the vehicle for higher agricultural production. A more direct role, for example, was given to various technical departments at the district level.

During the Third Five-Year Plan, a further element of selectivity was introduced in the agricultural development program. Some districts and some crops within districts were chosen for preferential assistance in the overall drive for higher agricultural production.[24] The hybrid and high-yielding varieties of wheat, paddy, jowar, bajra, cotton, groundnuts, castor, and sugarcane were released to the farmers during this and subsequent plan periods. By the end of the Fourth Plan, the rural areas in India had experienced a transformation in some regions, once again based on selected districts. This meant that development in other districts was unbalanced. The scheme, therefore, became more localized and specialized with heavy reliance on pilot projects located in districts where the returns on investment were not only higher but quicker. It was believed that these demonstrations would give rise to improvements in the districts that were geographically adjacent to the pilot projects. Even this belief was not fulfilled: the expected spread of demonstration effects did not take place, and this further accentuated the unbalanced development. The community development blocks and districts continue, however, to provide the administrative framework for various schemes of rural development. The spatial impact of these schemes is thus felt primarily at the district level.

The Panchayati Raj Program

Along with the community development program, the Government of India established a structure of rural local government, the Panchayati Raj program. The process was started in 1958 and was completed in 1962.[25] This program now covers about 98 percent of the rural population through a network of about 230,000 *gram panchayats* (villages), 5,004 *panchayat samitis* (community-development blocks), and about 300 *zilla parishads* (districts). Representatives of the people selected at each of these levels confer with their administrative and technical superiors to arrive at development priorities for their areas of jurisdiction.

The perception of the Panchayati Raj, however, varied from one group of people to another. The development administrators saw these institutions as the instruments for bringing the fruits of science and technology to the rural areas; the rural elite saw them as a means of legitimizing their traditional power base; and the weaker sections of the society (if they were not too skeptical) saw them as vehicles for voicing their fears and grievances.[26]

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[23] B. Mukherjee, *Community Development in India* (Bombay: Orient Longman Ltd., 1967).

[24] Guy Hunter and A. Bottrall, eds., *Serving the Small Farmer: Policy Choices in Indian Agriculture* (Hyderabad: National Institute of Community Development, 1974).

[25] See R. Parekh, *Report of the Committee on Democratic Decentralisation* (Ahmedabad: Government of Gujarat Press, 1964); V. P. Naik, *Report of the Committee on Democratic Decentralisation* (Bombay: Government of Maharashtra Press, 1961); Sadiq Ali, *Report of the Study Team on Panchayati Raj* (Jaipur: Rajasthan Government Press, 1964); P. Pai, *Report of the High Power Committee on the Reorganisation of Panchayat Samiti Blocks and Allied Matters* (Hyderabad: Andhra Pradesh Government Press, 1964); M. T. Raju, *Report of the Committee Constituted to Examine the Question of Organisation of the District Administration* (Hyderabad: Andhra Pradesh Press, 1964).

[26] H. Hoffsomer and S. C. Dubey, *A Sociological Study of Panchayati Raj* (Hyderabad: National Institute of Community Development, 1961); L. K. Sen, V. R. Gaikwad, and G. L. Verma, *People's Image of Community Development and Panchayati Raj* (Hyderabad: National Institute of Community Development, 1967); B. H. Farmer, ed., *Green Revolution? Technology and Change in Rice Growing Areas of Tamilnadu and Sri Lanka* (London: Macmillan and Co., 1977).

There are variations from state to state in the operation of the Panchayati Raj institutions, which reflect not only adjustments to local conditions but also the commitment of the state government to popular participation in the planning process.[27] Nevertheless, a definite pattern of spatial impact in rural areas and within districts was identified by the end of the Third Five-Year Plan. By then, the district was a unit of revenue administration, of development administration (for the Community Development program), and of local government (for the Panchayati Raj program). In this respect, at least, the states that had effectively devolved administrative and financial powers to these local government institutions showed remarkable progress in rural development.

By 1969, as in the case of the urban and industrial-based models of rural/regional development, the Government of India was aware that the programs of rural development were accentuating regional imbalances. In other words, the normal channels for distribution of funds were not delivering goods effectively, because of failures in policymaking or coordination or both. In order to correct these imbalances, the central government sponsored special projects for hill areas, tribal areas, and drought-prone areas as well as for small and marginal farmers and agricultural laborers. More significantly, an attempt was made to identify the characteristic features of spatial organization in rural India by initiating a pilot research project on rural growth centers.[28]

Rural Growth Centers

The research project on rural growth centers, the first to be introduced in India as a matter of spatial policy, was also unusual in its approach to the problem of rural development. It looked at rural India from the village viewpoint and not from that of the urban centers alone. The aim of the pilot project was to evolve a broad research methodology for identifying existing and potential growth centers in rural areas and to indicate how these centers could be meaningfully woven into the framework of a district plan, thus assisting the process of planning from below.[29] The reports from the 20 pilot projects throughout India were unanimous in their findings that it is possible to use some form of locational analysis in a rural region, together with studies of resource endowment and commodity flows, to identify spatial relations between rural settlements. The results were used for recommending policy planning measures for service provision to the rural areas covered by the pilot projects.

All of the studies included in the pilot project indicated clearly that certain services tended to cluster within definite population size groups; as population increased, more complex services were encountered. The higher-order service centers tended to have extensive service areas, whereas the service areas of the lower-order service centers tended to nest under those of the higher-order service centers; that is, the latter were contained by the former. For individual services, such as branch post offices, centers for medical checkups, secondary schools, branches of nationalized banks, centers for distributing agricultural inputs (such as fertilizers, pesticides, and seeds) and trade, there existed definite size ranges of population and service areas. The settlements with populations below these ranges did not have that particular service, whereas the settlements with population above the ranges always possessed the service. Although, as is to be expected, the size ranges of population and of service areas varied from one region to another, the concepts were universally applicable. All the studies noted that there were serious gaps in the provision of services in rural areas. In some studies the analysis recommended locations for a number of services with a view to reducing the degree of imbalance.

The Government of India and the state

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[27] P. H. Appleby, "Some Thoughts on Decentralised Democracy," *Indian Journal of Public Administration* 18 (1962): 443-455; G. Jacob, ed., *Readings on Panchayati Raj* (Hyderabad: National Institute of Community Development, 1962); T. N. Chaturvedi, "Case for a Change in the Pattern of Development at Panchayati Raj Level," Seminar on Community Development and Panchayati Raj in India, Jaipur, 1969. (Mimeographed.)

[28] India, Planning Commission, *Fourth Five Year Plan.*

[29] India, Planning Commission, *Fourth Five Year Plan;* Sen et al., *Planning Rural Growth Centres.*

governments were justifiably encouraged by the results of the pilot project. The exercise could be conducted periodically with the help of planned funds for a district and could be adjusted to the existing time horizons of the five-year plans. Furthermore, the results could be viewed in the context of local and relevant spatial relationships rather than as a part of a distant urban system. At the end of the Fourth Plan period, the project was handed over to the state governments with the recommendation that they should initiate similar exercises in other districts. With the exception of Andhra Pradesh, however, no state has seriously followed up on this recommendation.

4

THEORIES OF SERVICE PROVISION

Current literature on location theories and regional development maintains that innovations (goods, services, or outlets providing them) are passed down from one level of an urban hierarchy to successively lower ones. At times, however, instead of trickling down the urban hierarchy, growth is concentrated in a few large cities, which opens up a wide gap between these cities and the rural countryside.[30] According to some location theories, such a gap is best dealt with by creating more centers to fill the appropriate voids in the settlement system.

But Friedmann and Weaver (and a few before them) have observed that even after they are located, growth centers in backward regions frequently do not grow. The inequality remains ingrained in the regional landscape.[31] According to Friedmann and Weaver, the urban bias of the location theories prevents a proper regional spread of development. Not enough attention has been paid to what has been taking place in the countryside to properly locate growth centers. Other studies on development and planning in the Third World have also noted this urban bias.[32]

Friedmann and Weaver also contend that in the early growth center studies too much emphasis was placed on the diffusion of urban consumer goods (patents, television sets, waterworks, radio stations, and street railways to name a few) to facilitate a proper understanding of the distribution and spread of immobile services, such as banks, post offices, fertilizer distribution centers, and veterinary dispensaries. The latter, in their opinion, are more relevant to the development of rural areas through the development of agriculture. In the new Friedmannian landscape, growth "filters upward" in response to agricultural development.[33]

The Modified Growth-Pole Hypothesis

Examples of urban bias or unwillingness to look at rural problems from the village viewpoint abound in the Indian literature on regional development. A number of urban-based alternatives have been put forward as a means of mitigating regional problems in agricultural, industrial, rural, urban, and tribal regions.[34] One such attempt demonstrates how wrong assumptions about rural space can render a whole exercise impracticable. The modified growth-pole hypothesis of Misra, Rao, and Sundaram is a mixture of three theories with a common thread: those of central places, growth poles, and spatial diffusion.[35]

The central place theory maintains that there is a hierarchy of central places ranging from a metropolitan city to a village.[36] There

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[30] B. J. L. Berry, "Relationship Between Regional Economic Development and the Urban System," *Tijdschrift voor Economische en Sociale Geografie* 60 (1969): 283-307.

[31] J. R. Friedmann and C. Weaver, *Territory and Function: The Evolution of Regional Planning* (London: Arnold, 1979); H. Brookfield, *Interdependent Development* (London: Methuen Press, 1975); H. W. Richardson, "Regional Development Policy in Spain," *Urban Studies* 8 (1971): 39-53.

[32] M. Lipton, "Strategy for Agriculture: Urban Bias and Rural Planning," in *The Crisis of Indian Planning*, eds., Paul Streeten and M. Lipton (Oxford: Oxford University Press, 1968).

[33] Friedmann and Weaver, *Territory and Function*.

[34] See National Council of Applied Economic Research, *Market Towns;* Johnson, *The Organization of Space;* P. B. Desai, I. M. Grossack, and K. N. Sharma, eds., *Regional Perspectives of Industrial and Urban Growth: The Case of Kanpur* (Bombay: Macmillan and Co., 1969); R. P. Misra, V. L. S. P. Rao, and K. V. Sundaram, *Growth Poles and Growth Centers in Regional Planning and Development in India*, parts 1 and 2 (Geneva: United Nations Research Institute of Social Development, 1970); Misra, Sundaram, and Rao, *Regional Development Planning*.

[35] Misra, Rao, and Sundaram, *Growth Poles;* Misra, Sundaram, and Rao, *Regional Development Planning*.

[36] Walter Christaller, *Central Places in Southern Germany* (Englewood Cliffs, N. J.: Prentice-Hall, 1966); A. Loesch, *The Economics of Location* (New Haven, Conn.: Yale University Press, 1954).

is one superior center where all goods are produced and sold. There are specialization, division of labor, and trade between centers. The lower-order centers produce and sell lower-order goods; the higher-order centers have more activities, produce a wider range of goods, and handle more business. Distance, in terms of transportation and communication costs, plays an important role in the location of central places; smaller places tend to locate at the center of triangles formed by places of higher order or halfway between two larger centers.

According to other elements of the central place theory, service areas are hexagonal; the centers are hierarchically ordered, with increasing numbers of centers as one goes down in the hierarchy; and the hierarchy entails nesting. That is, several lower-order services (primary schools, for example) will feed into a higher-order service (a middle school). Hexagonal service areas, which are a purely theoretical concept, assure that the boundaries of adjacent service areas will touch without overlapping or leaving gaps in service provision, as will circular service areas. In reality, of course, physical properties of the land or other socioeconomic factors influence the shapes of service areas.

According to the growth-pole theory, there are growth poles from which centrifugal forces emanate and to which centripetal forces are attracted.[37] Each pole has a proper field of forces and each pole has leading industries that are innovative and growth-generating. These belong to a fast-growing sector. The poles generate development in either their abstract or geographical environments through forward and backward links.

Thus, in an abstract sense, a steel manufacturing company will influence mining activities in coal, limestone, and iron ore. If the manufacturing company grows, then the mining concerns are also likely to grow. In a spatial or geographical sense, the changes in steel manufacturing result and influence changes in, say, jobs, business establishments, and incomes in the locality of the steel mills. The mining industry is a backward link of the steel manufacturing company; its forward links are companies that use steel in manufacturing other products such as automobiles.

The spatial diffusion theory holds that diffusion of innovations takes place in a social system that is localized in abstract space as well as in geographical space.[38] Mass media and personal contacts are the channels through which innovations are diffused, whereas distance from these channels acts as a barrier to the diffusion. The mean field of communication is determined by the distance over which such channels exist. Communication fields are varied and hierarchical, and innovations move from a higher to a lower order of communication fields. If there is a break in the hierarchy of settlements, the process of diffusion is halted.

Misra, Sundaram, and Rao simply integrate the features of these three theories and present a growth-pole hypothesis that is modified for Indian conditions.[39] They propose a five-tier hierarchy of "growth foci," which consists of central villages at the local level, service centers at the micro-regional level, growth points at the subregional level, growth centers at the regional level, and growth poles at the national level. The functional, demographic, and spatial features of these growth foci are sometimes not described. But this is only a minor problem of the modified hypothesis. The real problem begins when one is faced with the definition and application of the new hypothesis.

A Critique

In reviewing their features, it appears that certain interpretations of these three theories were accepted by Misra, Rao, and Sundaram, but their reasons for selecting these particular interpretations are not explained. This becomes apparent when the

[37] F. Perroux, "Note sur la Notion des Polles de Croissance," *Economie Appliquee*, 1 and 2 (1955): 307-320; J. R. Lasuen, "On Growth Poles," *Urban Studies* 6 (1969): 136-161; and J. R. Boudeville, *Problems of Regional Economic Planning* (Edinburgh: Edinburgh University Press, 1966).

[38] T. Hagerstrand, *Innovation Diffusion as a Spatial Process* (Chicago: University of Chicago Press, 1967).

[39] Misra, Rao, and Sundaram, *Growth Poles:* Misra, Sundaram, and Rao, *Regional Development Planning.*

dynamics of their scheme are analyzed. For example, they accept the geographical connotation of Boudeville's interpretation of growth poles rather than that of Perroux, which is more abstract.[40] And they recommend a growth pole that has a tertiary manufacturing base, but they do not make it clear whether it is the innovative industry or is in addition to or instead of another innovative industry at the location of the growth pole. Further, they appear to favor Loesch's interpretation of the central place system but, in recommending the services for central villages, service centers, and the growth points, they prefer Christaller's scheme, where services are immobile.[41]

At the lower levels of their hierarchy of growth foci, Misra, Rao, and Sundaram identify and recommend central villages and service centers. The jump from "growth" (in foci) to "service" (in centers) is not only unexpected but unexplained. Central villages, which appear to have been added to the scheme as an afterthought (they are absent in the 1970 scheme but mentioned in the 1974 scheme), are described as the "lowest level central place in a system of growth foci." Service centers are described as centers of diffusion of innovations without resolving the well-known basic issue in diffusion research, which relates to transfer of information flows from household and neighborhood to hierarchical levels in space and time.[42]

The growth points, which are small urban centers, are envisaged as not very different from market towns so far as their coverage and functions are concerned. Thus, "growth" in this modified hypothesis, at the level of a growth point, becomes an aspect of both a demographic (town) and a functional (market) entity.[43] An element of growth in the scheme of growth foci is introduced for the first time with the location of agro-based industries in them. Being resource-based, these industries have many forward links and therefore do not have any innovative force of their own.

The growth centers, which lie fourth from the bottom or second from the top in the hierarchy of growth foci and which are supposed to operate at the regional level, are described as countermagnets to urban centers such as Bombay, Calcutta, and New Delhi. They are also described as the satellite towns of these cities. The authors do not explain how growth centers can be both countermagnets and satellite towns.[44] These growth centers are described as "full grown" urban centers that will produce many of the agricultural inputs. (In what sense they are full grown is not defined.) They are also described as having higher-order socio-economic services and as providing an industrial resource base (rather than an agricultural base like the growth points a tier below). Misra, Rao, and Sundaram contend that they act as shock absorbers in the rural-to-metropolitan migration by providing jobs for the surplus labor from the service areas of growth points, service centers, and central villages. The apex of the hierarchy of the growth foci is the growth pole, which is expected to have a population of 500,000 or more.[45]

The number of units at each tier required to facilitate comprehensive development in India are: central villages, 100,000; service centers, 20,000; growth points, 4,000; growth centers, 500; and growth poles, 30. These are expected to serve the local region, the microregion, the subregion, the region, and the nation respectively. The size of these units, however, is somewhat unclear. There

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[40] J. R. Boudeville, *Problems of Regional Economic Planning;* Perroux, "Note sur la Notion."

[41] Loesch, *The Economics of Location;* Christaller, *Central Places;* and Misra, Sundaram, and Rao, *Regional Development Planning.*

[42] A. R. Pred, *The Spatial Dynamics of U.S. Urban-Industrial Growth 1800-1914: Interpretive and Theoretical Essays* (Cambridge, Mass.: Harvard University Press, 1966); P. O. Pedersen, "Innovation Diffusion in Urban Systems," *Lund Studies in Geography,* Series B, vol. 37, 1971; T. Hermansen, "Development Poles and Related Theories," in *Growth Centers and Regional Economic Development,* ed. N. M. Hansen (New York: The Free Press, 1972).

[43] The basic features of these market towns, which were recommended by Johnson and those who followed him, were examined by the author and found to be extremely confusing. National Council of Applied Economic Research, *Market Towns;* Johnson, *Organization of Space;* Misra, Rao, and Sundaram, *Growth Poles;* Misra, Sundaram, and Rao, *Regional Development;* and Wanmali, *Periodic Markets.*

[44] Misra, Rao, and Sundaram, *Growth Poles;* Misra, Sundaram, and Rao, *Regional Development Planning.*

[45] Misra, Rao, and Sundaram, *Growth Poles;* Misra, Sundaram, and Rao, *Regional Development Planning.*

is a vague basis for identifying the size of their service areas, but their extent appears at variance with what is recommended and practical. For example, planning regions of India have been identified, but only at the macro and meso levels: the former are interstate regions and the latter are intrastate regions. Both are aggregated at the district level. One must assume that subregions, microregions, and local regions would be established below the district level.

The method of identification of the regions is not the only element that is elusive; the identification of growth foci is also fraught with problems. No mention is made of the criterion for the identification of central villages, which will strike a casual observer as being the base of the pyramid. This strengthens the impression that these were added as an afterthought.[46]

Misra, Sundaram, and Rao further suggest that growth points should act as substitutes for many of the present-day weekly markets in rural India because the latter, it is implied, are disorganized entities. Much of the trade in rural India is carried out through a network of weekly markets, which act as centers for buying and selling both rural and urban goods. Although there is no denying that a little improvement in their administration would make them more efficient, there is no way that substitute marketing systems can soon be established. Instead, the functional and spatial features of these periodic markets should be used to establish mobile services for health, banking, agricultural inputs, animal husbandry, and communications.[47] This would reduce the cost of providing and maintaining fixed facilities for these services. Many of the services recommended by Misra, Rao, and Sundaram for location in central villages and service centers could be made available through a network of weekly markets.

The most distressing point about the modified growth-pole hypothesis, however, is fundamental to all development planning research efforts, particularly in the Third World. The authors appear to recommend a scheme of growth foci without giving sufficient weight to a rural/village/grass-roots point of view. Their hypothesis is top-heavy with urban characteristics. The concepts, definitions, and spatial dynamics of central villages and service centers are not at all clear. Considering that these two tiers constitute the base of the pyramid, it looks as though the base is rather weak. The data on which to base the scheme are also lacking. It appears, therefore, that Misra, Rao, and Sundaram describe central villages, service centers, and growth points as mere extensions of an urban system. The extensions emerge in the general scheme as chaotic, and much has been made of this chaotic nature.[48] Moreover, they show the Indian urban system as possessing integrative capacities that some recent studies have found elusive.[49] That equating population size with functional features and spatial relationships is inappropriate is noted elsewhere; it is enough to say here that such confusions in definition, arising out of incorrect interpretations of original concepts and their modification, have considerably reduced the value of the work on growth centers for spatial planning in India.[50]

In sum, all of the policies and theories examined in this and the previous chapter are inadequate for prescribing solutions for rural problems, because of their overwhelming urban bias. Rural solutions to rural problems do, however, exist in the body of work on the spatial and economic characteristics of rural India.

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[46] Misra, Rao, and Sundaram, *Growth Poles;* Misra, Sundaram, and Rao, *Regional Development Planning.*

[47] Wanmali, *Periodic Markets.*

[48] National Council of Applied Economic Research, *Market Towns;* Johnson, *Organization of Space.*

[49] Sudhir Wanmali, "The Regulated and Periodic Markets and Rural Development in India," *Transactions of the Institute of British Geographers* 5 New Series (1980): 446-486; Wanmali, *Periodic Markets;* and Chapman and Wanmali, "Urban-Rural Relationships."

[50] Wanmali, *Periodic Markets.*

5

ECONOMY OF THE STUDY AREA

General Features

Miryalguda is one of seven talukas of the Nalgonda District of Andhra Pradesh. It is located between 16°34′ to 17°06′ north latitude and 79°10′ to 79°41′ east longitude. It is bounded on the north by Nalgonda Taluka, on the east by the River Musi and the talukas Suryapet and Huzurnagar, and on the west by Devarkonda Taluka. Beyond the southern boundary formed by the River Krishna lies Guntur District (see Figure 1).

The Miryalguda Taluka extends over an area of 762.4 square miles. Its population was 232,366 in 1971.[51] There are 156 settlements in the taluka, of which two are towns: Miryalguda, the headquarters of the taluka, and Vijayapuri, the headquarters of NSP (see Figure 2 and the Appendix). The climate of the taluka is arid to semiarid and, until the introduction of NSP, it was one of the major drought-prone areas of the state. Annual rainfall is about 745 millimeters (30 inches) and is concentrated between June and September.

The taluka can be divided into three main physiographic areas: (1) the low areas of the Southeast, (2) the hilly areas of the Southwest and the high areas of the North, and (3) the gently sloping plains of the central tract (Figure 3). The land below 300 feet altitude and other areas bordering the rivers Krishna and Musi can be defined as the low areas of the Southeast; this valuable agricultural land is covered with black cotton soil and is now irrigated by the NSP canal system. The hilly areas of the Southwest and the high areas of the North are higher than 500 feet in altitude. They cannot be irrigated by the canal system but do have some tanks for irrigation on a local scale. The gently sloping plains in the central part of the taluka, with an altitude of 300-500 feet, are the most significant physiographic feature. These plains are also the main area irrigated by the NSP canal system.

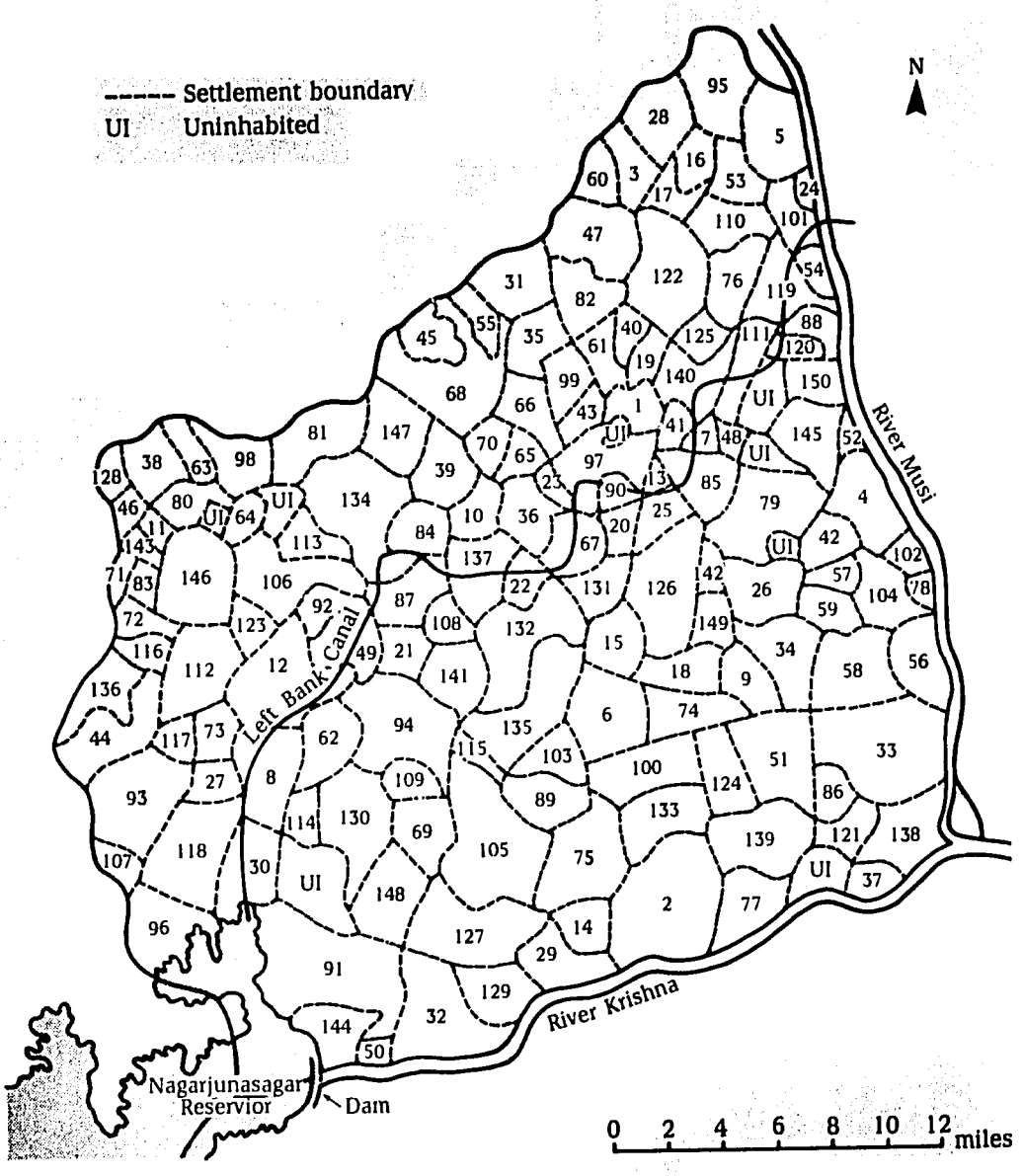
The density of population per square mile in 1971 was 308 persons, as against 295 in 1961, and 84.76 percent live in rural areas. In 1961 that proportion was 70.62 percent. Table 1 gives the distribution of population and settlements in the taluka. Major changes in the settlement system have occurred in the middle and to some extent in the upper segments of the system. The percentage of the population living in settlements of 2,000-4,999 people has risen from 15.42 percent in 1961 to 36.23 percent in 1971. On the other hand, as a consequence of the completion of NSP, the population of Vijayapuri has declined to 16,151 in 1971 from 55,300 in 1961. Nearly 47 percent of the population live in settlements that have a population of fewer than 1,999. Less than 4 percent of the population live in settlements with a population of fewer than 499. Thus, during the 10 years from 1961-71, the settlement system of Miryalguda Taluka showed a progressive tendency to fill up in the middle segment and to stabilize at the top, as can be seen from the straightening of the curve in Figure 4.

Table 2 shows the absolute and percentage changes in the population of the taluka since 1901. The most interesting figures are for the decades 1951-61 and 1961-71, which show a phenomenal increase in the population of the taluka and then a fall in the rate of growth of population. The former is associated with the establishment of NSP and the latter denotes its completion.

The occupational structure of the taluka has undergone considerable change since 1961 as a result of the decline in the population of Vijayapuri. This decline not only increased the percentage of the rural population in the total population from 70.62 percent in 1961 to 84.76 percent in 1971, but

[51] Andhra Pradesh, Office of the Director of Census Operations, *1971 District Census Handbook, Nalgonda District* (Hyderabad: Andhra Pradesh Government Press, 1974).

Figure 2—Settlements in Miryalguda Taluka



Note: The names of the settlements corresponding to the numbers are given in the appendix.

Figure 3—Physiography of Miryalguda Taluka

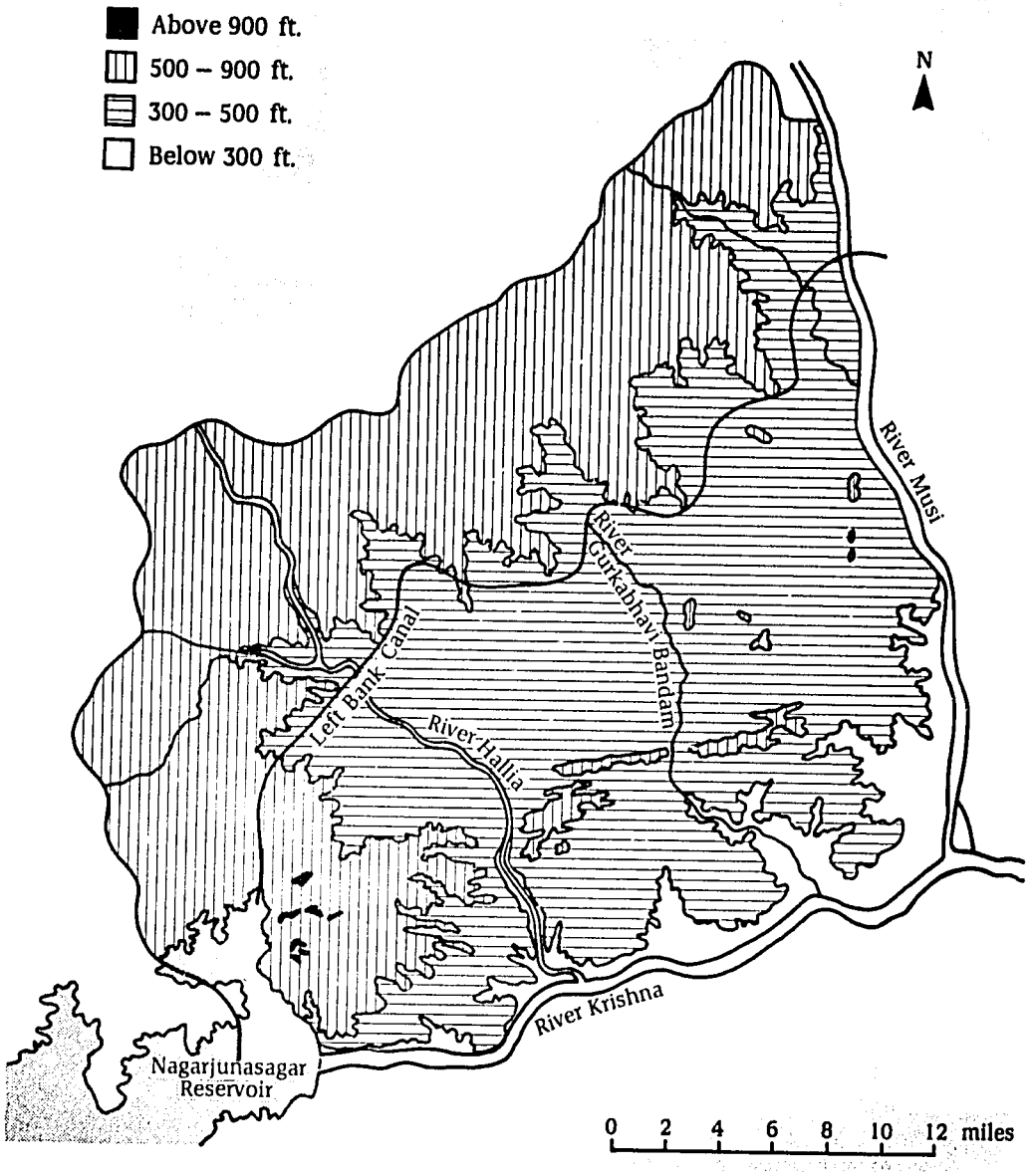


Table 1—Number of settlements and size groups of population, 1961 and 1971

Size Group	Number of Settlements		Population			
	1961	1971	1961	(percent)	1971	(percent)
Less than 199	5	5	717	0.32	687	0.29
200 – 499	29	23	9,954	4.48	8,227	3.55
500 – 999	52	45	37,671	16.94	31,127	13.39
1,000 – 1,999	47	44	68,554	30.84	67,684	29.13
2,000 – 4,999	13	30	34,296	15.43	84,208	36.24
5,000 – 9,999	1	1	5,823	2.62	5,019	2.16
10,000 – 19,999	1	2	10,024	4.50	35,414	15.24
20,000 or more	1	...	55,300	24.87	...	...
Total	149	150	222,339	100.00	232,366	100.00

Sources: Andhra Pradesh, Office of the Director of Census Operations, *1961 District Census Handbook, Nalgonda District* (Hyderabad: Andhra Pradesh Government Press, 1964); Andhra Pradesh, Office of the Director of Census Operations, *1971 District Census Handbook, Nalgonda District* (Hyderabad: Andhra Pradesh Government Press, 1974).

it also affected those occupations most closely associated with the NSP. Thus, one notes a decline in the percentage of those engaged in construction, down from 13.40 percent in 1961 to 1.53 percent in 1971, and those in services, down from 4.35 percent in 1961 to 2.29 percent in 1971. But there have been marked increases in the percentage of those engaged in agriculture, up from 29.46 percent in 1961 to 32.78 percent in 1971 (Table 3). This increase in agriculture is the result of the introduction of irrigation.

Figure 4—Size distribution of settlements, Miryalguda Taluka, 1968-78

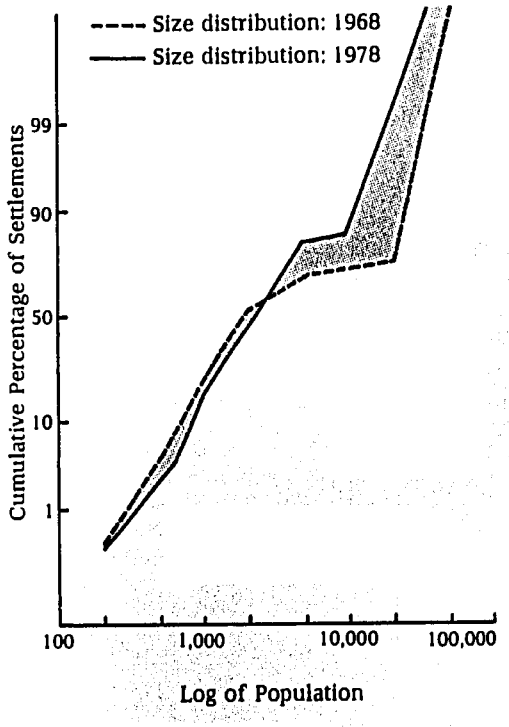


Table 2—Growth of population, census years, 1901-71

Year	Population	Decade Variation	Percentage of Variation
1901	77,347	...	...
1911	92,777	+15,430	+19.95
1921	85,029	-7,748	-8.35
1931	101,377	+16,348	+19.23
1941	114,205	+12,828	+12.65
1951	128,224	+14,019	+12.28
1961	222,339	+94,115	+73.40
1971	232,366	+10,027	+10.65

Sources: Andhra Pradesh, Office of the Director of Census Operations, *1961 District Census Handbook, Nalgonda District* (Hyderabad: Andhra Pradesh Government Press, 1964); Andhra Pradesh, Office of the Director of Census Operations, *1971 District Census Handbook, Nalgonda District* (Hyderabad: Andhra Pradesh Government Press, 1974).

Table 3—Occupational structure, 1961 and 1971

Occupation	1961		1971	
		(percent)		(percent)
Cultivators and agricultural labor	65,498	29.46	76,175	32.79
Mining, quarrying	4,376	1.97	3,923	1.68
Household industry	8,134	3.66	3,142	1.36
Manufacturing	2,059	0.92	1,815	0.78
Construction	29,796	13.40	3,576	1.54
Trade and commerce	4,572	2.06	4,122	1.77
Transport	651	0.29	509	0.22
Services	9,665	4.35	5,328	2.29
Nonworkers	97,588	43.89	133,776	57.57
Total	222,339	100.00	232,366	100.00

Sources: Andhra Pradesh, Office of the Director of Census Operations, *1961 District Census Handbook, Nalgonda District* (Hyderabad: Andhra Pradesh Government Press, 1964); Andhra Pradesh, Office of the Director of Census Operations, *1971 District Census Handbook, Nalgonda District* (Hyderabad: Andhra Pradesh Government Press, 1974).

The trends in the changes of occupational structure in 1951 and the other census years are not easily comparable. This is because the information is grouped differently and nonworkers as a group were not considered separately in the 1951 census. Furthermore, the groups that are considered include dependents also. Thus both nonworkers and dependents are added to the number of those who are genuine workers.

The absolute and percentage figures for 1951 are:

Occupation	1951	
		(percent)
Cultivators of land (wholly owned)	66,567	51.92
Cultivators of land (wholly unowned)	7,558	5.89
Cultivating laborers	21,963	17.13
Noncultivating owners of land	1,331	1.04
Production (other than cultivation)	16,605	12.95
Commerce	4,890	3.81
Transport	365	0.28
Other services	8,945	6.98
Total	128,224	100.00

The increase in the population of the taluka, however, was not uniformly distributed throughout the study area, either by size group of settlement or by individual settlement. For example, the size group of 2,000-4,999 appears to have gained the most at the expense of smaller size groups. Eleven settlements out of 150 decreased in population during the years 1961-71. Almost all of these were associated with the NSP construction program and declined upon its completion. The rest of the settlements gained in population—in some instances quite spectacularly. For example, the average growth in population in the taluka for the years 1961-71 was 369 persons. Forty-two settlements registered an increase larger than this regional average (the largest, of 9,239, was in the town of Miryalguda) and 38 of these were in the irrigated tract (Figure 5).

Regional Economy

As the sectoral allocations demonstrate, irrigation and agriculture are the most important sources of development in the taluka, the district, and the state (Tables 4, 5, and 6).[52] As will be seen, the change in the

[52] Andhra Pradesh, Department of Finance and Planning, *Fifth Five Year Plan: Draft Outline* (Hyderabad: Andhra Pradesh Government Press, 1973); Andhra Pradesh, Bureau of Economics and Statistics, "Nalgonda District," Nalgonda, Andhra Pradesh, 1977. (Mimeographed.)

Figure 5—Changes in population, Miryalguda Taluka, 1968-78

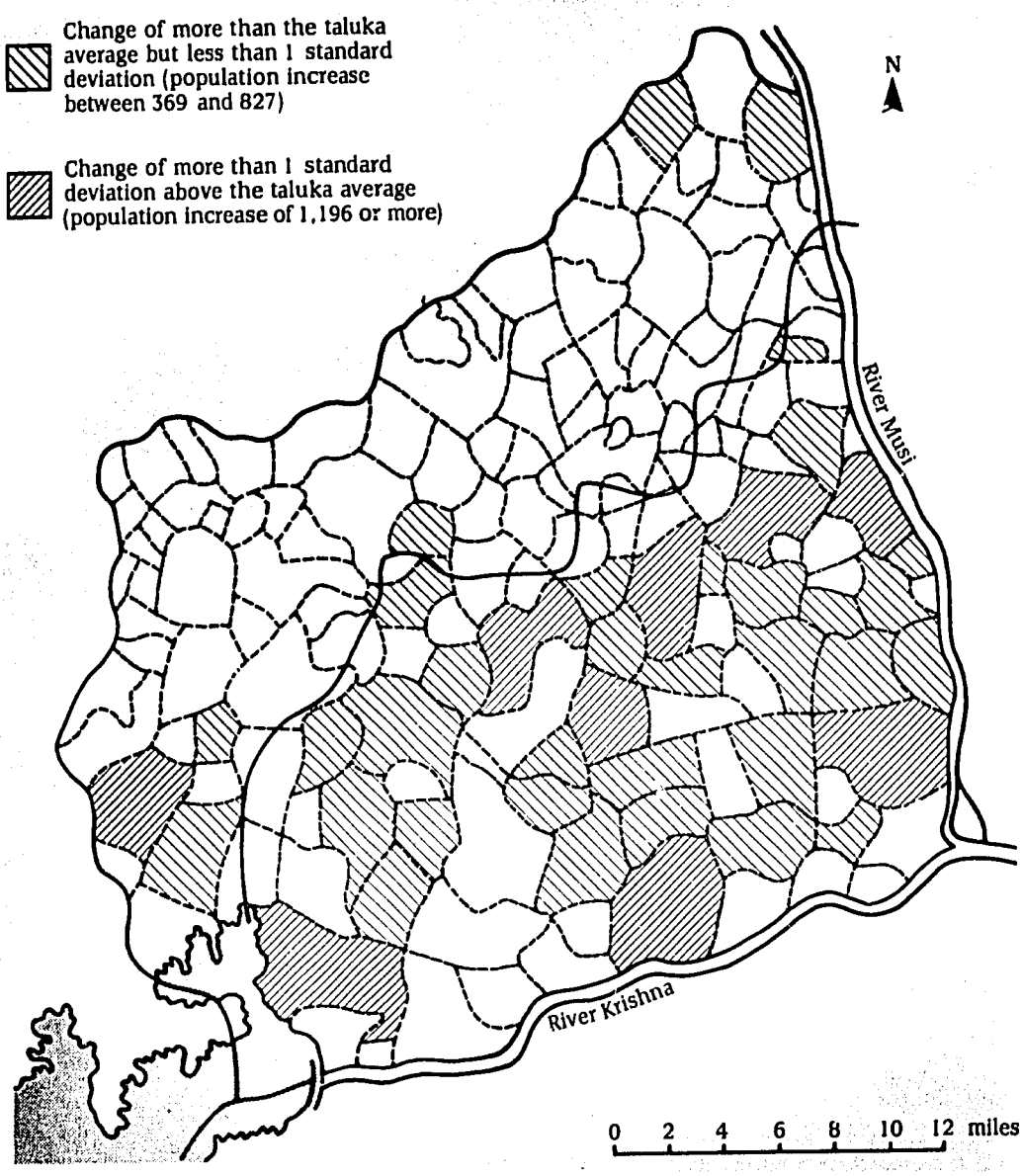


Table 4—Sectoral outlays by the Andhra Pradesh government during the five-year plans

Sector	First Plan	Second Plan	Third Plan	Fourth Plan	Fifth Plan
			(Rs 10,000,000 [1 crore])		
Agriculture and allied activity	10.76	18.40	51.48	82.22	159.91
Cooperation and community development	1.53	18.97	27.41	24.07	[a]
Irrigation	21.86	57.43	93.02	157.54	200.00
Power	37.84	38.53	93.62	274.18	450.00
Industry and mining	1.15	10.15	15.19	21.88	62.12
Transport and communications	3.43	9.52	17.00	22.71	43.88
Social services	18.40	33.51	53.22	78.36	168.87
Miscellaneous	1.81	2.09	1.48	0.52	15.49
Total	96.78	188.60	352.42	661.48	1,100.27

Source: Andhra Pradesh, Department of Planning and Cooperation, Hyderabad.

Notes: During the Fifth Plan the outlays for the Minimum Needs Programme, which included outlays for power, social services, and transport and communications, were separate from the figures shown in the table; these amounted to Rs 5 crores, Rs 141 crores, and Rs 30 crores, respectively.

[a] During the Fifth Plan, the outlays for Cooperation and Community Development were included in those for Agriculture and Allied Activity.

regional economy is measured by two derived statistics, one relating to the actual number of villages that have benefited from or have taken advantage of the development schemes in irrigation and agriculture and the other relating to the degree of change in the villages of the taluka.

Irrigation Facilities

Irrigation has been one of the basic inputs for agricultural development. It is worth noting that the building of one major and a number of minor irrigation projects has transformed the taluka from a chronically drought-affected area to one in which most of the villages have an assured water supply. One must keep in mind, however, that because the canal waters cannot be used above 500 feet in altitude, the entire taluka cannot benefit from NSP. Efforts have been made to overcome this technical difficulty by constructing lift irrigation, by diverting canal water into tanks, and by deepening the existing tanks. Similarly, a large number of wells have also been constructed and fitted with pumps. The NSP canal system itself irrigated about 86,000 acres in 1978, with 76 villages benefiting from it.

The Musi Irrigation Project, which is located in Suryapet Taluka, irrigates about 10,400 acres of land in Miryalguda Taluka. Of these about 87 percent are irrigated by the canal system of the Musi Project and the rest by tanks into which the Musi Project canals drain water regularly. The Utkur-Marepalle Minor Irrigation Project irrigates about 1,400 acres of land through an improved tank irrigation scheme. Before NSP irrigation waters were released, only 10 settlements had an assured water supply for at least two crops. This number has risen to 100 settlements in 1978 and a majority of these are in the NSP canal system area.

The average irrigated area per settlement just before irrigation waters were released was less than 7.2 percent of the total cropped area; in 1978 it was 49.24 percent. There were 4 settlements prior to NSP with more than the average area under canal irrigation—all of these were located in the Musi Canal area. This number had increased to 64 by 1978. More than 83 percent of this area is in the main canal system of NSP

Table 5—Sources of funds for sectoral outlays, Nalgonda district, Fifth Plan period, 1974-79

Sector	State Plan	Six-Point Formula Scheme	SFDA and MFAL	DPAP	Institutional Finance
			(Rs 100,000)		
Agriculture	40.63	9.50	29.12	6.16	197.06
Soil conservation	8.79	...	3.15	7.37	0.57
Minor irrigation	27.10	214.84	75.01	29.94	235.64
Animal husbandry	11.81	16.40	53.17	13.44	190.66
Dairy development	...	2.00	...	...	...
Fisheries	...	1.19	0.50	...	...
Forests	...	...	...	3.09	...
Cooperation	...	...	4.42	...	76.35
Marketing	...	...	9.00	...	...
Power	104.95	164.83	...	...	284.52
Industries	...	4.67	...	...	195.17
Transport and communications	75.52	...	...	...	...
Public health	...	8.79	...	...	...
Rural water supply	...	50.00	...	...	...
Education	134.14	7.87	...	...	...
Nutrition	1.05	...	...	...	...
Public libraries	3.44	...	...	...	...
Social welfare	7.08	2.00	...	...	...
Tribal welfare	2.26	...	...	...	...
House sites for weaker sections	33.00	...	...	...	...
Woman and child welfare	0.23	...	...	...	1.89
Miscellaneous	...	...	9.84	...	...
Total	450.00	482.09	184.21	60.00	1,181.86

Sources: Andhra Pradesh, Bureau of Economics and Statistics, and Nalgonda District Statistical Officer.

Notes: Under the six-point formula scheme, the Government of India used six criteria to identify backward areas of states, which received special funds for encouraging development. SFDA is the Small Farmers Development Agency, MFAL is the Marginal Farmers and Agricultural Labourers Development Agency, and DPAP is the Drought Prone Area Programme.

Table 6—Annual outlays by sector, Miryalguda Development Block, 1968-78

Year	Education	Health	Agriculture	Roads and Buildings	Minor Irrigation
			(rupees)		
1968/69	72,650	28,080	15,285	20,552	8,000
1969/70	567,027	32,240	66,166	63,146	11,060
1970/71	35,331	37,340	44,095	20,320	3,000
1971/72	746,313	10,602	22,707	20,320	7,000
1972/73	809,342	38,694	26,099	20,320	16,533
1973/74	980,351	48,566	23,860	2,000	30,993
1974/75	1,310,223	48,430	18,792	23,877	14,339
1975/76	1,182,456	48,485	36,171	44,495	30,195
1976/77	1,643,595	52,516	46,605	61,416	14,940
1977/78	1,835,667	37,254	79,892	57,560	40,372

Source: Office of the Block Development Officer, Miryalguda.

(Table 7). This demonstrates that there has been an impressive increase in the land under irrigation, in the number of villages served, and in the core irrigated area (defined as that area with villages having more than the average proportion of land under irrigation).

Agricultural Development

The major crops grown in the taluka are the foodgrains, paddy and jowar; the oilseeds, groundnuts and castor; and the additional cash crops, pulses and sugarcane.

There has been a slight decline in the percentage of land devoted to certain crops, such as paddy and jowar (Table 8), but in absolute terms the land sown with them has increased remarkably. It must also be noted that all paddy lands are cropped twice, which increases the area sown by almost 100,000 acres. Crop diversification accounts for the decline where other crops such as castor, groundnuts, and sugarcane are being cultivated.

As a result of new farming techniques for both dry and irrigated land, there has been an increase in the number of villages growing these crops, as well as in the land sown with them.[53]

Crop	Number of Villages	
	1968/69	1978/79
Paddy	119	150
Jowar	110	105
Pulses	63	80
Castor	25	56
Groundnuts	85	87
Sugarcane	2	33

With the exception of jowar, which is grown in five fewer villages than in 1968, all other crops register an increase. The average distribution of land under each crop as a percentage of the total cropped area has shown an increase at the village level for groundnuts, castor, and sugarcane, while jowar, pulses, and paddy have declined. The increase in absolute area can be explained by the widespread introduction of paddy in the canal- and lift-irrigated tracts, of sugarcane in the canal-irrigated tracts, and of high-yielding varieties of castor on the virgin but dry tracts in the northern and western parts of the taluka. The recent introduction of high-yielding varieties of jowar in the dry tracts and groundnuts in the canal- and lift-irrigated tracts has also contributed to the increase.

Table 7—Irrigated area by source of irrigation, 1967/68 and 1978/79

Source	1967/68	1978/79
Irrigation canal		
Acres	...	72,906.43
Percent	...	83.01
Irrigation tank		
Acres	7,113.22	11,747.60
Percent	82.90	13.38
Irrigation well		
Acres	1,466.22	3,170.22
Percent	17.10	3.61
Total		
Acres	8,579.44	87,824.25
Percent	100.00	100.00

Source: Office of the Tahsildar, Miryalguda.

In order to identify the areas of crop specialization, the number of villages that have more-than-average land under a particular crop was noted. These villages are designated as "specialized villages" as far as the cultivation of that crop is concerned. With the exception of groundnuts, all other crops indicate an increase in the number of villages that are designated as specialized villages. The crop specialization patterns are most interesting for castor and sugarcane.

Crop	Number of Specialized Villages	
	1968/69	1978/79
Paddy	50	63
Jowar	53	60
Pulses	25	33
Castor	14	38
Groundnuts	45	33
Sugarcane	2	19

[53] These figures were obtained from the Office of the Tahsildar in Miryalguda. The tahsildar is a revenue official with jurisdiction over a taluka.

These changes in the cropping pattern correlate to the one major event in the taluka: the provision of irrigation facilities (Tables 9 and 10). The cropping pattern underlines the complementary association of the dry and irrigated tracts. The dry areas specialize in all crops except paddy and sugarcane, and the irrigated areas specialize in those two crops. The correlation coefficients denote the strength of this dual-crop association. In 1968 the cropping pattern of the taluka was dominated by paddy, jowar, and pulses; in 1978 the major crops were paddy, jowar, groundnuts, and castor.

Table 8—Changes in the cropping pattern, 1968/69 and 1978/79

Crop	1968/69		1978/79	
	Acres	Percent	Acres	Percent
Paddy	53,238.38	52.16	95,250.61	51.53
Jowar	30,218.40	29.60	52,142.88	28.22
Pulses	6,148.30	6.02	9,430.29	5.10
Castor	2,314.25	2.29	6,944.72	3.76
Groundnuts	10,117.09	9.91	19,347.74	10.46
Sugarcane	27.29	0.02	1,716.32	0.93
Total	102,063.71	100.00	184,832.56	100.00

Source: Office of the Tahsildar, Miryalguda.

Table 9—Correlation coefficients between irrigation and area under different crops, 1968

Variable	Irrigation	Paddy	Jowar	Pulses	Castor	Groundnuts	Sugarcane
Irrigation	1.00						
Paddy	0.83	1.00					
Jowar	-0.73	-0.76	1.00				
Pulses	-0.21	-0.32	-0.11	1.00			
Castor	-0.22	-0.23	-0.11	-0.06[a]	1.00		
Groundnuts	-0.27	-0.36	-0.09[a]	-0.08[a]	-0.14	1.00	
Sugarcane	0.11	0.11	-0.09[a]	-0.02[a]	-0.02[a]	-0.07[a]	1.00

Note: N = 150.

[a] These figures are not statistically significant at the 0.01 level.

Table 10—Correlation coefficients between irrigation and area under different crops, 1978

Variable	Irrigation	Paddy	Jowar	Pulses	Castor	Groundnuts	Sugarcane
Irrigation	1.00						
Paddy	0.88	1.00					
Jowar	-0.72	-0.78	1.00				
Pulses	-0.21	-0.37	0.22	1.00			
Castor	-0.31	-0.32	0.06[a]	-0.02[a]	1.00		
Groundnuts	-0.32	-0.39	0.08[a]	0.13	-0.01	1.00	
Sugarcane	-0.02[a]	0.01[a]	-0.04[a]	-0.13	-0.08[a]	-0.11	1.00

Note: N = 150.

[a] These figures are not statistically significant at the 0.01 level.

6

SERVICE PROVISION

Thus far, policies and theories of service provision in rural India have been examined, Miryalguda Taluka has been described, and the 1968 study of service provision has been introduced. This and the subsequent chapters note the changes in the pattern of service provision in order to identify whether services are now more accessible to the population of the taluka, the regional imbalances in their provision have been reduced, and the recommendations for service provision have indeed been implemented.

There are 30 services in the taluka that can be designated as central functions. Christaller described these services as "available in a few places and availed of by a number of places."[54] For this exercise, let education, health, credit, banking, transport, communications, trade, and marketing and distribution of agricultural inputs be defined as rural services (whose provision is controlled or facilitated by the government). Similarly, let retail services of various kinds be a separate group (whose provision is controlled or facilitated by the private sector). These categories are not mutually exclusive. For example, there are some services in the former category, such as health, transport, and distribution of fertilizers, pesticides, and agricultural machinery, where the private sector operates alongside the government sector. Similarly, the trading of agricultural produce, which until recently was a spontaneously organized system of traders, consumers, and weekly markets, is now being complemented by a system of government-controlled regulated markets.

The reasons why the government is the main provider of these services, at least in the initial stages, are many, but only the more relevant are noted below. For certain services (such as education and health), in the short run the private cost is higher than the private gain, whereas in the long run the social cost is lower than the social gain. For others (such as supply of agricultural inputs, animal husbandry, transport facilities, credit and banking), there are initial risks that the private sector tends to overestimate. For still others (such as marketing, roads, and processing units) the infrastructure for creation and provision of these services is too extensive for the private sector to undertake their provision; hence the government provides them. It is quite possible that once the government has played this pioneering role, the private sector will then complement these efforts.

Operational Definitions of Services

Most of the services hardly require any further description. The scope of others needs to be clarified. A branch post office sells stamps, envelopes, postcards, inland letters, and airmail letters; receives and sends money orders; and has postal savings and banking facilities. A subpost office, in addition to the above, sells postal orders, receives and sends telegrams, and issues radio licenses. A primary credit society arranges for agricultural loans for its members, who belong to a specified village. A cooperative bank has the jurisdiction to provide agricultural financing to the residents of the taluka; it normally provides this service through the primary credit societies, but sometimes it also makes loans available directly. A rural bank looks after agriculture-related finance but not necessarily for agricultural production. A nationalized bank (if it is a branch of the lead bank for the district) looks after all of the financial needs of the taluka. Although the animal husbandry center is meant to serve only those villages that are within its jurisdiction, it sometimes treats animals from villages outside its jurisdiction. A seed distribution center is controlled solely by the *panchayat samiti* for all the

[54] Christaller, *Central Places*.

villages located within it, but fertilizers, pesticides, and agricultural machinery are distributed by both the government and private sectors. The regulated market and its subyards buy paddy, castor, pulses, and groundnuts.[55] Other products are not regulated and are traded in the weekly markets. A retail kirana store sells daily needs at the village level.

Measuring the Importance of Services

Studies on the identification of central places have emphasized the role of the hierarchy of settlements. All settlements perform some services, but for those services that are not performed, residents are dependent on settlements that have them. Thus it is possible to arrive at the hierarchy of settlements on the basis of services performed as well as on area and population served.

Some aspects of Christaller's central place theory can help in the identification of the hierarchy of settlements in a rural region. The hierarchy is an outcome of the centrality of settlements. Centrality, in turn, is a measure of the importance of a settlement. It's centrality score depends upon how many services are performed within the settlement and at what level of complexity.

Although 30 services are performed among the settlements in Miryalguda Taluka, this does not mean that the services are equally complex in all settlements. For example, an educational facility exists in almost all villages, but primary schools are more ubiquitous, and there is only one junior college in the taluka. In measuring the importance of a settlement in educational services, if the settlement has a secondary school, a middle school, and a primary school all in the same building, then the secondary school alone is considered. However, if in addition to the secondary school, there also exists a separate middle or primary school, each is considered separately. A bus service is weighted according to the frequency of its operation.

An attempt is made to note at what point in the population growth of a settlement a service first occurred. This point of entry of a service in terms of population has been used in a number of other studies and is called the threshold of the service. Table 11 gives the population thresholds of the services in Miryalguda Taluka. The relative importance of services based on the threshold values is then determined. The threshold value of the lowest-order service is considered as a base with a value of 1. The relative importance of different services is obtained by calculating the values of other services from this base. For example, the value of a primary school is 1 and that of a branch post office is 2.20, because the threshold population of the primary school is 250 and that of the branch post office is 550 (Table 12). The intraservice importance, that is, the relative weights of different elements of the same service, is obtained in a similar fashion. A middle school with a threshold population of 1,390 is 5.56 times more important than a primary school.

The values of interservice and intraservice importance are used as weights to measure the value of the total service structure in a particular settlement. Another variable, the number of such services, is added to the ranking at this stage. If a settlement has one primary school, its value is 1; if it has 10 primary schools, its value is 10.

By considering the variety, level, and number of services performed in all settlements, it is possible to measure the relative importance of settlements in the taluka (see the Appendix).

Changes in Service Provision

The changes in the agriculture of the taluka, brought about by the provision of irrigation facilities, increased demand for both rural and retail services. This increased demand was responsible for increases in the quantity and quality of the services provided.

Table 13 shows the number of settlements out of 150 that have a particular service. The

[55] Regulated markets frequently operate minor markets located in smaller villages elsewhere in a taluka. For example, the town of Miryalguda has a major regulated market and Anjanpalli is a subyard under it.

Table 11—Thresholds of population for rural and retail services

Service	Threshold of Population
Rural (government only)	
Primary school	250
Primary credit society	260
Center for medical checkup	290
Branch post office	550
Middle school	1,390
Subpost office	1,390
Animal husbandry center	1,400
Secondary/high school	2,060
Rural bank	4,400
Junior college	16,151
Post and telegraph office	16,151
Nationalized bank	16,151
Cooperative bank	16,151
Seed distribution center	16,151
Fertilizer and pesticide distribution center	16,151
Veterinary hospital	16,151
Regulated market	16,151
Retail (private only)	
Kirana store	260
Cloth store	340
Tea and coffee shop	620
Fertilizer and pesticide shop	960
Hardware shop	1,390
General provision shop	1,390
Restaurant	3,090
Weekly market	3,700
Pharmacy	4,500
Private and government	
Bus stop/service	320
Allopathic treatment center/clinic	2,110
Surgery and hospital	16,151

Sources: Sudhir Wanmali, "Ranking of Settlements: A Suggestion," *Behavioural Sciences and Community Development* 5 (September 1971): 97-111; Andhra Pradesh, Office of the Director of Census Operations, *1971 District Census Handbook, Nalgonda District* (Hyderabad: Andhra Pradesh Government Press, 1974); and field survey 1978/79.

Table 12—Ranking of services

Service	Threshold of Population	Weight
Education		
Primary school	250	1.00
Middle school	1,390	5.56
High school	2,060	6.40
Junior college	16,151	64.60
Credit/banking		
Primary credit society	260	1.04
Rural bank	4,400	17.60
Cooperative bank	16,151	64.60
Nationalized bank	16,151	64.60
Health/medicine		
Center for medical checkup	290	1.16
Allopathic treatment/clinic	2,110	8.44
Surgery and hospitals	16,151	64.60
Transport		
Bus stop/service	320	1.28
Communications		
Branch post office	550	2.20
Subpost office	1,390	5.56
Post and telegraph office	16,151	64.60
Agricultural inputs		
Fertilizer and pesticide shop	1,470	5.88
Seed distribution center	16,151	64.60
Fertilizer and pesticide distribution center	16,151	64.60
Marketing of agricultural produce		
Weekly markets	3,700	14.80
Regulated markets	16,151	64.50
Veterinary services		
Animal husbandry center	1,400	5.60
Veterinary hospital	16,151	64.60
Retail goods		
Retail kirana stores	260	1.04
Retail cloth stores	340	1.36
Tea and coffee shop	620	2.48
General provisions	1,390	5.56
Hardware	1,390	5.56
Restaurant	3,090	12.60
Pharmacist	4,500	18.00

number of times a service is available in a settlement is, however, not noted in the table. The increase in the number of settlements providing the lower- and middle-order services during the period 1968-78 is impressive. In addition, some new services or channels for their provision are widely encountered, including rural banks and regulated markets (and their subyards) in the government sector, and allopathic treatment clinics, transport, and fertilizer and pesticide shops in the private sector (in addition to those that are provided by the government). Of course, both the government and private sectors provide the basic services first, as the need arises. For example, the first rural service to appear in the settlement system of a taluka is normally a primary school and the first retail service is normally a kirana store.

There were 23 settlements in Miryalguda Taluka in 1968 that had no services provided at all; in 1978 there were only 12. The number of settlements with no rural services provided by the government sector in 1968 was 26; in 1978 it was down to 17. But the

Table 13—Occurrence of rural and retail services, 1968 and 1978

Service	Number of Settlements With Service	
	1968	1978
Primary school	111	128
Primary credit society	79	107
Retail kirana store	46	116
Branch post office	46	61
Bus stop/service	42	52
Center for medical checkup	31	32
Tea and coffee shop	24	54
Fertilizer and pesticide shop	16	33
Public center for allopathic treatment	12	16
Secondary/high school	10	23
Middle school	9	4
Retail cloth store	9	40
Animal husbandry center	6	24
General provision store	5	14
Subpost office	4	6
Pharmacists	2	5
Private clinic for allopathic treatment	3	21
Hardware shop	2	5
Restaurant	2	7
Nationalized bank	2	3
Junior college	2	2
Surgery and hospital	2	3
Weekly market	1	5
Regulated market	1	3
Veterinary hospital	1	1
Post and telegraph office	1	1
Seed distribution center	1	1
Fertilizer and pesticide distribution center	1	1
Cooperative bank	1	1
Rural bank	0	6

Sources: Lalit K. Sen et al., *Planning Rural Growth Centres for Integrated Area Development: A Study in Miryalguda Taluka* (Hyderabad: National Institute of Community Development, 1971); and field surveys in 1968/69 and 1978/79.

most impressive spread was in the retail services (private sector). In 1968, 104 settlements did not have any retail establishments; this number was down to 34 in 1978.

A large number of new services were established during the period. Thirty new primary schools, 2 middle schools, 7 secondary schools, 29 primary credit societies, 8 rural banks, 14 branch post offices, 13 centers of fertilizer distribution, 7 centers for distribution of pesticides, 10 animal husbandry centers, and one regulated market (with 2 subyards) were established by the government. In the private sector, about 514 kirana stores, 114 retail cloth stores, 78 general provision stores, 12 hardware stores, 21 pharmacies, 30 restaurants, and 216 tea and coffee shops were established in the taluka. And 3 weekly markets appeared in the rural areas in addition to the 2 that already existed.

The average value of change in total service provision was 30.61. The average values for changes in the rural and retail services were 15.83 and 14.78 respectively. There were 25 settlements with values above the regional average: Adividevulapalle, Alagadapa, Amangal, Anjanpalle, Anumula, Damercherla, Kondrapole, Miryalguda, Madgulapalle, Nidmanoor, Peddavoora, Perur, Peddadevulapalle, Thungathurti, Tadakamalla, Tungapahad, Tirumalgiri, Tripuravaram, Thummadam, Vadepalle, Veerlaplem, Vemulapalle, Vijayapuri, Yacharam, and Yerraballi (Figure 6). Of these, all but 7 are in the irrigated tract. Only 1 of the 7 benefits from lift irrigation.

In the correlations between changes in irrigated land, cropped area, population, total services, rural services, and retail services (Table 14), the first two and the last

Table 14—Correlation coefficients between changes in irrigation, cropping, population, and services

Variable	Irrigated Area	Cropped Area	Population	Rural Services	Retail Services	Total Services
Irrigated area	1.00[a]					
Cropped area	0.50[a]	1.00[a]				
Population	-0.01	-0.02	1.00[a]			
Rural services	-0.03	-0.03	0.88[a]	1.00[a]		
Retail services	-0.01	-0.01	0.86[a]	0.96[a]	1.00[a]	
Total services	-0.02	-0.02	0.88[a]	0.99[a]	0.99[a]	1.00[a]

[a] Statistically significant at the 0.01 level.

Figure 6—Changes in the provision of total services, Miryalguda Taluka, 1968-78

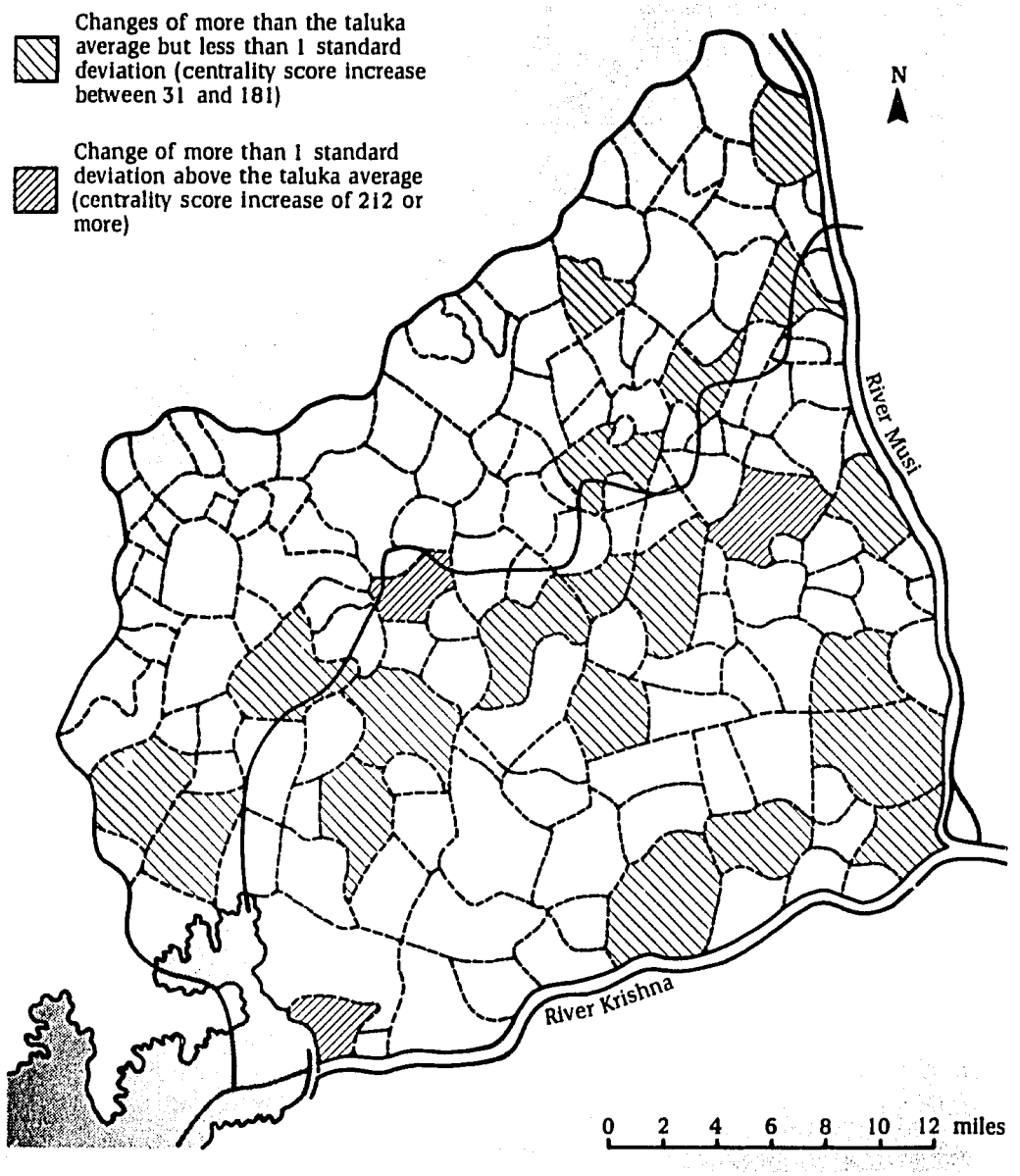


Table 15—Scores of service provision and distribution of settlements, 1968-78

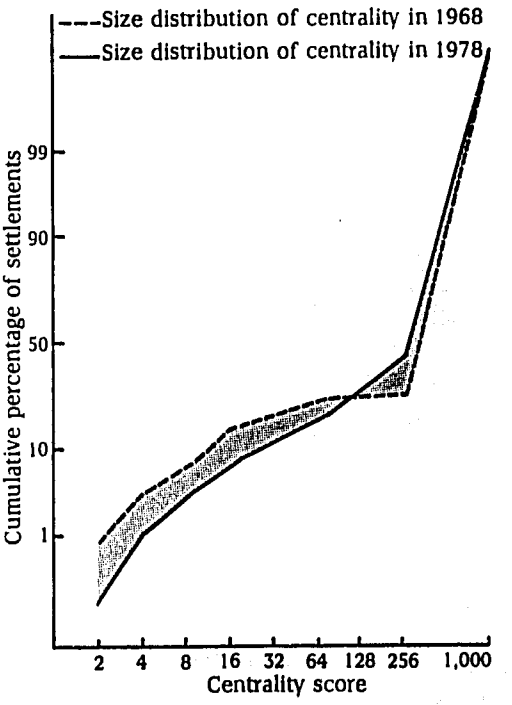
Score of Relative Importance	1968			1978		
	Number of Settlements	Total Score	Percent	Number of Settlements	Total Score	Percent
Less than 2.00	52	27.28	0.80	21	7.12	0.08
2.01 – 4.00	34	79.52	2.32	29	73.15	0.89
4.01 – 8.00	25	136.74	3.97	30	157.56	1.92
8.01 – 16.00	22	242.52	7.06	28	326.11	3.96
16.01 – 32.00	10	179.36	5.21	16	336.57	4.08
32.01 – 64.00	3	128.49	3.73	10	488.82	5.94
64.01 – 128.00	1	66.32	1.92	9	831.86	10.09
128.01 – 256.00	...	...	...	4	1,378.43	16.74
256.01 and above	2	2,579.66	74.99	3	4,639.32	56.30
Total	149	3,439.89	100.00	150	8,238.94	100.00

four are statistically highly correlated. The immediate effect of the provision of irrigation to an area is to change the cropping pattern from that of dry farming to irrigated farming where a larger number of crops are grown. Some of these changes in cropping are facilitated by the provision of services by both the government and the private sectors. The increase in production creates employment opportunities (on a permanent and a seasonal basis) and raises incomes in the region. More people settle in the irrigated tract. Because the services are located in settlements, these changes in the population of settlements bring about similar changes in the pattern of service provision. When more land is brought under irrigation, it produces more crops and is therefore able to support more people and to generate more wealth; the increase in crop production results in greater demand for rural services (government sector) and the increase in wealth generates more demand for retail services (private sector). The correlation coefficients are significant from another point of view: they denote a dynamic situation. The correlations are not between irrigated land, population, and so on, but between changes in them.

The scores of relative importance of settlements in the taluka are categorized by size classes. The number of settlements in a size class and the percentage of that size class in the total structure of service provision are noted (Table 15 and Figure 7).

The taluka's services are located in the settlements. The distribution of services among the settlements in 1968 was dominated by Vijayapuri and Miryalguda. By 1978, however, the primacy of these two towns in service provision had clearly declined, no doubt as the result of a planned diffusion of certain services among smaller settlements as well as by the emergence of new services in the middle segment of the system.

Figure 7—Size distribution of centrality scores, Miryalguda Taluka, 1968-78



7

SPATIAL CHARACTERISTICS OF SERVICE CENTERS

The organization of rural and retail services described in the previous chapter reflects an ordered adjustment to a scale of population thresholds. Some settlements have services and others do not have them, and this leads to spatial interaction. In other words, people must travel to a settlement that has a service they need, if their settlement does not have it. If the service is commonly available, then the extent of spatial interaction is limited, which results in a small service area. A less commonly available service may generate spatial interaction on a broad scale, which will result in a large service area.

The taluka, at the time of the 1968 survey, had a poor resource base, and it had only recently been provided with irrigation.[56] The four service centers identified in the earlier study were all administrative headquarters of some kind. Miryalguda was the headquarters of the taluka and the *panchayat samiti*. Peddavoora was a *panchayat samiti* headquarters, Vijayapuri was the headquarters of the NSP authority, and Chelakurthi was a minor administrative headquarters on the Left Bank Canal of NSP (but the only one of its kind in Miryalguda Taluka). The earlier study noted that the concentration of services in these four centers tended to create an imbalance in the distribution of services throughout the taluka. To stimulate agriculture and to reduce the regional imbalance, it suggested that 18 more service centers be created, to be operational by the beginning of the Fifth Plan period.[57]

These 22 potential service centers were surveyed once again in 1978/79 to determine if the earlier recommendations were followed and to note any changes in their functional and spatial characteristics. The locations of the centers are shown in Figure 8.

In analyzing the changes in the occurrence of rural and retail services located at these service centers and the changes in service areas and service populations, the changes in the interrelationships among these factors are also noted. This exercise entails two steps: first, the changes are noted for each service in all service centers, and, second, an aggregate picture of all changes in all service centers is presented.

The study also seeks a deeper understanding of the particular effects of services provided by the government (rural) and the private sector (retail)—first by analyzing them separately and then generalizing their regional patterns. A distinction is made between those services that are simply provided by the government and those whose service areas are delineated for them. In this report the latter are designated as "regulated services."[58] The regulated services in the taluka are veterinary hospitals; nationalized and rural banks; cooperative banks and primary credit societies; fertilizer, pesticide, and seed distribution centers (provided by the government); and regulated markets.

The service area of each service is noted and mapped. A list is made of the settlements and the populations that are served by the service centers for each service for both 1968 and 1978. The population figures for the settlements come from the 1961 and 1971 Censuses of India, Nalgonda District.

Rural Services

There are 20 rural services in the taluka. These are all provided by the government and in some instances even the size of their service areas is determined by the government.

The average area served by each of these services in 1968 and 1978 is given in Table 16. The figures show, first, that there has

[56] Sen et al., *Planning Rural Growth Centers.*

[57] Ibid.

[58] Johnson calls the service areas with borders determined by the government "contrived." See Johnson, *Organization of Space.*

Figure 8 - Service centers and irrigated and dry tracts, Miryalguda Taluka, 1978

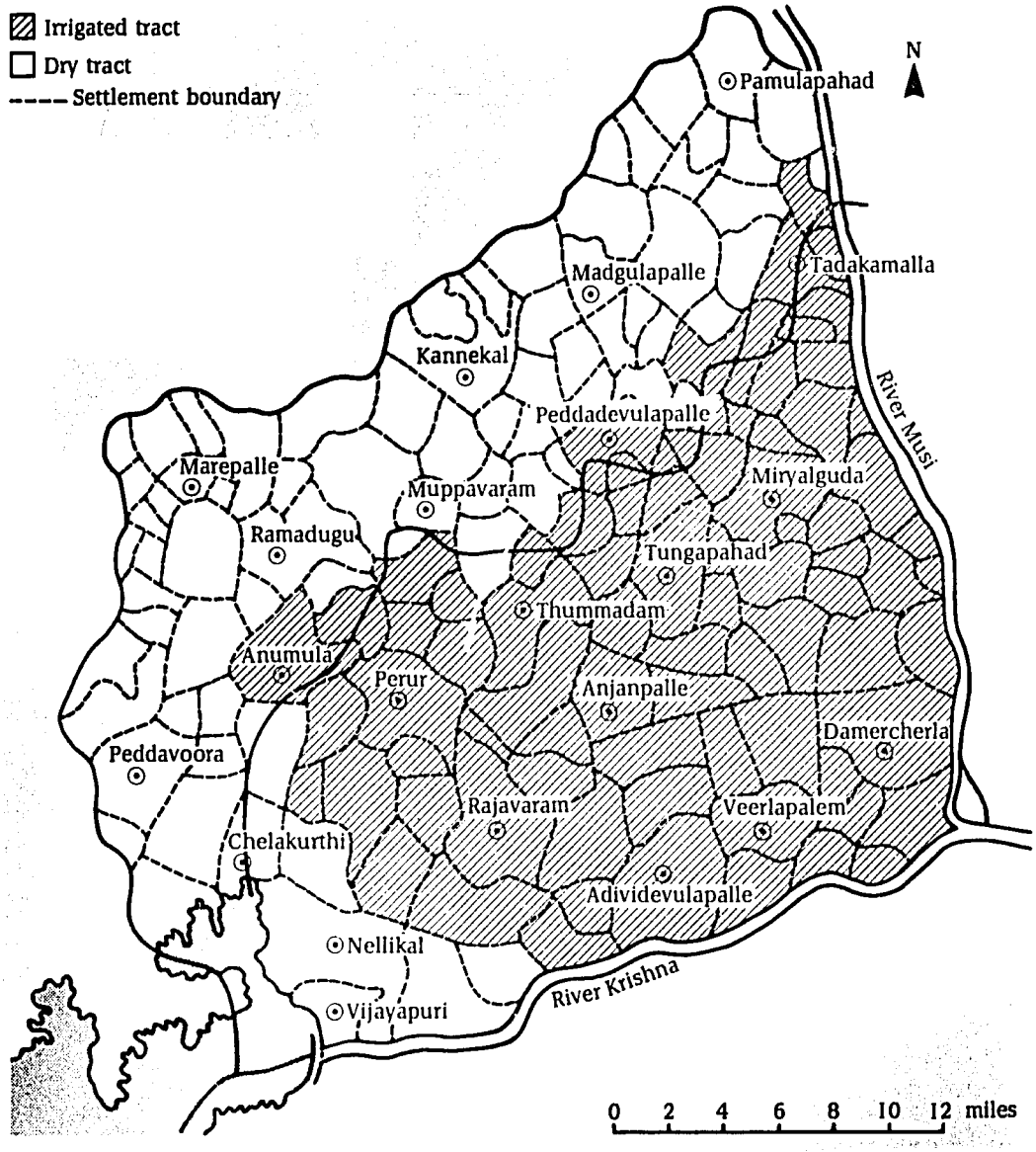


Table 16— Service area of rural services, 1968 and 1978

Service	Service Area	
	1968	1978
	(square miles)	
Primary school	9.90	9.90
Primary credit society	14.94	10.06
Center for medical checkup	12.98	9.96
Bus stop/service	33.58	29.01
Branch post office	16.48	22.28
Middle school	12.83	10.12
Subpost office	140.99	167.46
Animal husbandry center	257.62	44.97
Secondary school	89.16	47.96
Allopathic treatment center	27.08	34.15
Rural bank	297.96	91.30
Junior college	285.62	240.56
Surgery and hospital	285.62	240.56
Post and telegraph center	285.62	240.56
Nationalized bank	571.24	240.56
Fertilizer and pesticide distribution center	728.81	728.81
Cooperative bank	728.81	728.81
Seed distribution center	728.81	728.81
Veterinary hospital	728.81	728.81
Regulated market	...	728.81

Sources: Field surveys, 1968/69 and 1978/79.
Note: The rural services are those provided by the government

Table 17— Service populations of rural services, 1968 and 1978

Service	Service Population	
	1968	1978
Primary school	4,980	4,220
Primary credit society	6,753	4,420
Center for medical checkup	5,832	4,822
Bus stop/service	14,257	9,087
Branch post office	6,298	7,259
Middle school	6,980	5,822
Subpost office	44,240	54,920
Animal husbandry center	57,273	14,767
Secondary school	27,856	15,539
Allopathic treatment center	10,832	10,699
Rural bank	92,645	29,683
Junior college	93,283	96,826
Surgery and hospital	93,283	96,826
Post and telegraph center	93,283	96,286
Nationalized bank	93,283	96,286
Fertilizer and pesticide distribution center	222,339	232,366
Cooperative bank	222,339	232,366
Seed distribution center	222,339	232,366
Veterinary hospital	222,339	232,366
Regulated market	...	232,366

Source: Field surveys, 1968/69 and 1978/79.
Note: The rural services are those provided by the government.

been a decline in the extent of the service areas of almost all services. The three services with service areas that have grown—branch post offices, subpost offices, and centers for allopathic treatment—have had a marginal increase in the number of settlements they were located in.

There has been no change in the size of the service areas of the highest-order services, which include veterinary hospitals; seed, fertilizer, and pesticide distribution centers; and cooperative banks, because there has been no change in the number of settlements providing these services since 1968. These services registered an increase in their service populations, but this is not because the extent of their service areas increased but because the population of the taluka did (Table 17).

Second, the higher-order services have more extensive service areas, and the service areas of the lower-order services nest under those of the higher order. The general trend for the size of the service areas to decline is to be expected because since 1968 the government has embarked upon a plan to locate new services in the taluka. Any new service tends to limit the size of the service area of the settlement that previously provided it. Similarly, the nesting of service areas is also expected because various development programs have adhered to a hierarchical system of provision of services. The areas of responsibility and accountability are clearly defined, which also results in nesting.

Retail Services

There are 10 retail services in the taluka that are provided by the private sector. In some cases, such as the provision of health and agricultural input services, the private sector appears to compete with the government. Thus, it is not uncommon to find allopathic treatment centers and clinics and

fertilizer and pesticide shops provided by both the government and the private sectors. (The facilities for medical treatment are called "centers" if they are controlled by the government and "clinics" if they are privately operated.) There are no regulated service areas for any of the retail services.

The retail services also reflect an ordered adjustment to the scale of population thresholds. Admittedly, there has been a greater change in the relative importance of retail services from 1968 to 1978 than in the rural services. This is clearly observed in the figures for service area and service population (Table 18). The services that had the most striking growth in the number of outlets have shown a decline in both area and population served. Those that have grown less markedly have gained in service area and service population.

Spatial Features of Change

In 1968, with the exceptions of Miryalguda, Vijayapuri, Peddavoora, and Chelakurthi, none of the service centers had more than 7 rural services (out of the 20 that were considered). These 7 were made up of different combinations of lower- and middle-order services, such as primary schools, primary credit societies, centers for medical checkup, bus stops/services, branch post offices, middle schools, and secondary schools. Similarly, with the exception of the same four service centers, none had more than 2 retail services (out of 10), which typically were retail kirana stores and tea and coffee shops. All these services together can be defined as basic services.

These basic services do not have an identical service area and service population. For example, in both time periods primary schools, retail kirana stores, and tea and coffee shops have tended to serve only the population of the service center where the services are located. Bus stops/services and secondary schools usually serve more extensive areas and populations than those served by the first three. On the other hand, primary credit societies and centers for medical checkup have gradually abandoned their spatial links and primarily serve the population of their service centers only.

The mere location of a new service in a service center or a settlement does not necessarily mean that it will immediately start to serve surrounding villages. The location of a new service also needs to be seen in its regional context. If the service is so new that it is the only one of its kind in the region, there are bound to be associated changes in the region. This has happened in the location of regulated markets, which are a new service in the taluka. But if the location is new only at a particular service center or settlement but not in the region (that is, if there are similar services located

Table 18—Service area and service population of retail services, 1968 and 1978

Service	Service Area		Service Population	
	1968	1978	1968	1978
	(square miles)			
Retail kirana store	12.67	12.67	5,414	4,220
Retail cloth store	32.23	45.59	10,395	14,060
Tea and coffee shop	10.95	10.55	6,360	4,220
Hardware store	259.89	177.52	91,992	57,638
General provision store	150.65	65.56	46,552	20,793
Fertilizer and pesticide shop	211.58	73.33	66,800	22,842
Allopathic treatment/clinic	35.35	26.35	40,625	78,956
Restaurant	155.73	120.22		
Weekly market	195.06	179.84	60,537	54,863
Pharmacy	302.75	141.53	92,960	45,675

Sources: Field surveys, 1968/69 and 1978/79.

in nearby service centers or settlements), then it is quite possible that the service and the service center within which it is located will begin to evolve new regional relationships from the moment that particular service is introduced in the settlement system. That the service area and the service population tend to decline when new services are introduced in a region seems to be the case for animal husbandry centers, rural banks, allopathic treatment centers and clinics, general provision stores, retail cloth stores, hardware stores, weekly markets, fertilizer and pesticide shops, and pharmacies.

As was seen earlier, changes in the regional economy and population have influenced the provision of rural and retail services in the taluka, and these services, in turn, have shaped the patterns of spatial relationships in several ways. Upon the introduction of a new service, the service centers have either (1) lost service population and service area, (2) lost service population and gained service area, (3) gained service population and lost service area, or (4) gained service population and service area. The spatial characteristics that brought about these changes are as follows.

First, the introduction of any new service results in the decline of service population and service area, except when the service is the only one of its kind (in which case new space relationships emerge). This is true for both time periods and also for both the dry and the irrigated tracts. For example, the service centers of Adividevulapalle and Madgulapalle have lost service population and service area in primary credit societies, retail kirana stores, and centers for medical checkup because these services have been made available in the surrounding villages. This holds true for higher-order complex services as well, such as animal husbandry centers, rural banks, and junior colleges.

Second, Vijayapuri is the only service center that has declined in service population but has gained in service area. When its own population declined from 55,300 to 16,151 upon the completion of NSP, its services were opened to the surrounding villages, which contributed significantly to its emergence as a regional service center.

Third, the services that were available in both time periods but that have grown relatively rapidly during the period have experienced a decline in their service areas but an increase in their service population in both the dry and irrigated tracts. Bus service is an example of this category. New bus routes and a higher frequency of bus service on the established routes have resulted in a reduction in the size of the service area. The increase in the size of the service population, however, is due to a general increase in the population of the taluka.

Finally, the services that were available in both time periods but that have grown relatively slowly have experienced an increase in their service area and in their service population in both the dry and irrigated tracts. The service centers with branch post offices, secondary schools, subpost offices, allopathic treatment centers, and retail cloth stores have often exhibited these spatial characteristics.

Service Area and Service Population of Centers

The service areas of the lower-order services nest under those of the higher-order services; thus the service area of the most important service located at a service center can be considered as the area of influence of that service center. And, the population of that area is taken as the service population of the service center. The service areas and service populations of the less important services located at the same center will of course be smaller. The number of services, the extent of the service area, the size of the service population, and the scores of relative importance of each service center for 1968 and 1978 are given in Tables 19 and 20.

In theory, an increase in the number of services available in a service center will be reflected by an increase in its total service area and service population. This is what has happened in reality. During the years 1968-78, the variables were not only highly correlated, but the values of the correlation coefficients increased (Tables 21 and 22). The number of services, the scores of importance, the extent of the service area, and the size of the service population have all changed, however, in a highly selective manner. Those service centers that show low values in all variables (one standard deviation below the regional averages) in both time periods are located in the dry tract or in areas away from the Left Bank Canal or

Table 19—Spatial features of service centers, 1968

Service Center	Number of Services	Service Area	Service Population	Score of Relative Importance
		(square miles)		
Miryalguda	108	728.81	222,339	1,259.17
Peddavoora	15	166.66	87,080	36.96
Vijayapuri	106	144.98	83,345	1,320.53
Chelakurthi	23	95.12	21,645	59.41
Pamulapahad	13	34.36	10,900	27.99
Peddadevulapalle	7	35.32	9,142	26.96
Damercherla	15	47.50	7,916	27.20
Advidevulappalle	12	53.71	7,079	18.72
Madgulappalle	9	40.30	6,617	11.52
Anjanpalle	15	28.78	5,515	23.02
Tungapahad	8	25.89	5,397	20.51
Tadakamalla	9	14.27	3,502	14.06
Ramadugu	8	26.06	3,370	7.48
Kannekal	5	17.31	3,365	12.44
Thummadam	16	14.20	3,185	32.20
Muppavaram	7	18.63	2,947	13.36
Anumula	7	16.84	2,937	16.24
Perur	10	15.83	2,643	11.92
Veerlapalem	7	17.06	2,497	8.52
Rajavaram	6	16.32	2,465	9.98
Marepalle	7	12.97	2,319	9.28
Nellikal	4	11.03	1,800	4.12

Sources: Field surveys, 1968/69 and 1978/79.

Table 20—Spatial features of service centers, 1978

Service Center	Number of Services	Service Area	Service Population	Score of Relative Importance
		(square miles)		
Miryalguda	436	728.81	232,366	3,397.33
Vijayapuri	175	158.28	45,848	879.32
Anumula	77	195.35	44,229	224.24
Chelakurthi	23	90.66	24,385	58.88
Anjanpalle	63	47.77	16,862	122.72
Damercherla	52	74.11	15,318	94.36
Pamulapahad	16	36.94	14,447	35.20
Peddavoora	49	53.09	12,063	163.66
Adividevulapalle	55	57.78	11,741	138.95
Madgulapalle	51	35.94	10,384	59.60
Peddadevulapalle	31	40.21	9,683	59.50
Tungapahad	43	27.24	9,185	63.72
Thummadam	72	27.15	8,017	123.04
Kannekal	18	39.97	6,991	26.16
Tadakamalla	23	18.09	6,329	74.38
Muppavaram	17	24.97	5,536	23.20
Perur	45	15.83	4,858	55.62
Nellikal	17	18.27	4,362	19.12
Ramadugu	23	19.83	4,031	25.88
Veerlapalem	26	19.82	3,860	44.64
Rajavaram	22	23.31	3,316	28.32
Marepalle	10	12.06	2,182	25.80

Source: Field survey, 1978/79.

Table 21—Correlation coefficients of spatial features, 1968

Variable	Number of Services	Service Area	Service Population	Score of Relative Importance
		(square miles)		
Number of services	1.00			
Service area (square miles)	0.65[a]	1.00		
Service population	0.73[a]	0.97	1.00	
Score of relative importance	0.70[a]	0.97	0.93	1.00

[a] These correlation coefficients are significant at the 0.1 level (N = 22). All other correlation coefficients are significant at the 0.01 level.

they have only recently been provided with gravity or lift irrigation. These service centers are Ramadugu, Nellikal, Muppavaram, Marepalli, Kannekal, Chelakurthi, and Pamulapahad, which are in the dry tract; Veerlapalem and Rajavaram, which are located away from the Left Bank Canal; and Tadakamalla and Peddadevulapalle, which have recently received canal irrigation. There is also some evidence that the service centers in close proximity to more important service centers have grown slowly: Tungapahad (near Miryalguda) and Perur (near Anumula) are two examples.

In order to understand the changes in the nature of influence of service centers, they are ranked on the basis of the size of their service populations for both time periods. Both upward and downward shifts in their positions are noted. This composite picture of changes in their ranks mirrors the empirical evidence already examined. The town of Miryalguda excepted,[59] those service centers whose rank either remained unchanged or dropped during the years 1968-78 are all located in the dry tract or in the areas away from the Left Bank Canal, or they have been irrigated only recently (Figure 9).

The most dramatic increase is registered by Anumula, which is located at the contact zone of the dry and the irrigated tracts. It has the advantage of being located in an area halfway between Miryalguda and Vijayapuri, the two major service centers. It is also located at the crossroads leading to Devarkonda (west), Vijayapuri (south), Miryalguda (east), and Nalgonda (north).

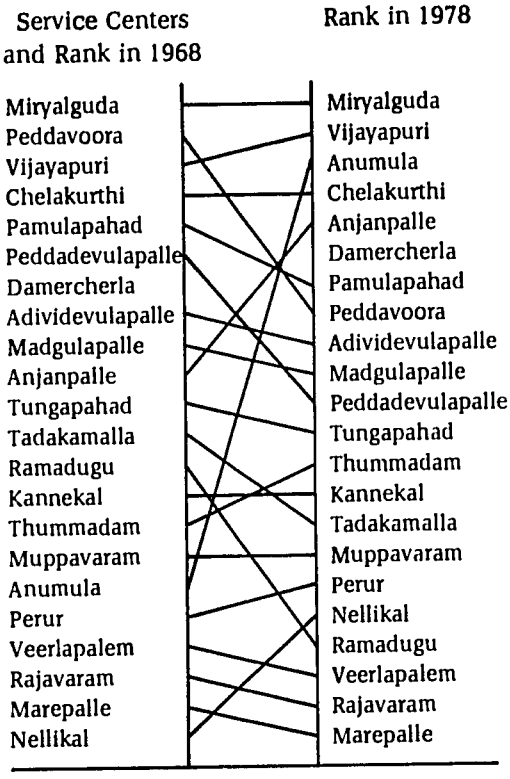
Table 22—Correlation coefficients of spatial features, 1978

Variable	Number of Services	Service Area	Service Population	Score of Relative Importance
		(square miles)		
Number of services	1.00			
Service area (square miles)	0.95	1.00		
Service population	0.96	0.99	1.00	
Score of relative importance	0.98	0.97	0.98	1.00

Note: These correlation coefficients are significant at the 0.01 level (N = 22).

[59] This does not mean that Miryalguda has not changed at all—in fact, it has changed substantially—but in a closed frame of reference, it appears to have been static.

Figure 9—Changes in the ranks of service centers, Miryalguda Taluka, 1968-78



Regional Policies

In sum, due to structural differences, the provision of services in some parts of a region may become unbalanced. Creating new service centers (by locating new services in already existing settlements) is a quick remedial measure for reducing the imbalance. It is hoped that once provided, the services will be used by the residents of the surrounding villages. It is also hoped that once the government provides services in certain settlements of a region, more retail outlets will be opened in these settlements. These private retail services tend to concentrate initially in the part of the region that has such structural advantages as assured irrigation facilities, a diversified cropping pattern, more double cropping, more wealth, higher levels of rural service provision, and a highly concentrated population.

The significant feature of the regional policy in Andhra Pradesh is that all of these things appear to have taken place in the taluka during the period 1968-78. What is more, the horizontal spread of service centers was strengthened by policies encouraging vertical integration between villages and service centers. This comes as no surprise because the earlier study made recommendations along these lines.[60]

Service areas defined by government regulation are a common feature of the development administration at the district level. There are cooperative banks, regulated markets, centers for seed and fertilizer distribution, and veterinary hospitals, normally located at the headquarters of a *panchayat samiti*, which serve only the settlements of that *panchayat samiti*. The second survey shows that below the *panchayat samiti* level there are regulated or controlled service areas for some of the new services. Thus, regulated market yards (foodgrain procurement centers), animal husbandry centers, rural banks, and allopathic treatment centers all show the same features as related services at a higher level. If vertical integration of rural service provision becomes more common, it will be interesting to see whether the retail services integrate their service areas in a similar manner.

The more practical and direct implications of the regional policy can be seen in the provision of such rural services as primary credit societies, bus services, secondary schools, centers for medical checkup, allopathic treatment centers, animal husbandry centers, and rural banks in both the irrigated and the dry tracts. By 1978, it is possible to discern a small locational bias in their provision. For example, although secondary schools, centers for medical checkup, bus services, and allopathic treatment centers are provided in selected settlements throughout the taluka, new agricultural services, such as primary credit societies, animal husbandry centers, rural banks, and regulated market yards, are only provided in the irrigated tract.

[60] Sen et al., *Planning Rural Growth Centers.*

8

THE SPATIAL IMPACT OF SERVICE PROVISION

Service Provision in Irrigated and Dry Tracts

It is clear from the discussion of regional policy that the state government was aware of the potential and limitations of the regional economic base of the taluka during the period 1968-78. The objectives of regional policy were to reduce the imbalances in service provision between the study area and the other talukas of the district and between the irrigated and the dry tracts within the taluka (Figure 8). This study evaluates only the imbalances that occurred within Miryalguda Taluka.

Index of Service Provision

To formulate the index of service provision, the settlements are grouped according to whether they belong to the irrigated tract or the dry tract. The values of the services provided in the settlements are known, as is the area of the settlements. These values are added for the irrigated tract, the dry tract, and the taluka as a whole and standardized to a unit value of one square mile. The values are also standardized separately for the rural and retail services and for the years 1968 and 1978. The value per square mile is called the index of service provision (Table 23).

In 1968 the index of service provision for total services for the taluka was 4.63, that for the irrigated tract was 4.50, and that for the dry tract was 4.71. It is clear from these figures that at the time the irrigation waters were released, there was not much difference between the services provided in the irrigated tracts and those in the dry tracts. In fact, the values for the dry tract were somewhat higher than those for the irrigated tract. This pattern of high values in the dry tract is maintained even when the service provision structure is disaggregated to consider rural and retail services.

In 1978, when irrigation had been available for 10 years, the index of service provision for total services for the taluka was 9.94, that for the irrigated tract was 13.90, and that for the dry tract was 5.86. The slightly better provision of services in the dry tract in 1968 was sharply reversed. In both rural and retail services the irrigated tract shows higher values than the dry tract. The indexes reflect not only an impressive improvement in service provision in both rural and retail services for the taluka as a whole, but also a significant bias in favor of the irrigated tract.

A Sectoral View of Service Provision

Once large-scale irrigation was accomplished, the government gave a higher priority to the development of agriculture. New varieties of seeds were made available for paddy, groundnuts, and sugarcane in the

Table 23—Patterns of service provision, 1968 and 1978

Service/Unit of Provision	Index of Service Provision 1968	1978
Total service in the taluka	4.58	9.94
Total service in the irrigated tract	4.50	13.93
Total service in the dry tract	4.71	5.86
Rural service in the taluka	2.73	5.55
Rural service in the irrigated tract	2.70	7.79
Rural service in the dry tract	2.79	3.26
Retail service in the taluka	1.85	4.39
Retail service in the irrigated tract	1.80	6.14
Retail service in the dry tract	1.92	2.59

Note: This is the index of services provided in 1 square mile.

irrigated tract and for jowar, pulses, and castor in the dry tract. Moreover, a heavy investment was made in the provision of services necessary to initiate and sustain this new drive for agricultural development. In the dry tract attention was given to the creation of irrigation potential through investment in minor irrigation schemes for construction and repair of tanks; deepening of wells, tanks, and ponds; and repairs to the irrigation channels leading from the tanks.

The government apparently felt that it should not discriminate in favor of the irrigated tract when providing rural services. It recommended a uniform set of services for selected centers.[61] The actual implementation of the plan, however, is more complete in the irrigated tract than in the dry tract.[62] The retail services have followed the pattern set by the rural services. The changes in regional distribution are, again, more impressive in the irrigated tract, where high returns on investment seem assured by a boom in the regional economy.

The problems of agricultural development cannot be solved, as the state government seems to think, by a schematically uniform approach to service provision. As the earlier study showed, the basis for providing these services in rural Miryalguda was going to be uneven within the taluka—more secure in the irrigated tract and less so in the dry tract.[63]

The Spatial Spread of Service Provision

In charting the progress of the settlements that were recommended to become service centers in the earlier study, the number of centers that exist today, the services provided, and the means of provision are compared with the recommendations. This comparison is limited, however, to the rural services, and the retail services are not considered in this aspect of the study.

Although all 22 of the service centers recommended in the earlier study have grown during the last 10 years, they were not the only ones to grow. Three other centers have also emerged, and significantly these too are located in the irrigated tract.

Of the rural services recommended for location, it can be seen that almost all have taken root in these centers, with the exception of a few of the higher-order services, which are missing from some of the service centers in the dry tract (Table 24). This gap between recommended and actual provision arises because the government appears to have held back on investment in the dry tract, perhaps because the returns on investment were not as quick.

The rural services seem to have been provided by the state government both in anticipation of and to satisfy demand. The bases for their provision are both economic and social—economic in growing areas that need the services and social in areas where growth needs to be facilitated. The retail services, which follow the locations of rural services, are located purely as a consequence of local demand.

Within the taluka the process of service provision appears to be influenced by the distribution and hierarchy of settlements. As demonstrated earlier, by 1978 the demographic and service aspects of the settlement system of the taluka were no longer dominated by Miryalguda and Vijayapuri. New centers—almost all of them in the population size group of 2,000-4,999—had emerged as alternative locations for new services. These new centers also provided a base for locating additional rural and retail services in the taluka. This has led to a further reduction in the historically dominant position of Miryalguda and Vijayapuri.

In theory, when a good or a service is provided from a center to its service region, it can be distributed either directly from the center to the settlements in the service region without any regard to the number of hierarchical levels that might exist between them or indirectly through each of these hierarchical levels.

Broadly speaking, in the taluka the rural services follow the indirect pattern and the

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[61] Andhra Pradesh, Department of Finance and Planning, *Area Planning Approach: Integrated Services Through Select Centres* (Hyderabad: Government of Andhra Pradesh Press, 1975), Tables 2, 3, and 4.

[62] Sen et al., *Planning Rural Growth Centers;* Andhra Pradesh, Department of Finance and Planning, *Area Planning Approach.*

[63] Sen et al., *Planning Rural Growth Centers.*

Table 24—Recommended and actual provision of rural services

Service Center	Service Provision	
	Recommended	Provided
Adividevulapalle	Health dispensary, subpost office, bus stop, animal husbandry center, seed, fertilizer, and pesticide distribution	All except subpost office
Anjanpalle	High school, health dispensary, subpost office, bus stop, seed, fertilizer, and pesticide distribution, and animal husbandry center	All except subpost office and animal husbandry center
Damercherla	Health dispensary, subpost office, animal husbandry center, pesticide distribution	All except subpost office
Madgulapalle	High school, health dispensary, subpost office, animal husbandry center, seed, fertilizer, and pesticide distribution	All except subpost office
Pamulapahad	High school, primary credit society, bus stop, subpost office	Primary credit society only
Tadakamalla	High school, health dispensary, subpost office, bus stop, animal husbandry center, seed, fertilizer, and pesticide distribution	All except subpost office and seed, fertilizer, and pesticide distribution
Peddadevulapalle	High school, subpost office, bus stop, animal husbandry center, seed distribution	All except subpost office and seed distribution
Tungapahad	High school, health dispensary, subpost office, primary credit society, seed, fertilizer, and pesticide distribution	Health dispensary and primary credit society only
Veerlapalem	High school, health dispensary, subpost office, bus stop, animal husbandry center, seed, fertilizer, and pesticide distribution	Bus stop only
Anumula	High school, health dispensary, subpost office, bus stop, primary credit society, animal husbandry center, seed, fertilizer, and pesticide distribution	All except high school, subpost office, and animal husbandry center
Chelakurthi	Health dispensary, animal husbandry center, seed and pesticide distribution	All except seed and pesticide distribution
Kannekal	High school, subpost office, health dispensary, animal husbandry center, seed, fertilizer, and pesticide distribution	Health dispensary only
Marepalle	High school, health dispensary, subpost office, animal husbandry center, seed, fertilizer, and pesticide distribution	None
Muppavaram	High school, subpost office, bus stop, health dispensary, animal husbandry center, seed, fertilizer, and pesticide distribution	None
Nellikal	High school, health dispensary, subpost office, bus stop, animal husbandry center, seed, fertilizer, and pesticide distribution	Bus stop only

Table 24—Continued

Service Center	Service Provision	
	Recommended	Provided
Feddavoora	Health dispensary	It has been provided
Perur	High school, health dispensary, subpost office, animal husbandry center, seed, fertilizer, and pesticide distribution	Health dispensary only
Rajavaram	High school, health dispensary, subpost office, bus stop, animal husbandry center, seed, fertilizer, and pesticide distribution	Health dispensary and bus stop only
Ramadugu	High school, subpost office, bus stop, health dispensary, animal husbandry center	Health dispensary and bus stop only
Thummadam	High school, subpost office, bus stop, health dispensary, animal husbandry center, seed, fertilizer, and pesticide distribution	All except subpost office and animal husbandry center

Sources: The recommended services are taken from Lalit K. Sen et al., *Plonning Rural Growth Centres for Integrated Area Development: A Study in Miryalguda Taluka* (Hyderabad: National Institute of Community Development, 1971); the distribution of actual services is from the field survey, 1978/79.

Note: Since Miryalguda and Vijayapuri already had the services that were recommended for location in other centers, the table lists only 20 service centers instead of 22.

retail services follow the direct pattern. There are, however, exceptions to this broad rule. For example, the distribution of lower-order rural services, such as primary schools and primary credit societies, proceeds directly from the headquarters of the taluka to the villages without any regard for the hierarchy of settlements that exists in between, perhaps because the locations of these two services are based on social welfare considerations. The middle-order services such as secondary schools, bus service, rural banks, animal husbandry centers, and fertilizer and pesticide distribution centers, on the other hand, are located indirectly. For example, the 4 higher-order centers in 1968 all had these services; 10 additional centers obtained them during the 10 years of the study; and the other centers are only now obtaining them. The provision of services by the government in a hierarchical manner is consistent with the functioning of the spatial instruments of regional policy in the taluka (Table 25).

The initial investment made by the government was influenced more by social than by economic considerations, especially in the areas of transport, communications, supply of agricultural inputs, banking and credit, marketing, animal husbandry, and health. The government was well aware that they would run at a loss, but to realize the full economic potential of NSP, it was necessary that some agency provide these services, at least in the irrigated tract. Since the private sector was unwilling to undertake the task, the government financed these services from its own development funds and within the framework of its regional policy. Now, after some years of government operations, the private sector has started to provide complementary services in transport, marketing, supply of agricultural inputs, credit and banking, and health, besides exclusively providing the retail services. But this deeper involvement by the private sector in the irrigated tract only underscores that economic considerations govern the location of services in the private sector. Not only do the retail services locate more frequently in the irrigated tract, but some, such as retail cloth stores, general provision shops, pharmacies, fertilizer and pesticide shops, and

Table 25—Locations of selected services since 1968

Service Center	Service				
	Bus Stop[a]	High School	Rural Bank	Animal Husbandry Center	Fertilizer Shop[a]
Miryalguda	+	+	+	+	+
Peddavoora	+	+	–	+	+
Vijayapuri	+	+	+	+	+
Chelakurthi	+	+	–	+	+
Pamulapahad	–	–	–	1972	–
Peddadevulapalle	1974	1975	–	1974	–
Damercherla	+	+	1976	1974	1976
Advidevulapalle	1972	1974	1976	1970	1975
Madgulapalle	+	1974	–	1977	1976
Anjanpalle	1972	1977	1976	–	1976
Tungapahad	+	–	–	1973	–
Tadakamalla	1970	1974	–	1971	1976
Ramadugu	–	–	–	–	–
Kannekal	1977	–	–	–	–
Thummadam	1976	1976	–	–	1975
Muppavaram	–	–	–	–	–
Anumula	1974	–	–	–	1974
Perur	–	–	–	–	–
Veerlapalem	1978	–	–	–	–
Rajavaram	1978	–	–	–	–
Marepalle	–	–	–	–	–
Nellikal	–	–	–	–	–

Source: Field survey, 1978/79.

Notes: + denotes that the service center had the service in 1968/69.
– denotes that the service center did not have the service in 1978/79.

[a] This service exists in both private and government sectors.

hardware shops, have also chosen to locate in the fast-growing middle-size centers noted in Table 25. In 1968 only Miryalguda and Vijayapuri had these retail services.

Another new development taking place is related to the location of agro-based processing industries. The government has provided electricity to all of the 22 service centers, and this has helped to establish rice hullers, flour mills, and oil extraction units. Initially, these agro-based units were located in Miryalguda and to a very small extent in Vijayapuri. Today, all the service centers have them. The government hoped that major agro-based industries such as rice mills, oil mills, sugar mills, mixing plants for livestock feed, and rice bran oil units would be started in the region by the private sector, but the private sector demonstrated the same unwillingness to lead as in the initial stages of the provision of retail services. Thus, the government has taken upon itself the task of providing the infrastructure for the development of agro-based industries. The government has not only built industrial estates, such as those located on the outskirts of Miryalguda, where land, water, electricity, and buildings are made available to private entrepreneurs at highly subsidized rates, but it has also actually entered the business of industrial production. The Food Corporation of India (FCI) rice mill in Miryalguda is one example.[64] As in the case of service provision, the government's concern about providing the necessary infrastructure for a fuller development of the agro-industrial potential of the taluka appears to be both social and economic.

[64] The Food Corporation of India is a quasi-governmental organization that initially procured surplus foodgrains from rural areas for distribution throughout the country. It is now involved in manufacturing and agroprocessing as well.

9

CONCLUSIONS AND POLICY IMPLICATIONS

The analysis presented so far explains the interactions of regional policy and service provision. A number of lessons can be drawn from this study: those of a specific nature have already been noted, but those of a broader nature bear repeating.

It is clear that the overwhelming changes that took place in the study area resulted from the development of agriculture and not of industry. It was the rural segment of the settlement system that was manipulated to locate services. Planning was based on field surveys, which ensures a sufficiently rural view of the problem. This alone makes the whole approach a little more realistic than previous attempts at planning for services in rural India.

Clearly, the current approach to rural development and planning in India, which stresses budgetary allocations and time horizons, can be usefully complemented by a study of spatial organization. What is significant about the spatial approach advocated here is that it views the development plans and processes from the grass-roots level. After the completion of almost five five-year plans, regional planners in India appear to be bogged down in a confusion of their own creation, because of their basic unwillingness to look at new policy options.

District Planning

All the elements that have been described in the discussion so far exist in the politico-administrative framework of the Indian district, which has now become a planning unit. The district has both the executive and financial powers to implement programs of development. Viewed in the temporal scale of five-year plans, service provision in a typical district probably proceeded as follows. In the first stage, services were based entirely in the towns; if the towns did not have the requisite services, they were made available through program funds allocated during the first three five-year plans. It was hoped that once the gaps in service provision were filled, the towns would be able to act as service centers for the surrounding areas. This did not happen because of the unintegrated nature of the urban system. In the second stage, less complex services were located in what were described as service centers, which were largely identified through studies conducted during the Fourth Plan period. The service centers were also unable to serve their rural hinterlands, partly because some people were more mobile than others but also because the frequency of use of services was not uniform throughout the year, which made for uneconomical operation. The next stage (post-Fifth Plan) will perhaps provide for mobile services, which could take advantage of the traditional system of periodic markets in making services more accessible to the people.[65]

Comparison Between 1968 and 1978 Studies

In comparing the findings of the 1978-based study with those of the 1968-based study, particular attention is paid to the critical examination of the assumptions and realities of the planning schemes for service provision.

Cropping Pattern

It was assumed in the earlier study that a two-crop economy would emerge in the area as a consequence of the introduction of irrigation; paddy would be grown in the irrigated tract and groundnuts in the lift-irrigated dry tract.[66] It was also assumed

[65] Wanmali, "The Regulated and Periodic Markets."

[66] Sen et al., *Planning Rural Growth Centers.*

that the cropping pattern would become less diversified once irrigation was available. Neither assumption has held. There is a diversified cropping pattern in both the irrigated and dry tracts. Broadly speaking, paddy and sugarcane appear to be the major crops in the irrigated tract, but on higher irrigated ground, pulses and groundnuts are also grown. Jowar, pulses, and castor are the major crops in the dry tract, but in the lift-irrigated areas within the dry tract, groundnuts and paddy are also grown. Spices and vegetables are grown for the nonfood-producing population in towns such as Miryalguda and Vijayapuri.

The study area has experienced an impressive diversification, intensification, and spatial spread of agricultural activities as a consequence of the NSP project. The effects on the dry tract have also been beneficial. New investment is now being made there in lift, tank, and well irrigation. Similarly, high-yielding varieties of paddy, jowar, castor, and groundnuts have been successfully introduced.

Distribution of Population

The earlier study assumed that the population of the study area would be about 250,000 by the mid-1970s, that the increase in population would not be uniformly distributed in the study area, and that the irrigated tract would behave differently from the dry tract. The irrigated tract was expected to follow a pattern set by West Godavari, one of the delta districts of Andhra Pradesh, as far as increase and occupational pattern of population were concerned.[67] At the time of this writing, the 1981 census figures are not available, but extrapolating the trends for 1961-71 indicates a 1981 population only a little higher than the mid-decade assumption. Two factors not considered in the earlier study are responsible: the dry tract lost population to a greater degree than had been anticipated and the irrigated tract did not gain as much, despite the beginnings of migration into the taluka from the delta districts of Andhra Pradesh. The fault apparently lies with the population projections in the earlier report, which were based on a comparison of Miryalguda to West Godavari without making adjustments for a longer growth period for the latter.

Settlement System

After the completion of NSP construction, the population of settlements such as Vijayapuri and Chelakurthi and the construction camps in settlements along the Left Bank Canal (and some of its distributaries), declined considerably. For the study area as a whole, the decline of population in these settlements was greater than the increase in the irrigated tract. These important demographic, functional, and spatial changes in the settlement system of the study area indicate the emergence of a greatly altered system, which even today is adjusting to changes in the regional economy.

Demographically, the settlement system is less marked by primacy. Miryalguda and Vijayapuri are integrating with the rural settlement system. They are no longer two towns with few strong links to their rural hinterlands. The middle-sized settlements are growing: thus the shift toward a log-normal system is as much a consequence of the increase in the rural population as of the decline in the population of Vijayapuri.

Functionally, the system has become stronger hierarchically. Some of the new rural services have been located according to settlement hierarchy, and higher-order retail services also appear to be located in a hierarchical manner. The spatial spread of the services, both rural and retail, is outward from the major centers such as Miryalguda and Vijayapuri and downward along the settlement hierarchy. Because this has resulted from the policy of filling in the functional gaps in the settlement system by locating rural services in selected centers, the spatial policy of the Government of Andhra Pradesh seems to be successful.

Spatially, the service centers have made services more accessible to the people than ever before. Service areas and service populations generally declined between 1968-78—to a much greater degree in the irrigated tract than in the dry tract. The retail services have followed the lead of the rural services by locating in the service centers as well as

[67] Ibid.

in the middle-sized towns, but they have tended to locate in the irrigated tracts rather than in the dry tracts.

Agro-Processing and Other Industries

Processing of agricultural produce for domestic as well as industrial consumption has become an important aspect of development. In 1978 all service centers had processing units for local consumption and, in part, for processing outside the area. In addition, some, such as Thummadam, Damercherla, Tadakamalla, Peddadevulapalle, and Anjanpalle, had rice mills (2-tons-per-hour capacity). Altogether the town of Miryalguda had 31 of these smaller rice mills (this number had increased to 76 by April 1982); 14 flour mills to process jowar, bajra, and pulses; about the same number of oil mills; and a modern FCI rice mill (8-tons-per-hour capacity). It also had a large agro-industrial complex, which housed processing units for rice bran oil, paints and varnishes, hardboard and cardboard, cattle feed, and agricultural inputs. Not far from the town of Miryalguda on Miryalguda-Huzurnagar Road a new sugar factory was established by the Nizam Sugar Company. A cement manufacturing unit was also established in Vadepalli. An oilseed crushing complex to process castor was under way not far from Nidmanoor, and a large number of workshops for the repair of agricultural implements had emerged. All of these enterprises are in the private sector.

The process of filling in the gaps in service provision, though lagging a little in the dry tract, appears to be near completion. The government is now directing the pattern of spatial interaction by delineating the service areas of animal husbandry centers, rural banks, regulated markets, and foodgrain procurement centers. Though it may be administratively convenient to have the service areas set for each service below the level of the *panchayat samiti,* the government should take steps to ensure that such moves do not create more problems than they solve.

Service Provision and Linkages

This analysis clearly shows that it is possible to chart the pattern of provision of services in a region by planning the settlement system of that region. Services, after all, are located in settlements; therefore, the study of the demographic, functional, and spatial characteristics of a region's settlement system could provide a useful basis for the planning of services in that region.

The linkage effects described earlier are evident in Miryalguda at the village level. The study area grew more crops in 1978—more intensively and over a wider geographical area than in 1968. This improvement in agriculture was not unrelated to other sectoral developments in irrigation, rural electrification, roads, transport, banking, service provision, and agro-industries. Despite the unavailability of household data, it is possible to speculate that this has led to an increase in employment in the study area. New rural services and retail businesses have indeed emerged. What is significant for linkage effects is the shift from purely agricultural occupations to nonagricultural activities. The retail establishments listed in the study would not have emerged in Miryalguda Taluka, at least not with the speed that they have, had it not been for an increase in regional incomes as a consequence of the investment in agriculture. There is, of course, an urgent need to trace these linkage effects in different crop regions of the study area as well as among households.

APPENDIX: SERVICE PROVISION IN MIRYALGUDA TALUKA

Table 26—Relative importance of settlements in services provided, 1968 and 1978

Settlement	1968			1978		
	Rural	Retail	Total	Rural	Retail	Total
1. Abhangapuram	2.04	...	2.04	2.04	1.04	3.08
2. Advidevulapalle	9.88	8.84	18.72	45.55	93.40	138.95
3. Agamothkur	10.90	...	10.90	11.96	2.08	14.04
4. Alagadapa	5.56	11.15	16.71	8.32	69.28	77.60
5. Amangal	5.56	7.04	12.60	21.68	56.44	78.12
6. Anjanpalle	5.40	17.62	23.02	63.96	58.76	122.72
7. Annapureddigudem	1.28	...	1.28	3.36	1.04	4.40
8. Alwal	5.56	...	5.56	5.56	...	5.56
9. Annaram	2.04	...	2.04	2.04	3.92	5.19
10. Annaram	1.00	...	1.00	2.04	2.04	4.08
11. Annavaram	2.20	...	2.20	2.20	...	2.20
12. Anumula	10.24	6.00	16.24	77.52	146.72	224.24
13. Aylapuram	1.00	1.04	2.04	1.00	5.52	6.52
14. Balnepalle	...	...	...	...	1.04	1.04
15. Bejjikal	3.24	1.04	4.28	6.72	7.68	14.40
16. Bheemanpalle	5.88	...	5.88	5.88	4.88	10.76
17. Bommakal	3.20	...	3.20	3.20	...	3.20
18. Borraipalem	3.32	1.04	4.36	5.40	5.20	10.60
19. Buggabhavigudem	6.92	...	6.92	6.92	1.04	7.96
20. Babasahebpet	4.24	...	4.24	5.22	5.20	5.42
21. Bankapuram	...	...	...	1.00	1.04	2.04
22. Bokkamantalapahad	1.00	...	1.00	1.00	1.04	2.04
23. Brundavanpur	2.16	...	2.16	2.16	...	2.16
24. Chalicheemalapalem	...	...	...	...	...	...
25. Chillapuram	...	...	...	...	...	...
26. Chinthapalle	2.04	...	2.04	2.04	2.08	4.12
27. Chinthapalle	2.04	...	2.04	5.28	4.56	9.84
28. Chirumaruthi	1.24	1.04	2.28	5.52	12.88	18.40
29. Chityala	1.00	...	1.00	2.04	2.40	4.44
30. Chelakurthi	25.17	34.24	59.41	38.32	20.56	58.88
31. Chervupalle	5.40	...	5.40	9.24	4.56	14.80
32. Chintalapalem	7.04	...	7.04	8.08	4.16	12.24
33. Damercherla	17.04	10.16	27.20	50.00	44.36	94.36
34. Dilawarpuram	5.52	...	5.52	12.01	9.52	21.53
35. Dacharam	2.04	...	2.04	2.04	1.04	3.08
36. Duggepalle	...	...	...	2.04	2.40	4.44
37. Erkigudem	1.00	...	1.00	2.04	1.04	3.08
38. Gouraram	2.04	...	2.04	2.04	1.04	3.08
39. Gunthipalle	2.04	...	2.04	2.04	1.04	3.08
40. Gandravanigudem	2.16	...	2.16	2.16	...	2.16
41. Goguvanigudem	1.00	...	1.00	2.04	6.48	8.52
42. Gudur	2.28	...	2.28	5.40	6.00	11.40
43. Gajjalapuram	2.04	...	2.04	2.04	2.08	4.12
44. Garnekunta	2.04	...	2.04	2.04	3.44	5.48
45. Gopalapuram	...	...	...	...	...	...
46. Hydlapuram	9.00	...	9.00	9.00	1.04	10.04
47. Indugula	5.52	...	5.52	9.82	...	9.82
48. Itykyala	2.04	...	2.04	2.04	2.08	4.12
49. Ibrahimpet	9.24	...	9.24	11.72	2.08	13.80
50. Jammankota	...	...	...	...	...	...
51. Kallepalli	5.52	...	5.52	6.56	1.04	7.60
52. Kalvapalle	2.04	...	2.04	2.04	3.44	5.48
53. Kalvalapalle	2.04	...	2.04	2.04	...	2.04
54. Kamepalli	...	...	...	...	...	...
55. Keshavapuram	...	...	...	...	...	...
56. Keshavapuram	2.16	...	2.16	7.04	...	7.04

Table 26—Continued

Settlement	1968			1978		
	Rural	Retail	Total	Rural	Retail	Total
57. Kishtapuram	2.04	...	2.04	2.04	4.56	6.60
58. Kondrapole	11.20	6.00	17.20	31.64	27.32	58.96
59. Kothagudem	6.00	...	6.00	12.67	5.20	17.87
60. Koyalpahad	1.00	...	1.00	1.00	1.04	2.04
61. Kukkadam	9.24	...	9.24	13.92	6.00	19.92
62. Kothapalle	4.48	...	4.48	6.60	3.52	10.12
63. Kumarikuntakalva	...	...	...	...	...	...
64. Kuppaspalle	...	...	...	...	...	...
65. Kamareddigudem	2.04	...	2.04	2.04	1.04	3.08
66. Kampalapalle	...	...	...	...	...	...
67. Kampasagaram	2.04	...	2.04	2.04	2.40	4.44
68. Kannekal	11.40	1.04	12.44	19.52	6.64	26.16
69. Kompalle	1.00	...	1.00	4.24	...	4.24
70. Konthalapalle	...	...	...	...	...	...
71. Kosalmari	...	...	...	...	...	...
72. Kothalur	2.04	...	2.04	2.04	1.04	3.08
73. Lingampalle	1.00	...	1.00	2.16	...	2.16
74. Matur	...	...	...	2.04	2.52	4.56
75. Molkacherla	...	...	...	1.00	1.04	2.04
76. Molkapatnam	1.00	...	1.00	2.04	6.96	9.00
77. Mudimanikyam	1.00	...	1.00	1.00	2.40	3.40
78. Mulkalakalva	1.00	...	1.00	2.04	3.44	5.48
79. Miryalguda	745.76	513.41	1,259.17	2,098.09	1,299.24	3,397.33
80. Marepalle	4.24	5.04	9.28	9.80	16.00	25.80
81. Marpaka	5.52	...	5.52	9.36	3.56	12.92
82. Madgulapalle	5.52	6.00	11.52	21.52	38.08	59.60
83. Mukkamala	1.00	...	1.00	1.00	1.04	2.04
84. Muppavaram	11.28	2.08	13.36	13.12	10.08	23.20
85. Nandipahad	1.00	...	1.00	4.24	6.00	10.24
86. Narasapuram	...	...	...	...	...	...
87. Nidmanoor	20.56	45.76	66.32	149.65	213.06	362.71
88. Narsimhulugudem	1.00	...	1.00	2.04	...	2.04
89. Nehtapuram	1.00	...	1.00	4.24	2.08	6.32
90. Narlikantigudem	...	...	...	...	...	...
91. Nellikal	2.00	2.12	4.12	9.32	9.80	19.12
92. Palem	1.00	...	1.00	1.00	...	1.00
93. Peddavoora	29.60	7.36	36.96	144.34	19.32	163.66
94. Perur	4.24	7.68	11.92	14.96	40.66	55.62
95. Pamulapahad	26.95	1.04	27.99	24.40	10.80	35.20
96. Pervedula	4.24	1.04	5.28	10.40	15.68	26.08
97. Peddadevulapalle	22.40	4.56	26.96	36.20	23.30	59.50
98. Pulimamidi	2.04	...	2.04	4.60	8.00	12.60
99. Pusalapahad	...	...	...	...	1.04	1.04
100. Ragadapa	5.40	...	5.40	9.24	9.44	18.68
101. Ravulapenta	10.04	...	10.04	12.96	10.80	23.76
102. Rayenpalem	3.20	...	3.20	4.24	2.08	6.28
103. Regulagadda	3.20	...	3.20	3.20	1.04	4.24
104. Rudravaram	6.68	...	6.68	11.80	2.08	13.88
105. Rajavaram	5.42	4.56	9.98	11.52	16.80	28.32
106. Ramadugu	5.36	2.12	7.48	14.04	11.84	25.88
107. Sangaram	1.00	...	1.00	4.60	3.44	8.04
108. Sakhapuram	1.00	...	1.00	1.00	1.04	2.04
109. Silgapuram	...	...	...	...	...	...
110. Salkanoor	...	...	...	8.12	7.28	15.40
111. Settipalem	...	2.08	2.08	12.39	10.80	23.19
112. Sirsangandla	4.84	...	4.84	10.64	5.60	16.24
113. Sreenathapuram	1.00	...	1.00	1.00	1.04	2.04
114. Sriramapuram	3.32	...	3.32	4.60	1.04	5.64
115. Surepalle	5.88	...	5.88	5.88	1.04	6.92
116. Tammadpalle	...	...	...	...	...	5.52
117. Teppalamdugu	2.04	...	2.04	2.04	1.04	3.08
118. Tungaturthi	5.52	4.56	10.08	35.23	32.04	67.27

Table 26—Continued

Settlement	1968			1978		
	Rural	Retail	Total	Rural	Retail	Total
119. Tadakamalla	9.80	4.26	14.06	54.24	20.20	74.44
120. Takkalapahad	2.04	...	2.04	2.04	1.04	3.08
121. Tallaveerappagudem	2.04	...	2.04	2.04	2.08	4.12
122. Topcherla	8.20	...	8.20	9.24	2.08	11.32
123. Thimmapur	...	...	...	5.52	...	...
124. Thimmapuram	6.34	...	6.34	8.24	3.52	11.76
125. Thimmareddigudem	...	...	...	5.52	...	5.52
126. Tungapahad	15.95	4.56	20.51	45.88	17.84	63.72
127. Thunkinthula	2.16	...	2.16	2.16	...	2.16
128. Turkapalle	1.00	...	1.00	1.00	...	1.00
129. Thimmaipalem	1.00	...	1.00	1.00	...	1.00
130. Tirumalgiri	4.24	7.36	11.60	37.04	54.80	91.84
131. Tripuraram	8.08	19.00	27.08	36.83	107.08	143.91
132. Thummadam	8.76	23.04	31.80	35.88	87.16	123.04
133. Ulshayapalem	...	...	...	...	2.08	2.08
134. Utkur	4.24	...	4.24	10.87	6.00	16.87
135. Vallabhapuram	1.00	...	1.00	1.00	...	1.00
136. Velmagudem	4.24	...	4.24	5.28	7.04	12.32
137. Vempahad	1.00	...	1.00	2.04	...	2.04
138. Vadepalle	9.00	1.04	10.04	38.75	1.04	39.79
139. Veerlapalem	4.36	4.16	8.52	11.44	33.20	44.64
140. Vemulapalle	13.36	4.56	17.92	48.85	51.24	100.09
141. Venigandla	2.04	1.04	3.08	4.24	9.12	13.36
142. Venkatadripalem	1.00	...	1.00	4.60	7.68	12.28
143. Venkatadripalem	3.20	...	3.20	3.20	...	3.20
144. Vijayapuri	715.97	604.56	1,320.53	491.96	387.36	879.32
145 Yadgarpalle	5.40	1.04	6.44	5.40	9.76	15.16
146. Yacharam	8.08	1.04	9.12	9.22	16.16	25.38
147. Yerraballi	9.60	1.04	10.64	17.43	22.80	40.23
148. Yellapuram	1.00	...	1.00	3.24	4.56	7.80
149. Zapathiveerappagudem	1.00	...	1.00	1.00	1.04	2.04
150. Vootlapalle	8.08	1.04	9.12	15.91	5.20	21.11

Note: The methodology used to arrive at the centrality scores that determine relative importance is discussed in Chapter 6.

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