PN-AAS-496

RESEARCH REPORT

48

RURAL HOUSEHOLD USE OF SERVICES: A STUDY OF MIRYALGUDA TALUKA, INDIA

Sudhir Wanmali

March 1985

INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE

INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE

The International Food Policy Research Institute was established to identify and analyze alternative national and international strategies and policies for meeting food needs in the world, with particular emphasis on low-income countries and on the poorer groups in those countries. While the research effort is geared to the precise objective of contributing to the reduction of hunger and malnutrition, the factors involved are many and wide-ranging, requiring analysis of underlying processes and extending beyond a narrowly defined food sector. The Institute's research program reflects world-wide interaction with policymakers, administrators, and others concerned with increasing food production and with improving the equity of its distribution. Research results are published and distributed to officials and others concerned with national and international food and agricultural policy.

The Institute receives support as a constituent of the Consultative Group on International Agricultural Research from a number of donors including the governments of Australia, Brazil, Canada, the People's Republic of China, the Federal Republic of Germany, India, Italy, Japan, the Netherlands, the Philippines, Spain, Switzerland, the United Kingdom, and the United States; the World Bank; the Ford Foundation; the International Development Research Centre (Canada); and the Rockefeller Foundation. In addition, a number of other governments and institutions contribute funding to special research projects.

IFPRI CELEBRATES 10 YEARS

IFPRI was incorporated in March 1975 and by the end of that year, with a staff of four and a Board of Trustees of five, began to undertake research on issues related to food production and consumption in low-income countries. Four years later, the Institute became a member of the Consultative Group on International Agricultural Research (CGIAR). Initially, IFPRI's research was heavily focused on Asia in recognition of the importance of the region's food and poverty problems and because of the wealth of data and analytical capacity that could be built on and used later. In 1984 IFPRI underwent its first five-year review by the Technical Advisory Committee to the CGIAR. The review panel stated, "In the 10 years since its foundation, IFPRI's mandate and its research have clearly evolved in response to changing needs and perceptions of the problems faced by developing countries." They are still evolving. As we look to the next decade, we see that food issues continue to loom large in Third World development. The food problems of Africa are now especially challenging, and IFPRI's experience both allows us to place these problems in a broader perspective and to facilitate developing approaches to deal with them. IFPRI celebrates its tenth anniversary this year. We look forward to our continuing evolution, enabling us to meet the challenges of the next decade.

BOARD OF TRUSTEES

Samar R. Sen
Chairman, India

Ralph Kirby Davidson
Vice Chairman, U.S.A.

Eliseu Roberto
de Andrade Alves
Brazil

Yahia Bakour
Syria

Lowell S. Hardin
U.S.A.

Ivan L. Head
Canada

Nurul Islam
Bangladesh

Anne de Lattre
France

James R. McWilliam
Australia

Philip Ndegwa
Kenya

Saburo Okita
Japan

Leopoldo Solís
Mexico

T. Ajibola Taylor
Nigeria

Snoh Unakul
Thailand

Dick de Zeeuw
Netherlands

John W. Mellor, Director
Ex Officio, U.S.A.

RURAL HOUSEHOLD USE OF SERVICES: A STUDY OF MIRYALGUDA TALUKA, INDIA

Sudhir Wanmali

Research Report 48
International Food Policy Research Institute
March 1985

Copyright 1985 International Food Policy Research Institute.

All rights reserved. Sections of this report may be reproduced without the express permission of but with acknowledgment to the International Food Policy Research Institute.

Library of Congress Cataloging in Publication Data

Wanmali, Sudhir.
Rural household use of services.

(Research report / International Food Policy Research Institute ; 43)
Bibliography: p. 54.
1. Households—India—Miryalguda Taluka. 2. Service industries—India—Miryalguda Taluka. 3. Cost and standard of living—India—Miryalguda Taluka. 4. Quality of life—India—Miryalguda Taluka. I. Title. II. Series: Research Report (International Food Policy Research Institute) ; 48.

HB3640.M57W36 1985 338.4'6'095484 85-2344
ISBN 0-89629-049-2

√

CONTENTS

Foreword

1. Summary 9

2. Introduction 12

3. The Regional Economy of Sample Villages 17

4. The Economic Characteristics of Households 21

5. Patterns of Services Use 29

6. Changing Patterns of Household Economy and Service 41

7. Policy Implications 45

Appendix: Supplementary Tables 48

Bibliography 54

TABLES

1. Population of sample villages, 1981, and sample size of households, 1982 16
2. Land use in the sample villages, 1981 17
3. Cropped area in the sample villages, by season, 1981 18
4. Irrigated and unirrigated crops, 1981 18
5. Total irrigated area of the sample villages, 1981 19
6. Sources of irrigation in the sample villages, 1981 19
7. Services within and outside the sample villages, 1982 20
8. Number of sample households in each category of operational landholdings, 1982 21
9. Operational landholdings of sample households, 1982 22
10. Population of the sample households, 1982 22
11. Per capita availability of land for the sample households, 1982 23
12. Extent of irrigation on the operational landholdings of the sample households, 1982 23
13. Share of operational landholdings irrigated, 1982 24
14. Average amount of credit and finance made available, by source, 1982 24
15. Value of livestock owned by sample households, 1982 25
16. Wages earned and paid by families from their own farm or business, 1982 25
17. Value of household goods and agricultural implements of sample households, 1982 26
18. Expenses of sample households, 1982 26
19. Value of stocks of sample households, by crop, 1982 27
20. Correlation coefficients for major economic characteristics of sample households, 1982 28
21. Distance to services and frequency of use of them in the irrigated and dry tracts, by service group, 1982 31

ILLUSTRATIONS

22. Average frequency of use by average distance of services, 1982 32

23. Distances traveled by sample households to use services, 1982 36

24. Effects of distance and economic status on the frequency of use of services, 1982 37

25. Distance elasticities, 1982 40

26. Economic status of sample households by tract, 1968 and 1981 42

27. 1982 indexes showing the change in the economic status of sample households since 1968 by size of operational landholding 42

28. Distance of services from sample households and frequency of use among sample households, 1968 and 1982, and 1982 index showing changes in service use since 1968 43

29. Percentage of sample households using services, by size of operational landholding 48

30. Aggregated percentages of sample households using services, 1982 50

31. Use pattern of services: frequency and distance, by percent of sample households using services 52

1. Miryalguda Taluka 15

2. Relationship between frequency of use by households and the number of services used, 1982 30

3. Relationship between frequency of use of services by households and the distance traveled to them, 1982 31

4. Relationship between the size of operational landholdings and the distance traveled to services by households, 1982 33

5. Relationship between the size of operational landholdings and the number of services used by households, 1982 34

6. Relationship between the size of operational landholdings and the frequency of use of services by sample households, 1982 35

FOREWORD

Research at the International Food Policy Research Institute (IFPRI) has emphasized the linkages between technological change in food production, increased supplies of food, increased farmer incomes, and the growth of other sectors of the economy. The employment multiplier, which can spread the benefits of technological change in food production to lower income people, has been of greatest interest. IFPRI research explored the nature of the demand patterns that are so important in these linkages in *Rural Growth Linkages: Household Expenditure Patterns in Malaysia and Nigeria*, Research Report 41, by Peter B. R. Hazell and Ailsa Röell. A rapidly growing research effort is exploring how rural services affect these linkages and multiplier processes. In Sudhir Wanmali's earlier report, *Service Provision and Rural Development in India: A Study of Miryalguda Taluka*, Research Report 37, he showed how the effects of an increase in agricultural production caused by the extension of irrigation to a region could spread throughout the rural economy. The report also showed how that spread was enhanced by the provision of services by the government.

The current report builds on that previous work and looks at the way households use services. Its conclusions on the importance of economic status and distance to a household's access to services can be used to improve the way the provision of services is planned.

It is notable that the study shows that improvements in economic conditions in the decade and a half that followed the introduction of a major irrigation project permeated all economic classes. They all seem to have participated in the processes of agricultural growth. It is also notable that the use of services of all types gradually devolved to lower income groups but generally only after the upper income groups had been saturated with the services. The descriptions of the hierarchy of service provision and the relation of services to space provide the basis for policies to improve service provision and the efficiency of rendering these services. IFPRI's research on these processes is expanding and will soon make it possible to compare these processes in several parts of the world. Such comparative analyses will greatly increase our understanding of how the provision of services can affect agricultural growth.

John W. Mellor

Washington, D.C.
March 1985

ACKNOWLEDGMENTS

This study is a sequel to an earlier work on service provision and rural development in India that was published by IFPRI as its Research Report 37. It is based on the data collected from the households in the study area, which was complemented by the official records made available by the government offices in Miryalguda, Nalgonda, and Hyderabad in Andhra Pradesh, India.

I am most grateful to John Mellor for his sustained interest in this work. He read an earlier draft of the manuscript critically, and his comments were of great help in subsequent revisions of the text and in sharpening many of the arguments contained therein.

No study of this kind can hope to be completed without the willing cooperation of the government officials, fellow research workers, and friends in the field as well as without the encouragement of those with whom one is privileged to work. I am most grateful to M. H. V. Bhave, A. Mallikarjuna Rao, Y. Gangi Reddy, A. Janga Reddy, R. Narasimha Reddy, M. Sesh Kumar, V. S. R. R. Suryudu, and their able leader and my old friend, D. V. Ramana, for their help in collecting the data; to K. M. Ahmed, IAS; K. Madhava Rao, IAS; V. Ramana Rao, IAS; Y. Venugopal Reddy, IAS; B. P. R. Vithal, IAS; the late Waheeduddin Khan; and Afzal Mohammed for providing the administrative help in conducting the field survey and also for giving me access to the official records of the government offices in the field; and to Ojetunji Aboyade, Richard Adams, Raisuddin Ahmed, Harold Alderman, B. H. Farmer, Peter Hazell, Dayanatha Jha, Chandrashekhar Ranade, J. S. Sarma, Ram Yadav, and the anonymous referees for their comments on the manuscript. I have benefited greatly from them, although I alone am responsible for any errors of omission and commission in the text.

I am grateful to Rosalyn Millman for her assistance in analyzing the data.

1

SUMMARY

Although a great deal is known about the economic aspects of farmers' access to some production-oriented services (such as banking, trade, transportation, fertilizer distribution, and marketing), much less is known about the geographical aspects of these services, particularly those of distance and access. The ease or difficulty of access to these services also influences the development of agriculture or the lack of it in any region. When planned locationally, such services have improved farmers' access to other publicly and privately controlled services. But even where attempts to provide certain services appear to have made the entire system of goods and services more accessible to the rural population, important inefficiencies have arisen because of a lack of understanding of the patterns of service use. The next stage of service provision could take these factors into account and make services more accessible to rural people.

The current study is based on data on economic status and service use collected from 369 sample households from 10 villages of the dry and irrigated tracts of Miryalguda Taluka in Andhra Pradesh. The taluka, an administrative unit, is situated in the command area of the Nagarjunasagar Irrigation Project on the River Krishna. The villages were selected on the basis of the specialization in their cropping pattern (reflecting the ease of access to water), and the households were selected on the basis of a stratified random sample of the landless and the cultivating households. The survey was conducted from February to May of 1982.

The following data on the socioeconomic status of households was collected: family size, main occupation of the head of the household, the size of operational landholding, irrigation status of land, farm and nonfarm buildings owned, household goods and agricultural implements owned, farm and nonfarm expenses, and farm and nonfarm (but agriculture-related) stocks. All are known to affect the pattern of use of services directly or indirectly. The pattern of use of services was identified by queries about the services the households used, the distance these services were located from households, how often they were used, and the usual mode of transportation to them. The questions were also asked for 1968, the year when the irrigation waters were first released into the study area.

The sample villages had, on average, just about a third of their land (5,153 hectares) under crops, but the gross cultivated area, at least in the sample villages of the irrigated tract, was quite extensive. Almost 96 percent of the area was cultivated in the *kharif* season (summer); two crops of paddy were normally harvested, though it was not unusual to see a third crop of paddy, most often in the part of the tract irrigated by wells and tanks. The average irrigated area of the sample villages was about 56.75 percent of the total cropped area. The intensity of irrigation was almost double in the villages of the irrigated tract, but it was also quite impressive (though on a smaller scale) where land could be irrigated using wells.

The poorer intensity of cropping coupled with poorer availability of water can, and does, result in a crop regime that provides not much more than subsistence. If physical access to the services necessary for agricultural activities were poorer in these less productive tracts, then the basis for growth could be even weaker.

The inhabitants of the sample villages used 84 kinds of goods and services; 27 of these were essentially provided by the government (and are called rural services) and the rest by the private sector (these are called retail services). All the villages satisfied more than 70 percent of their demand for goods and services through outside service centers. And the 10 services favored most varied between sample villages and between sample households. However, it is significant that all service centers that the sample villages and households interacted with were those that a set of earlier studies recommended be established. One of the major objectives of this study is to identify differences in the use of services among inhabitants of the irrigated and dry tracts and among households of different economic status.

Preceding Page Blank

It was assumed that a household would have a higher economic status and greater mobility over space if its operational landholdings were large with a high proportion of irrigated land, if the value of its livestock, household goods, agricultural implements, and farm and nonfarm stock were high, if its farm and nonfarm expenses were high, and if the availability of and access to capital were excellent. In order to understand the differences in the patterns of service use, the households were divided into six categories: the landless, marginal farmers (owning 0-0.99 hectares), small farmers (owning 1-1.99 hectares), medium farmers (owning 2-3.99 hectares), large farmers (owning 4-9.99 hectares), and largest farmers (owning 10 hectares or more).

The economic status of households in the irrigated tract, irrespective of the size of their operational landholdings, has improved. More than one crop of paddy is grown by those who have reasonable access to water. There is also evidence of diversification, not only in cropping but also in other rural-related activities.

The patterns of service use were analyzed on the basis of the number of services used, the number of households using those services, the frequency of use of services, and the distances traveled by consumers to use the services. Service use is presented in the aggregate and after being disaggregated. When aggregated, the households are grouped into those from the dry and the irrigated tracts and the services are considered individually. When disaggregated, the households are categorized by the size of their operational landholdings and the services are grouped.

Although the services were available, villages and households did not necessarily use them with uniform frequency. Some households used services that others did not or used a particular group of services more often than others. Such variations are sometimes simply a function of the distance of services from the household in question.

Services were more frequently used and were available at shorter distances in the irrigated tract than in the dry tract. Four predominant patterns of service use can be identified: low service use where services were demanded and supplied at shorter distances from the sample households; low service use where services were demanded and supplied at greater distances; high service use where services were demanded and supplied at shorter distances; and high service use where services were demanded and supplied at greater distances.

Services can also be categorized by the nature of their use, such as whether they are oriented toward production or consumption. Thirty-two services were production oriented (of these, 27 were rural services and 5 were retail services), and of the 52 consumption-oriented services, 20 were categorized as food and personal services and the rest as consumer durables.

The frequency at which services are used can be influenced by distance, the income of a household, or both. A regression analysis shows that income was significant for a little more than a third of the services; and both income and distance were significant for a little less than a fourth of the services. There are 32 services in the study area that were distributed so that neither distance nor economic status really influenced their use, though their patterns of use varied.

A brief, comparative analysis of service use in 1968 with service use in 1982 was made to gain some understanding of the development processes at work. The basis for making this kind of comparison, however, is somewhat weak because some of the 1968 household data (entirely collected on "recall") cannot be relied upon for substantive statements on the process of change. Bearing this in mind, the direction of changes in the economic status of households and in the provision and use of services in the study area can be speculated about. The indexes of change in households of differing economic status demonstrate that the households in the irrigated tract continued to be better off than those in the dry tract; but that not only did the rich households continue to get richer; the marginal, small, and medium farmers, too, became economically more mobile.

Based on the data from the two time periods, a number of observations can be made with regard to the use of services: services located further away from the sample households were used less frequently; services served by better means of transportation were located at greater distances; and services were more accessible to households because they were located nearer the households than before. The data from the field demonstrate that these observations are true for both time periods, for the irrigated and the dry tracts, and for the study area as a whole.

There appears to be a time sequence governing the pattern of service provision

and use within the region: after the development reached a point of "saturation" in the irrigated tract and among the large and the largest farmers, other regions (such as the dry tract) and other sections of society (such as medium, small, and marginal farmers and the landless) also appeared to benefit.

This research has general implications for policy. It showed that the frequency of use of rural services is different for individual services and that the frequency of use in the study area declines as distance increases. These services, for which the government is mostly responsible, could be made available from the service centers in a mobile manner. This mobile provision could also take advantage of the existing spatiotemporal patterns of the periodic local markets in the study area. This would reduce the costs of establishing, maintaining, and using these services.

The location of rural services has given rise to privately owned outlets selling retail goods in the same locations as the government outlets in the study area. In the past these services were offered in Miryalguda and Vijayapuri. Now some of these are also available in the 20 other service centers of the study area. It is hoped that government decisions on the location of services in the rural parts of the study area will continue to influence those of the private sector.

It has been demonstrated that the emergence of and improvement in the provision of retail services to households in the study area are a direct consequence of the demand linkages emanating from the overall development in agriculture. There is a good deal of evidence to suggest that all segments of society have benefited from these services, which indicates that all segments actively participate in the rural economy.

It can be argued from the above discussion that a pattern of increasingly accessible and used service systems would reduce the overall cost and time spent in procuring services, other things being equal. This would make more time and money available for further investment in the productive and consumer sectors of the rural economy. Appropriate planning for the regional distribution system of goods and services is likely to strengthen the service and demand linkages of households.

2

INTRODUCTION

Attempts have been made in India to provide easy access to a variety of services necessary for the development of agriculture. But these services have been centered around towns and cities and within the urban segment of the settlement system of India.[1]

In some more recent studies and government reports, however, it was noted that when the design of services takes into account the demographic, functional, and spatial characteristics of the rural segment of a settlement system, the services not only become more accessible to the population at large but the settlement system itself gains in articulation.[2]

These studies attempted to analyze how service provision can facilitate the development of agriculture and vice versa. Some emphasized the roles of government and the private sector in providing service facilities, the importance of the location of these facilities, and the ways in which the government could improve the channels of distribution of goods and services through its own investment and through its policies toward the private sector.[3]

Adequate geographical access to goods and services is crucial if increases in agricultural productivity are to translate into successful rural development. It must be borne in mind, however, that productivity does not increase unless infrastructural facilities and services are adequately provided.

In fact, a sequence of successful rural development can be traced. In order to facilitate the cultivation of crops (besides providing roads and irrigation), a set of production-oriented services are established (such as banking, trade, transportation, communications, input distribution centers for seeds, fertilizers, and pesticides, and marketing). This results in higher agricultural production, which raises the incomes of cultivating and noncultivating households (the incomes of the latter through additional employment opportunities on and off the

---

[1] Many studies and government reports have contributed significantly to an understanding of the problems and the processes of spatial planning in India. Most, however, have concentrated on improving the articulation of the urban segment of the settlement system. The studies include Ashok Mitra, *Levels of Regional Development in India*, Census of India Technical Paper (New Delhi: Manager of Publications, 1961); J. E. Schwartzberg, "Three Approaches to the Mapping of Economic Development in India," *Annals of the Association of American Geographers* 52 (1962): 455-468; V. L. S. Prakasa Rao, *Towns of Mysore State* (London: Asia Publishing House, 1964); National Council of Applied Economic Research, *Market Towns and Spatial Development in India* (New Delhi: NCAER, 1965); Sudhir Wanmali, "Hierarchy of Towns in Vidarbha, India and its Significance for Regional Planning," Discussion Papers Nos. 23 and 24, Graduate School of Geography, London School of Economics and Political Science, London, 1968; E. A. J. Johnson, *The Organization of Space in Developing Countries* (Cambridge, Mass.: Harvard University Press, 1970); R. P. Misra, K. V. Sundaram, and V. L. S. Prakasa Rao, *Regional Development Planning in India: A New Strategy* (New Delhi: Vikas, 1974); 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). The government reports are India, Town and Country Planning Organization, *Planning Regions of India* (New Delhi: Manager of Publications, 1968); India, Town and Country Planning Organization, *Regional Imbalances in India: Some Policy Issues and Problems* (New Delhi: Manager of Publications, 1971); and India, Ministry of Works and Housing, *National Urbanization Policy* (New Delhi: Manager of Publications, 1975).

[2] The government reports include the reports by Andhra Pradesh listed in the bibliography. The studies include 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); Sudhir Wanmali and Waheeduddin Khan, "Role of Location in Regional Planning with Particular References to the Provision of Social Facilities," *Behavioural Sciences and Community Development* 4 (1970): 65-91; 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); Shah Manzoor Alam and Waheeduddin Khan, *Metropolitan Hyderabad and its Region: A Strategy for Development* (Bombay: Asia Publishing House, 1972); S. M. Shah, "Growth Centers as a Strategy for Rural Development: India Experience," *Economic Development and Cultural Change* 22 (January 1974): 215-228; I. S. Bhat, *Micro-Level Planning: A Study of Karnal Area, Haryana, India* (New Delhi: K. B. Publications, 1976); Sudhir Wanmali, *Periodic Markets and Rural Development in India* (New Delhi: B. R. Publishing Corporation, 1981); Sudhir Wanmali, *Service Provision and Rural Development in India: A Study of Miryalguda Taluka*, Research Report 37 (Washington, D.C.: International Food Policy Research Institute, 1983); and Sudhir Wanmali, "Service Provision, Spatial Intervention and Settlement Systems: The Case of Nagpur Metropolitan Region, India," *Annals of the National Association of Geographers of India* 3 (No. 2, 1983): 27-65.

[3] Sen et al., *Planning Rural Growth Centres*, and Wanmali, *Service Provision and Rural Development*

farm). These higher incomes generate greater demand for other consumer goods and services. There is, of course, a time scale in which the entire scenario can unfold, but previous studies have demonstrated that it can be speeded up by investing in critical inputs such as irrigation, electrification, and roads (hard infrastructure) as well as in production-oriented services of the type noted above (soft infrastructure).

Although the economic importance of farmers' access to some agroservices is well established, much less is known about the significance of the location of these services and about the ease of access farmers have to consumer goods and services. As noted above, government investment in local "soft" infrastructural facilities is an important determinant of the type and location of complementary services provided by the private sector. For example, in Miryalguda Taluka in Andhra Pradesh, an investment in roads, marketing, credit facilities, banking, veterinary services, and provision of seeds, fertilizers, and pesticides by the government at selected settlements gave rise to private investment in road transportation services, trucking, storage, warehousing, and processing facilities and to the establishment of a number of shops providing goods and services to consumers.[4] When planned locationally, such services can lead to obvious advantages in farmers' physical access to both publicly and privately controlled services.

Even where attempts by the government to provide certain services appear to have been successful in making the entire system of distribution of goods and services more accessible to the rural population, important inefficiencies appear to have arisen because of a lack of understanding of the patterns of service use. This has occurred because differences in the behavior of different types of households have been inadequately recognized (some goods and services are required much less frequently than others and income differences in households are reflected in their spatial demand for goods and services). Furthermore, no attempt was made previously to explore the patterns of distribution of complementary services provided by the private and the traditional sectors. It has been shown in some recent studies that the channels of marketing of private-sector, urban-consumer goods and periodic markets have helped to make services more accessible to the consumer than before.[5] The present system of distribution of goods and services, however, fails to use the immense potential of private and traditional systems to provide some of these services.

These inefficiencies in the provision of government services bring up wide-ranging questions for policy. Should the government continue to invest in infrequently used services in the present manner, or does the manner need to be changed? How can this be achieved? What are the spatial implications of the differences in access that rural people have to the same set of services? Are there any lessons to be learned from private and traditional systems when planning for the distribution of goods and services to rural areas?

In a precursor to this study, it was noted that service provision in a rural area can be planned with the help of an analysis of the areas' settlement system.[6] In that study it was also noted that the overwhelming changes that have taken place in Miryalguda Taluka have resulted from agricultural rather than industrial development, and that agricultural development can provide a strong impetus to general economic development. In that analysis, however, household data, not having been collected, was not included. Therefore, the author only speculated on the increase in incomes of households in the taluka and observed that the provision of both irrigation water and services were responsible for the growth in agricultural activity. This spurred economic growth in other sectors of the economy. For example, retail businesses would not have emerged so rapidly if household incomes had not also grown throughout the region. The study concluded by stating that there is an urgent need to trace the links between incomes and service use among households in the same taluka.[7]

The same study also attempted to put

[4] For details, see Wanmali, *Service Provision and Rural Development*

[5] For details, see Wanmali, *Periodic Markets and Rural Development*

[6] For details, see Wanmali, *Service Provision and Rural Development*

[7] Ibid.

service provision in rural India on a time scale that could be read in the context of postindependence development plans. It was noted, for example, that in the first stage of service provision in a typical district, services were based entirely in towns. If the towns did not have the requisite services, these were made available through funds allocated during the first three five-year plans (1951-66). It was hoped that once the gaps in service provision were filled, the towns would be able to act more effectively as service centers for the surrounding areas. This did not happen because of the unintegrated nature of the urban settlement system.

In the second stage less complex services were located in what were described as service centers. These were villages with populations large enough to support these services. They were largely identified through studies conducted during the Fourth Plan period (1969-74). The service centers were limited in their ability to serve their rural hinterlands efficiently, partly by the greater mobility of some consumers and partly by seasonal differences in the frequency of use of services.[8] It was suggested that the next stage could be the provision of mobile services which could take advantage of the differences in the frequency of use of services and the availability of periodic markets in making services more accessible to people.

The Study Area

Miryalguda Taluka is one of the seven administrative subdivisions of Nalgonda District in Andhra Pradesh, India (see Figure 1). It is bounded on the north by Nalgonda Taluka, on the east by the River Musi and the talukas of Suryapet and Huzurnagar, and on the west by Devarkonda Taluka. Beyond the southern boundary formed by the River Krishna lies Guntur District. Miryalguda Taluka extends over an area of 1,974.6 square kilometers. Its population according to the 1981 census of India was 265,894. There are 158 settlements in the study area of which two are towns: Miryalguda, the headquarters of the taluka, and Vijayapuri, the headquarters of the Nagarjunasagar Irrigation Project. Eight villages are uninhabited. The climate of the taluka is arid to semiarid, and until the introduction of the above-mentioned irrigation project, it was one of the major drought-prone areas of the state. Annual rainfall is about 745 millimeters, concentrated between June and September.

Scope of the Study

This is a study of the interaction of several spatial and socieconomic factors in the study area. The patterns of the provision and use of these services vary, as was seen in an earlier study, between the dry tract and the irrigated tract. It was hypothesized that they also vary between poor households and rich households and between households with different occupations, such as cultivators, traders, and those engaged in services.[9] The differences and variations between the irrigated and the dry tracts of the study area are emphasized in this study, and an attempt is made to emphasize how the spatial behavior of households differs by economic status.

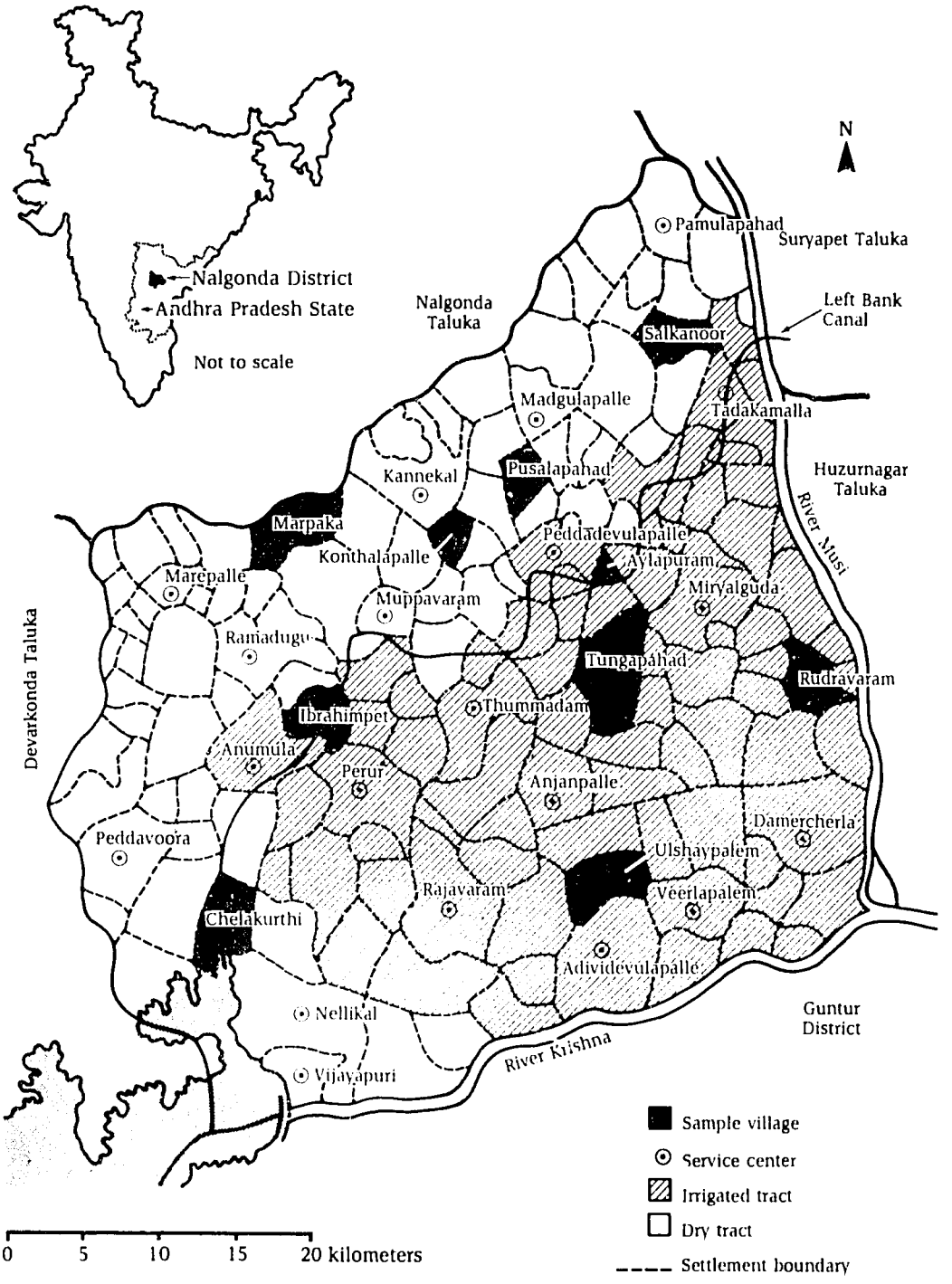
After the method of selection and characteristics of the sample villages and households are described, patterns of use of services by the households of the sample villages are presented in detail. The nature of improvement in the access to services is discussed in a simple framework of their use and nonuse, and then the complex relationships of distance and frequency of use per year are superimposed on it. The relationships between the economic status of households and the use of services are also examined, as are effects of spatial and economic factors on the patterns of use of services by households.

The analysis was conducted using data from the field survey made between February and April, 1982. Similar information was col-

[8] Sudhir Wanmali, "Popular Participation and Organization, Distribution and Consumption of Social Services and Facilities in Rural Human Settlements: An Indian Experience." Institutional Development and Popular Participation Section, Social Development Division of the United Nations, New York, 1976 (mimeographed).

[9] A similar hypothesis was tested with the help of data from another part of India. The data on the households in that study, however, were not as sharply focused, nor was the information collected about their service use as diverse as in the present study; see, for example, Wanmali, "Popular Participation and Organization."

Figure 1—Miryalguda Taluka



lected with the help of "recall" for 1968 (when the irrigation waters were made available in the study area). There are some problems in comparing the data for the two years that make it difficult to make a definitive statement about the changes that took place in the economic status, service provision, and service use in the study area. But the data are used to speculate on the nature of such changes in the dry and the irrigated tracts of the study area. In more senses than one, such speculation delineates the dynamics of change and is a useful point of reference for planning services in the future.

Selection of Villages and Households

Ten villages and 369 households from those villages were selected in order to identify the effect of economic development on the pattern of service use of households in the study area. The villages were selected on the basis of their cropping patterns, which reflect their dependence on irrigation water, and the households were selected on the basis of a stratified random sample of the landless (which includes those who own land but do not cultivate it) and the cultivating households.

Four villages were categorized as belonging to the irrigated tract and the rest to the dry tract. The names of selected villages, their irrigation status (whether they are in the irrigated or dry tracts), total population, total households, and number of sample households surveyed are given in Table 1 (also see Figure 1).

Wherever a village had more than 200 households, a 10 percent sample of households was obtained; if it had less than 200 households, the percentage of sample households selected for canvassing was raised to 20. The sample was selected so that the proportion of each category of household in the sample accurately reflected its proportion in the population in its village.

Table 1—Population of sample villages, 1981, and sample size of households, 1982

Village	Population	Number of Households	Number of Households Surveyed
Aylapuram	731	130	26
Chelakurthi	3,960	988	98
Ibrahimpet[a]	1,078	219	21
Konthalapalle	629	116	22
Marpaka	1,479	291	29
Pusalapahad	651	142	28
Rudravaram[a]	1,482	321	32
Salkanoor	1,647	362	36
Tungapahad[a]	2,849	562	56
Ulshaypalem[a]	485	109	21

Sources: Andhra Pradesh, Office of the Director of Census Operations, *1981 District Census Handbook, Nalgonda District* (Hyderabad: Andhra Pradesh Government Press, 1982); data from the household survey conducted by the International Food Policy Research Institute in Miryalguda Taluka, Andhra Pradesh, 1982.

[a] These villages are in the irrigated tract.

The following data on the socioeconomic status of households was collected for the time of the survey and for 1968: family size, the main occupation of the head of the household, the amount of operational land held, the irrigation status of the land, the number of farm and nonfarm buildings owned, the number of household goods and agricultural implements owned, farm and nonfarm expenses, and agriculture-related stocks, both farm and nonfarm. Some data were also collected on literacy, the types of tenancy arrangements, expenditures on the development of farms, and the number of livestock owned by the households. All affect the pattern of use of services directly or indirectly.

The pattern of service use was identified by queries about the services used by the households, the distances these were located at, how often they were used, and the usual mode of transportation used to reach them.

3

THE REGIONAL ECONOMY OF SAMPLE VILLAGES

A description of the relevant features of the regional economy of the 10 sample villages makes it possible to understand the socioeconomic context in which the sample households exist and operate. The description given below deals with details of the land use, cropping pattern, and irrigated area and gives some indication of service provision and service use in the sample villages.

Land Use and Cropping Pattern

An average of just about a third of the land in the sample villages was under crops at the time of the survey. There were, however, three villages, Konthalapalle (unirrigated village), Rudravaram, and Tungapahad (irrigated villages), in which more than this average was under crops (see Table 2). Furthermore, the gross cultivated area in some villages is extensive. It can be concluded that some of the sample villages have a larger resource base from which to grow crops than others. Most of the uncultivated area consists of rock outcrops (barren lands), forests, grazing lands, roads, and settlements.

The important crops grown in the sample villages are paddy, jowar (sorghum), bajra (a type of pearl millet), pulses, groundnuts, castor, and sugarcane. During the *kharif* season of 1981 almost 96 percent of the total cultivated area was cropped (see Table 3); irrigated paddy was the most important crop, the other irrigated crop being sugarcane. Two crops of paddy are normally harvested during *kharif*, although it is not unusual to see a third crop of paddy, mostly in the dry season *(rabi)* in the land of the sample villages irrigated by wells and tanks. The actual *kharif* season in the Telangana part of Andhra Pradesh can last from June (when the monsoon begins) to the end of January or middle of February. Unirrigated *kharif* crops are jowar, bajra, castor, and pulses. Groundnuts are cultivated in the irrigated tract (see Table 4).

Irrigation

In the sample villages an average 56.75 percent of the total cropped area was irrigated in 1981; this high percentage of irrigated area was, of course, a consequence of the avail-

Table 2—Land use in the sample villages, 1981

Village	Geographical Area	Net Cultivated Area	Gross Cultivated Area	Cropping Intensity
		(hectares)		
Aylapuram	380.42	97.78	114.43	117.02
Chelakurthi	3,903.23	1,053.39	1,077.83	102.24
Ibrahimpet[a]	1,522.48	394.64	690.62	174.99
Konthalapalle	691.63	326.08	350.56	107.50
Marpaka	1,473.51	392.70	457.86	116.59
Pusalapahad	665.73	112.21	128.50	114.51
Rudravaram[a]	1,290.18	571.35	971.29	169.99
Salkanoor	1,154.60	271.59	338.37	124.58
Tungapahad[a]	2,468.67	1,570.89	2,670.13	169.97
Ulshaypalem[a]	1,261.45	362.70	634.72	174.99
Total	14,8[illegible]1.90	5,153.33	8,078.17	156.75

Source: Offices of the Tahsildar in Miryalguda and Nidmanoor.
[a] These villages are in the irrigated tract.

Table 3—Cropped area in the sample villages, by season, 1981

Village	Kharif Season	Rabi Season	Whole Agricultural Year
	(hectares)		
Aylapuram	97.78	...	97.78
Chelakurthi	1,053.39	...	1,053.39
Ibrahimpet[a]	393.02	1.62	394.64
Konthalapalle	303.52	22.56	326.08
Marpaka	392.70	...	392.70
Pusalapahad	112.21	...	112.21
Rudravaram[a]	433.30	128.05	571.35
Salkanoor	259.98	11.61	271.59
Tungapahad[a]	1,549.85	21.04	1,570.89
Ulshaypalem[a]	352.91	9.79	362.70
Total	4,958.66	194.67	5,153.33

Source: Offices of the Tahsildar in Miryalguda and Nidmanoor.
Note: Two crops are planted during the *kharif* season.
[a] These villages are in the irrigated tract.

Table 4—Irrigated and unirrigated crops, 1981

Crop	Irrigated		Unirrigated	
	Kharif Season	Rabi Season	Kharif Season	Rabi Season
	(hectares)			
Paddy	2,716.11	176.26	...	...
Jowar (sorghum)	...	...	510.25	...
Bajra (pearl millet)	...	...	1,017.55	...
Pulses	...	...	197.03	...
Groundnuts	...	18.41	88.75	...
Castor	...	...	419.67	...
Sugarcane	9.30	...	...	...
Total	2,725.41	194.67	2,233.25	...

Source: Offices of the Tahsildar in Miryalguda and Nidmanoor.
Note: During the *kharif* season two crops of paddy are cultivated in the irrigated tract.

ability of canal irrigation from the Nagarjunasagar Irrigation Project (see Table 5). Of the 10 sample villages, Ibrahimpet, Rudravaram, Tungapahad, and Ulshaypalem are located in the canal-irrigated tract; Chelakurthi, Konthalapalle, Marpaka, and Pusalapahad have no canal-irrigation facilities and Aylapuram and Salkanoor have few, but all have lift, tank, or well irrigation (see Table 6). The intensity of irrigation was about 170 in the villages of the irrigated tract in 1981, but it was also quite impressive in Konthalapalle, a dry tract village that benefits greatly from well irrigation (see Tables 5 and 6). Aylapuram originally was to have been provided with irrigation waters but was left out of the scheme on technical grounds. Salkanoor and Chelakurthi, on the other hand, benefited marginally from the lift-irrigation schemes that were planned in the early stages of the irrigation development programs and were executed only recently. The dry tract villages have benefited from the new drive by the government to improve access to water within the study area. This is being achieved by constructing lift-irrigation schemes and irrigation wells and by improvements in the existing tank-irrigation systems in the dry tract. Wells appear to be an important source of irrigation in the dry tract, particularly in villages the canal waters cannot reach because the village is built too high above the canal.

The basis of earning a livelihood within the sample villages is varied, to say the least. Thus a low intensity of cropping coupled with poor availability and use of water can result in agricultural production not much above subsistence. The cultivation of two crops of paddy in the *kharif* season in the irrigated tract, however, tends to increase the productivity of agriculture in that tract considerably. Within the dry tract, if physical access to the services necessary for agricultural activities were poorer, then the basis for growth would be even weaker. However, the villages in the study area that do not use land intensively and do not have access to canal-irrigation waters are making every effort to improve their potential for agricultural development by investing in well-, tank-, and lift-irrigation schemes and land-development schemes (with the help of capital made available by formal sources such as banks and primary cooperative societies and by informal sources such as moneylenders and personal savings).

Service Provision and Use

Services are used not only by the inhabitants of the villages they are located in but also by the inhabitants of surrounding villages. Other things being equal, the proximity

Table 5—Total irrigated area of the sample villages, 1981

Village	Net Irrigated Area	Gross Irrigated Area	Irrigation Intensity
	(hectares)		
Aylapuram	16.65	16.65	100.00
Chelakurthi	24.44	24.44	100.00
Ibrahimpet[a]	353.50	618.62	174.99
Konthalapalle	24.28	46.84	192.91
Marpaka	65.16	65.16	100.00
Pusalapahad	16.29	16.29	100.00
Rudravaram[a]	484.43	823.56	169.99
Salkanoor	66.78	78.39	117.38
Tungapahad[a]	1,529.60	2,600.32	169.99
Ulshaypalem[a]	343.51	601.14	174.99
Total	2,924.64	4,891.41	167.24

Source: Offices of the Tahsildar in Miryalguda and Nidmanoor.
Note: Irrigated area consists of land irrigated by canals, tanks, wells, and lift-irrigation schemes.
[a] These villages are in the irrigated tract.

to, and distance from, these services influences their use.

There were 84 goods and services used by the inhabitants of the sample villages at the time of the survey. Twenty-seven were essentially provided by the government and are called rural services. The rest were provided by the private sector and are called retail services (see the Appendix, Table 29). It can be seen from Table 7 that most villages—Chelakurthi is an exception—depended upon outside service centers to satisfy their demand for about 85 percent of the goods and services. Even Chelakurthi depended on other villages for 70 percent of its service needs. Thus the villages, whether in the dry or irrigated tracts, appear to have had similar patterns of availability and use of services, and all appear to have depended on outside sources for a majority of the services they needed.

Where did the households from the village go to satisfy their demand for goods and services? It would be tedious to give each household's pattern of spatial interaction for every service considered in this study. But a general idea about the locational parameters within which the sample households and the villages appeared to interact can be produced if the services are put into categories such as communications and credit and banking and if the households are categorized into the landless and those with land. The 10 most favored locations would be the service centers in the study area with which the households interact most.

The 10 most favored service centers varied for sample villages as well as sample households and for some services too. This is only to be expected since the sample villages are in 10 locations and therefore have different service centers to interact with. Furthermore,

Table 6—Sources of irrigation in the sample villages, 1981

Village	Type of Irrigation				Total Irrigated Area
	Canal	Tank	Well	Lift	
			(hectares)		
Aylapuram	4.71	...	11.94	...	16.65
Chelakurthi	...	12.30	...	12.14	24.44
Ibrahimpet[a]	344.00	...	9.50	...	353.50
Konthalapalle	...	...	24.28	...	24.28
Marpaka	...	...	65.16	...	65.16
Pusalapahad	...	10.12	6.17	...	16.29
Rudravaram[a]	443.15	...	41.28	...	484.43
Salkanoor	12.51	38.96	11.58	3.73	66.78
Tungapahad[a]	1,471.40	58.20	...	...	1,529.60
Ulshaypalem[a]	336.63	...	6.88	...	343.51
Total	2,612.40	119.58	176.79	15.87	2,924.64
Share of total irrigated area (percent)	89.32	4.09	6.04	0.55	100.00

Source: Offices of the Tahsildar in Miryalguda and Nidmanoor.
[a] These villages are in the irrigated tract.

Table 7—Services within and outside the sample villages, 1982

Village	Number of Services Within the Village	Services Outside the Village	
		Number	Percent
Aylapuram	6	78	92.86
Chelakurthi	25	59	70.24
Ibrahimpet[a]	8	76	90.48
Konthalapalle	6	78	92.86
Marpaka	12	72	85.71
Pusalapahad	7	77	91.66
Rudravaram[a]	5	79	94.05
Salkanoor	8	76	90.48
Tungapahad[a]	5	79	94.05
Ulshaypalem[a]	6	78	92.86

Source: Data from the household survey conducted by the International Food Policy Research Institute in Miryalguda Taluka, Andhra Pradesh, 1982.

[a] These villages are in the irrigated tract.

not all services required by sample villages were located in all these centers, and therefore different services had different patterns of interaction. It is significant that the service centers with which the sample villages and households interacted were those that earlier studies, made after 1968, when irrigation waters were first released, recommended become service centers and which, indeed, assumed that role.[10] Other service centers, such as Nalgonda, Suryapet, Macherla, Khammam, Warangal, and Hyderabad, are outside the study area. However, lower down the settlement hierarchy new centers are emerging and are providing services such as bus transportation, postage, and marketing of agricultural produce (for daily use) and some local retail goods.

The landless chose from fewer locations outside the villages in which they resided than those with land and appear to have had a wider choice of centers providing retail services than centers providing rural services. Households with land visited up to 8 centers for rural services and 10 centers for retail services. Within the landowning group, households with less than two hectares of land chose from fewer centers than those with more. It becomes apparent from the above discussion that within the study area, access to services depended not only on the location of service centers but also on the economic status of the households.

[10] Sen et al., *Planning Rural Growth Centres;* and Wanmali, *Service Provision and Rural Development.*

4

THE ECONOMIC CHARACTERISTICS OF HOUSEHOLDS

As was noted in Chapter 2, differences in the economic characteristics of households tend to be responsible for differences in their pattern of use of services. The economic characteristics themselves are difficult to measure, but, for the sake of the present discussion, these are assumed to reflect labor arrangements, the amounts of operational land, irrigation facilities, livestock, household goods and agricultural implements, farm and nonfarm expenses, farm and nonfarm stocks, and the availability of capital (for the development of agriculture and other related activities). Having more of any of these was assumed to indicate a higher economic status. It is hypothesized that higher status results in greater mobility for households, giving them easier access to goods and services. In the following paragraphs the details of these economic characteristics are given by operational landholding class to understand the patterns of service use in the study area.

The households were divided into six categories: the landless (this also includes noncultivating households), marginal farmers (owning between 0 and 0.99 hectares), small farmers (owning between 1 and 1.99 hectares), medium farmers (owning between 2 and 3.99 hectares), and large farmers (owning between 4 and 9.99 hectares). An additional category—the largest farmers (those with more than 10 hectares of operational landholdings)—was added to emphasize the structural differences between the large and largest farmers, which, as will be seen later, are significant. The number of sample households in each category is given in Table 8.

Operational Landholdings

The total area covered by operational land at the time of the survey was 1,164.87 hectares of which 874.93 hectares (75.10 percent) was in the dry tract and the remainder, 289.94 hectares (24.90 percent), was in the irrigated tract (see Table 9).

The average area operated was somewhat higher in Miryalguda than in other parts of Andhra Pradesh because the taluka was originally drought prone and therefore had larger farms to start with. After the introduction of irrigation waters, farm sizes did not change immediately, but they are changing now.

Population

The size of the household, according to the survey, was larger in the dry tract than in the irrigated tract (see Table 10). In the latter the households were smaller since most of them settled there after the irrigation waters were provided. Today between a fifth and a quarter of the population of the irrigated tract consists of immigrants from coastal Andhra Pradesh.

The availability of land per capita for the sample population (see Table 11) was 0.66 hectares in the dry tract and 0.41 hectares in the irrigated tract. But since 80 percent of the land in the irrigated tract was provided with water, and only 20 percent in the dry tract, and since most of the land in the irri-

Table 8—Number of sample households in each category of operational landholdings, 1982

Size of Operational Landholding	Number of Households: Dry Tract	Irrigated Tract	Total	Percent of Households
(hectares)				
0.00	17	21	38	10.29
0.00–0.99	38	49	87	23.58
1.00–1.99	43	24	67	18.16
2.00–3.99	66	14	80	21.68
4.00–9.99	56	17	73	19.78
10.00 or more	19	5	24	6.51
Total	239	130	369	100.00

Source: Data from the household survey conducted by the International Food Policy Research Institute in Miryalguda Taluka, Andhra Pradesh, 1982.

Table 9—Operational landholdings of sample households, 1982

Size of Operational Landholding	Dry Tract			Irrigated Tract			Whole Taluka	
	Average	Total	Percent	Average	Total	Percent	Total	Percent
(hectares)				(hectares)			(hectares)	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00 - 0.99	0.56	21.15	2.43	0.57	27.74	9.56	48.89	4.19
1.00 - 1.99	1.37	59.68	6.75	1.38	33.10	11.41	92.18	7.91
2.00 - 3.99	2.60	171.80	19.63	2.42	33.90	11.69	205.70	17.68
4.00 - 9.99	5.52	309.30	35.35	5.85	99.60	34.35	408.90	35.10
10.00 or more	16.50	313.60	35.84	19.12	95.60	32.99	409.20	35.12
Total	3.60	874.93	100.00	2.23	289.94	100.00	1,164.87	100.00

Source: Data from the household survey conducted by the International Food Policy Research Institute in Miryalguda Taluka, Andhra Pradesh, 1982.

gated tract was double cropped, the potential for agricultural development was larger in the irrigated tract. This, of course, is reflected in the cropping and irrigation intensities noted in the previous chapter.

Extent of Irrigation

The greater access to water (see Table 12) has been beneficial for the development of agriculture in the irrigated tract, where a greater variety of production-oriented services is being used, and the services are used more often. The irrigated tract also has a more equitable distribution of irrigated land (or of access to water). For example, the marginal farmers in the irrigated tract had 94 percent of their lands irrigated in 1982, small farmers had 78 percent, with at least two crops a year, whereas in the dry tract the percentages for the same groups were 41 and 19 and only one crop was harvested (a second crop is possible, but on a considerably smaller area). A considerably larger proportion of the land of medium and large farmers was irrigated in the irrigated tract than in the dry tract (see Table 13).

Land Development and Credit

Most of the expenditures on the development of land were met through credit from seven sources (see Table 14). It becomes apparent that the contribution of these sources to the credit needs of the households varied, depending upon the criteria applied to identify the importance of or ease of access to a source. Moneylenders, per-

Table 10—Population of the sample households, 1982

Size of Operational Landholding	Dry Tract			Irrigated Tract			Whole Taluka	
	Average	Total	Percent	Average	Total	Percent	Total	Percent
(hectares)								
0.00	5.41	92	7.00	4.52	95	13.55	187	9.28
0.00-0.99	5.07	193	14.68	5.29	259	36.95	452	22.43
1.00-1.99	5.28	227	17.27	4.79	115	16.40	342	16.97
2.00-3.99	5.09	336	25.57	6.00	84	11.98	420	20.84
4.00-9.99	6.08	341	25.95	7.00	119	16.98	460	22.83
10.00 or more	6.58	125	9.53	5.80	29	4.14	154	7.65
Total	5.50	1,314	100.00	5.39	701	100.00	2,015	100.00

Source: Data from the household survey conducted by the International Food Policy Research Institute in Miryalguda Taluka, Andhra Pradesh, 1982.

Table 11—Per capita availability of land for the sample households, 1982

Size of Operational Landholding	Availability of Land	
	Dry Tract	Irrigated Tract
(hectares)	(hectares per capita)	
0.00	0.00	0.00
0.00–0.99	0.11	0.11
1.00–1.99	0.26	0.29
2.00–3.99	0.51	0.40
4.00–9.99	0.90	0.84
10.00 or more	2.50	3.30
Total	0.66	0.41

Source: Data from the household survey conducted by the International Food Policy Research Institute in Miryalguda Taluka, Andhra Pradesh, 1982.

sonal savings, and land development banks were most important if the number of times a source is used is an indicator of ease of access. If the criterion is the average value of loans, then other sources (such as sale of land and other property), relatives, and a nationalized bank led in importance.

Of the total amount of credit made available to the sample households, Rs 806,695, 0.32 percent was made available to the landless, 9.06 percent to the marginal farmers, 10.79 percent to the small farmers, 12.26 percent to the medium farmers, 35.30 percent to the large farmers, and the rest (32.27 percent) to the largest farmers.

The importance of the land development bank as a major supplier of credit for the development of land and the extensive use of credit by the two biggest landholding groups does not come as a surprise. But the emergence of moneylenders and of personal savings as important sources of credit does.

In the dry tract the large and the largest farmers appear to have benefited most from institutional credit; in the irrigated tract, however, these sources appear to have been accessible to the marginal, small, and medium farmers as well. No loans were made available to the landless in the dry tract; the nationalized bank did not seem to operate widely in the irrigated tract. This left room for cooperative credit and informal sources of credit (moneylenders, personal savings, relatives, and other sources). The dominance of informal credit in the dry tract should not come as a surprise since the tract was deficient in sources of institutional and cooperative credit, and in ways to provide security for loans.

Poor people had only restricted access to sources of formal credit. The landless and the marginal farmers received the smallest amount of credit from institutional and cooperative sources and were therefore required to turn to informal sources.

Livestock

Most of the livestock owned by households in the study area were cattle or buffalo used as draft or dairy animals. More wide-

Table 12—Extent of irrigation on the operational landholdings of the sample households, 1982

Size of Operational Landholding	Dry Tract			Irrigated Tract		
	Average	Total	Percent	Average	Total	Percent
(hectares)				(hectares)		
0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00–0.99	0.23	8.75	4.56	0.57	26.04	11.14
1.00–1.99	0.26	11.18	5.82	1.07	25.70	10.99
2.00–3.99	0.44	28.84	15.05	1.34	28.80	12.34
4.00–9.99	1.15	64.30	33.57	5.09	86.60	37.04
10.00 or more	4.14	78.60	41.00	13.32	66.60	28.49
Total	1.03	191.67	100.00	3.56	233.74	100.00

Source: Data from the household survey conducted by the International Food Policy Research Institute in Miryalguda Taluka, Andhra Pradesh, 1982.

Table 13—Share of operational landholdings irrigated, 1982

Size of Operational Landholding	Dry Tract	Irrigated Tract
(hectares)	(percent)	
0.00	0	0
0.00–0.99	41	94
1.00–1.99	19	78
2.00–3.99	17	85
4.00–9.99	20	87
10.00 or more	25	70

Source: Data from the household survey conducted by the International Food Policy Research Institute in Miryalguda Taluka, Andhra Pradesh, 1982.

Note: The ratios were calculated by dividing the net irrigated land by the operational landholding

spread ownership of livestock indicates that households had begun to diversify their agriculture-related occupations. This is not new but the scale on which it has occurred in the study area is new. The most significant feature is that farmers with less than 2 hectares of operating land also seemed to have taken to this type of diversification in their activities, but more in the irrigated tract than in the dry (see Table 15). Nearly 35 percent of the total value of the livestock was owned by this group of landholders in the irrigated tract (total value, Rs 459,510); in the dry tract they owned about 17 percent (total value, Rs 691,775).

Table 14—Average amount of credit and finance made available, by source, 1982

Source	Average Amount	Times Source Used by Households
	(Rs)	(times/year)
Cooperative society	2,937	16
Land development bank	2,501	114
Nationalized bank	3,126	36
Moneylender	763	205
Relative	3,446	3
Personal savings	1,297	141
Other sources	5,290	11

Source: Data from the household survey conducted by the International Food Policy Research Institute in Miryalguda Taluka, Andhra Pradesh, 1982.

Labor

With the spectacular growth of cropping and irrigation intensities and with the *kharif* season including two crops a year (and some possibility of a third crop on a considerably reduced cultivated area), a tremendous potential was generated in the study area for earning wages from agricultural and nonagricultural labor, particularly in the irrigated tract. Nonagricultural labor was confined to working in shops and establishments that sprang up. Members of the households from the study area could earn extra income by working as laborers in agriculture and business. The labor arrangements prevalent in the study area are given in Table 16. This table shows that in the irrigated tract, there appeared to exist employment opportunities in agriculture and small businesses for the families of the landless and of marginal, small, and medium farmers. The prevalent pattern in agriculture in the dry tract appears to have been to cultivate and harvest one's own rainfed crop and then migrate to the irrigated tract to work as a wage laborer on the second and, possibly, third crop of paddy or sugarcane or in the storage, transport, warehousing, and processing businesses related to the main agricultural activity. Working as an agricultural laborer on someone else's farm was an important source of additional income for some of the cultivating as well as noncultivating households in both tracts.

Household Goods and Agricultural Implements

Households typically owned both domestically useful goods and occupationally useful agricultural implements. Twenty-four types of household goods and 29 agricultural implements were observed being used by the sample households. Their average value is given in Table 17. The average value does not differ significantly between the two tracts when the landless and the marginal farmers are compared, although those in the irrigated

Table 15—Value of livestock owned by sample households, 1982

Size of Operational Landholding/Tract	Draft Bullocks	Draft Buffalo	Young Bullocks	Young Buffalo	Milch Cows	Milch Buffalo	Total
(hectares)			(Rs/household)				
0.00							
Dry	0	0	0	94	23	188	305
Irrigated	142	28	0	19	176	419	784
0.00–0.99							
Dry	510	73	98	8	390	127	1,206
Irrigated	579	132	10	23	340	332	1,416
1.00–1.99							
Dry	880	39	125	25	522	145	1,736
Irrigated	1,458	179	150	156	575	629	3,147
2.00–3.99							
Dry	1,265	36	182	3	772	209	2,467
Irrigated	1,739	185	92	200	607	1,171	3,994
4.00–9.99							
Dry	2,962	71	244	143	1,085	508	5,013
Irrigated	4,717	50	788	282	2,400	752	8,989
10.00 or more							
Dry	4,515	410	257	252	1,352	1,100	7,886
Irrigated	6,600	140	1,400	1,840	4,180	5,400	19,560

Source: Data from the household survey conducted by the International Food Policy Research Institute in Miryalguda Taluka, Andhra Pradesh, 1982.

Table 16—Wages earned and paid by families from their own farm or business, 1982

Size of Operational Landholding/ Tract	Agricultural		Nonagricultural	
	Wages Paid	Wages Earned	Wages Paid	Wages Earned
(hectares)		(Rs)		
0.00				
Dry	0	300	0	0
Irrigated	0	2,080	0	0
0.00–0.99				
Dry	1,300	3,800	180	0
Irrigated	0	2,500	500	2,100
1.00–1.99				
Dry	0	8,000	0	0
Irrigated	2,800	0	0	0
2.00–3.99				
Dry	5,720	6,200	2,300	3,136
Irrigated	5,490	4,000	600	0
4.00–9.99				
Dry	30,400	400	1,800	0
Irrigated	9,200	0	0	4,800
10.00 or more				
Dry	46,350	0	0	0
Irrigated	27,500	0	0	0

Source: Data from the household survey conducted by the International Food Policy Research Institute in Miryalguda Taluka, Andhra Pradesh, 1982.

tract were a little better off (see Table 17). The value was almost double in the irrigated tract for small, medium, and large farmers and more than triple for the largest farmers.

Farm and Nonfarm Expenses

The main items of capital and current expenditure for the families in the study area were purchases of land, nonfarm business expenses, home improvements, purchases of household goods and agricultural implements, spending on religious and social functions, and educational and medical expenses. Low current expenditures on educational and health services can be explained, in part, by the peculiar age composition of the immigrant community, which had households with young families and fewer school children per family. It can be seen clearly from Table 18 that as the size of a household's landholding increased, there was a commensurate increase in its expenditures on all the items noted above. With the exception of the landless, households of the irrigated tract tended to spend more than those of the dry tract.

Table 17—Value of household goods and agricultural implements of sample households, 1982

Size of Operational Landholding	Average Value of Goods: Dry Tract	Average Value of Goods: Irrigated Tract
(hectares)	(Rs)	
0.00	802.82	823.42
0.00–0.99	871.34	977.08
1.00–1.99	1,033.74	2,426.50
2.00–3.99	1,445.33	2,946.21
4.00–9.99	5,294.96	11,720.47
10.00 or more	16,106.63	58,616.40

Source: Data from the household survey conducted by the International Food Policy Research Institute in Miryalguda Taluka, Andhra Pradesh, 1982.

Stocks

The size of the stocks held by farmers after the *kharif* harvest (and sales) can be of some use in determining the economic status of households. These stocks are retained after the sales of agricultural produce; there are no stocks of inputs such as fertilizers and pesticides. The values of stocks were obtained by multiplying the stocks by the market price of the commodity during the dominant sale season; this could undervalue these stocks.

Table 19 demonstrates that the values of stocks increased as the size of operational landholding increased; but the value of the stocks held by households in the irrigated tract was three to four times higher than in the dry tract.

Paddy was dominant among the crops that are stocked, not only in the irrigated tract but in the dry tract as well. About 70 percent of the value of stocks in the dry tract consisted of paddy, even for the marginal farmers; the proportion rose to just above 72 percent for the largest farmers. In the irrigated tract the proportions were about 86 percent and 73 percent. The other significant crop in both the tracts was groundnuts. Sugarcane was grown in the irrigated tract only by the largest farmers. The large and largest farmers appeared to diversify their patterns of cultivation of crops more than anyone else. However, crop diversification was accepted as a strategy by even the small and marginal farmers, who appear to have grown vegetables, groundnuts, and castor on their farms.

Table 18—Expenses of sample households, 1982

Size of Operational Landholding/Tract	Purchase of Land	Nonfarm Business	Home Improvement	Purchase of Durables	Religious and Social Expenses	Educational and Medical Expenses	Other Expenses	Total Expenses
(hectares)				(Rs)				
0.00								
Dry	52.94	251.47	402.94	309.21	419.41	274.11	58.82	1,768.90
Irrigated	47.61	64.28	516.66	133.33	591.42	45.03	183.33	1,581.66
0.00–0.99								
Dry	365.78	183.15	463.15	367.64	345.00	191.57	7.89	1,924.18
Irrigated	2,039.79	473.46	1,672.44	327.55	1,080.00	102.04	298.46	5,993.74
1.00–1.99								
Dry	466.74	527.90	464.04	167.44	428.97	181.62	0.00	2,236.71
Irrigated	2,562.50	751.03	2,666.66	446.42	1,432.1-	0.00	482.14	8,340.89
2.00–3.99								
Dry	1,035.75	762.11	1,111.13	757.57	1,067.12	561.13	242.42	5,537.23
Irrigated	3,000.00	1,321.42	2,842.85	682.29	1,758.33	107.14	514.58	10,226.61
4.00–9.99								
Dry	2,682.14	2,216.96	1,417.50	2,977.14	1,791.60	393.78	0.00	12,025.12
Irrigated	3,588.23	6,341.17	6,800.00	3,014.70	4,811.76	294.11	1,239.98	26,089.97
10.00 or more								
Dry	4,631.57	5,099.99	1,157.89	8,978.94	6,139.47	3,147.36	52.63	34,418.22
Irrigated	6,000.00	2,354.00	10,400.00	24,200.00	11,760.00	2,000.00	2,273.00	58,987.00

Source: Data from the household survey conducted by the International Food Policy Research Institute in Miryalguda Taluka, Andhra Pradesh, 1982.

Table 19—Value of stocks of sample households, by crop, 1982

Size of Operational Landholding/Tract	Jowar	Bajra	Ground-nuts	Pulses	Seeds	Castor	Paddy	Other	Total
(hectares)					(Rs)				
0.00									
Dry	0	0	0	0	0	0	0	0	0
Irrigated	0	0	0	0	0	0	0	0	0
0.00–0.99									
Dry	136	145	40	34	5	108	1,075	0	1,543
Irrigated	31	17	608	0	22	0	4,324	0	5,002
1.00–1.99									
Dry	253	361	220	89	20	166	1,113	0	2,222
Irrigated	107	84	625	112	39	0	8,269	0	9,236
2.00–3.99									
Dry	450	503	547	84	7	257	1,872	0	3,720
Irrigated	117	93	235	0	45	107	12,348	0	12,945
4.00–9.99									
Dry	694	694	1,194	164	121	757	6,079	0	9,703
Irrigated	29	17	2,070	29	701	0	28,180	0	31,026
10.00 or more									
Dry	1,900	1,800	1,897	268	181	873	18,321	0	25,320
Irrigated	1,500	300	12,680	0	220	900	78,259	13,000	106,859

Source: Data from the household survey conducted by the International Food Policy Research Institute in Miryalguda Taluka, Andhra Pradesh, 1982.
Note: Jowar is sorghum and bajra is a kind of pearl millet.

Effects of Development

In a generalized sense, it can be said that the development of agriculture appears to have benefited all categories of households but that the benefits were greater in the irrigated tract. This can be traced to the higher cropping intensity and more extensive irrigation there and to the economic benefits derived therefrom. Furthermore, in the study area, high-yielding varieties of crops are now being cultivated. The economic benefits appear to have been greater for the large and largest farmers than for the small and marginal farmers. But the latter groups and the landless appear to have taken advantage of their opportunities to increase their income; the marginal and the small farmers by diversifying by raising cattle or by working as laborers in the irrigated tract, which the landless did as well.

It can be argued that the size of operational landholdings, the extent of irrigated area, the value of farm and nonfarm buildings, the value of household goods and agricultural implements, and the value of stocks would be highly correlated in the study area, so that if one were high or large the rest would be, too. That is precisely what the correlation coefficients demonstrate (see Table 20). The values of the coefficients were higher in the irrigated tract.

In an earlier qualitative analysis of these characteristics, it was noted that agricultural activities were diversified, intensified, and spread spatially in the study area as a consequence of the Nagarjunasagar Irrigation Project.[11] The effects on the dry tract were also considered beneficial. New investment was made there in lift, tank, and well irrigation. It was speculated in that study that all this must have led to an increase in the diversity of employment and in the number of households with higher incomes. The study also expected that there would be a shift from agricultural to nonagricultural activities and that the volume and quality of service provision would have improved.

The overall development of the regional economy of the study area indeed percolated down to households, albeit differently in the

[11] Wanmali, *Service Provision and Rural Development*

Table 20—Correlation coefficients for major economic characteristics of sample households, 1982

Characteristic	Operational Holdings	Irrigation	Farm and Nonfarm Buildings	Household Goods and Implements	Stocks of Farm and Nonfarm Goods
Irrigated tract					
Operational holdings	1.00	0.78	0.68	0.76	0.91
Irrigation		1.00	0.58	0.68	0.79
Farm and nonfarm buildings			1.00	0.51	0.68
Household goods and implements				1.00	0.84
Stocks of farm and nonfarm goods					1.00
Dry tract					
Operational holdings	1.00	0.68	0.47	0.66	0.75
Irrigation		1.00	0.26	0.41	0.54
Farm and nonfarm buildings			1.00	0.41	0.48
Household goods and implements				1.00	0.63
Stocks of farm and nonfarm goods					1.00

Source: Data from the household survey conducted by the International Food Policy Research Institute in Miryalguda Taluka, Andhra Pradesh, 1982.

Notes: The coefficients for the irrigated tract were calculated using a sample of 130 households and are all significant at the 0.01 confidence level. The coefficients for the dry tract were calculated using a sample of 239 households and are all significant at the 0.01 confidence level.

dry and the irrigated tracts and for the landless and the largest farmers. Moreover, the overwhelming trend has been for the better in the irrigated tract for all households irrespective of the size of their operational landholdings. There is also evidence of diversification of cropping and other rural-related activities. That more than one crop of paddy was grown by those who had reasonable access to water is also substantiated by the evidence from households.

The analysis so far has also demonstrated that the households of the irrigated tract tended to be economically better off than those of the dry tract. They can be further categorized by their "location" on regional and societal scales. For example, the landless in the dry tract were the poorest, whereas the largest farmers in the irrigated tract were the richest people in the study area.

5

PATTERNS OF SERVICES USE

In this chapter an attempt is made to identify the pattern of use of services in the study area. The main areas of investigation were the number of services used, the number of households using those services, the frequency of use of services, and the distances traveled by consumers in order to use the services. Service use was analyzed both in the aggregate and after being disaggregated. In the aggregated analysis, households were grouped by their location in the dry or the irrigated tracts and services were considered individually. In the disaggregated analysis, households were categorized by the size of the operational landholdings, and services were grouped.

It can be argued that services are not necessarily used with equal regularity, that households use one group of goods and services more than another; that the frequency of use of services also varies, so that some services are used more often during the year; and that these variations in use—by households and by frequencies of use—are at times simply functions of the distance of a service from households. Of course, as will be seen below, the nature of a service is also an important determinant of these interactions. Generally speaking, other things being equal, the greater the distance of a service from a household, the smaller will be the number of households using it and the less often will it be used during the year.

Frequency of Use by Households

The number of households using the 84 services used in the sample villages varied considerably. This variation depended upon the nature of the service used. For example, if the service was perishable or required intermittent (if not regular) replacement, then the households used it more often; and since it could be an item of common use, it was also used by a greater number of households.

Of the services used by the fewest households (less than 20 percent) only three services in the dry tract (sale of vegetables; liquor; and gasoline, diesel fuel, and lubricants) and four in the irrigated tract (sale of vegetables; liquor; dairy products; and gasoline, diesel fuel, and lubricants) were used more than 12 times a year by the average household, the rest were used much less frequently (see the Appendix, Tables 30 and 31).

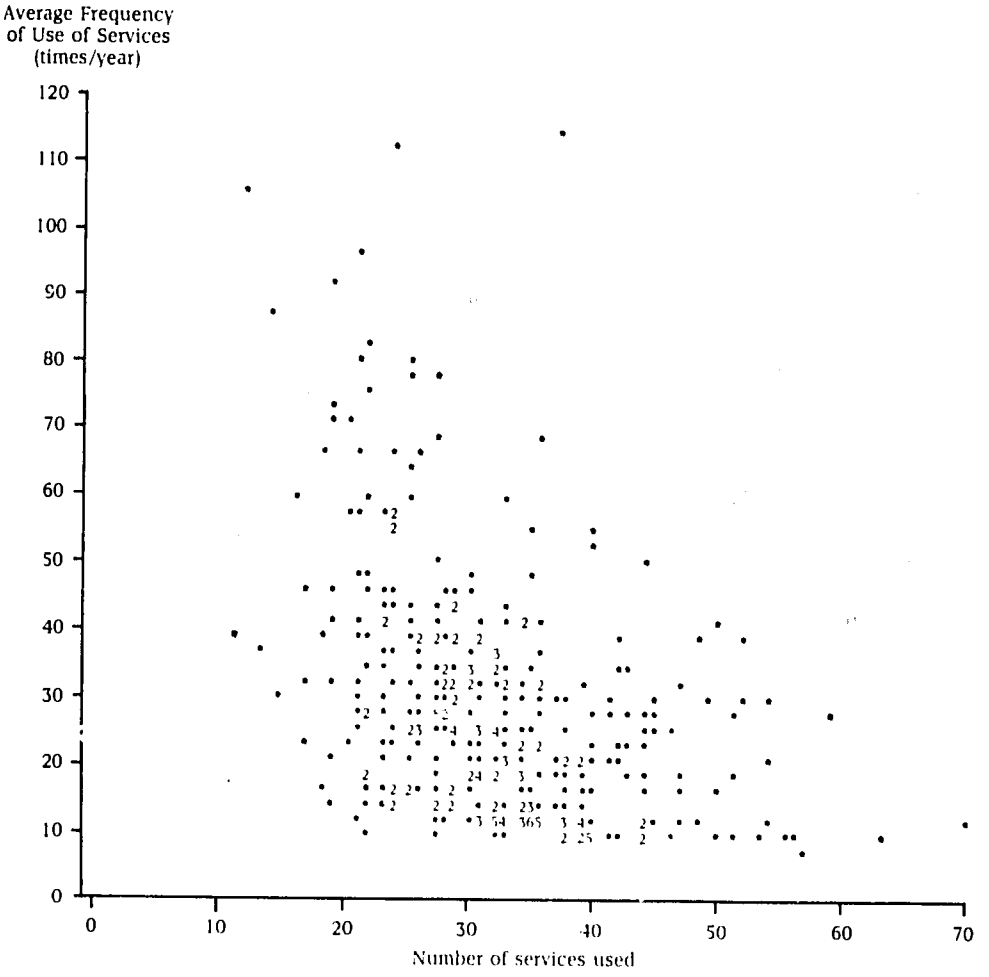
A small proportion (between 25 and 33 percent) of the services used by many households (20 to 79 percent) were needed more than 12 times a year (see the Appendix, Tables 30 and 31). More than 45 percent of the services used by most households (80 percent or more) were needed more than 12 times a year (see the Appendix, Tables 30 and 31).

For the households under study, there was an inverse relationship between the number of services used and the frequency with which they were used (see Figure 2). This means that as the number of services used by a household increased, there was a drop in the frequency of use of these services. This might have happened because households made multipurpose trips. The stage this occurred at is closely associated with an increase in the household's economic status as will be shown below. Similarly, there was an inverse relationship between the distance a household was willing to travel to make use of a service and the frequency with which the service was used (see Figure 3). This, of course, points to the well-known phenomenon of distance decay, where greater distances imply less use. For the poor households the decline in frequency of use could be purely a matter of distance, but for rich households it could be both that and a propensity to undertake multipurpose trips.

Spatial Features of Frequency of Use and Distance of Services

On the whole, services were used more often and were available at shorter distances in the irrigated tract than in the dry tract (see Table 21; for the frequency of use and distance of individual services, see the Appendix, Table 31). Some rural services, such as wholesale markets for the sale of fruits, sugar-

Figure 2—Relationship between frequency of use by households and the number of services used, 1982



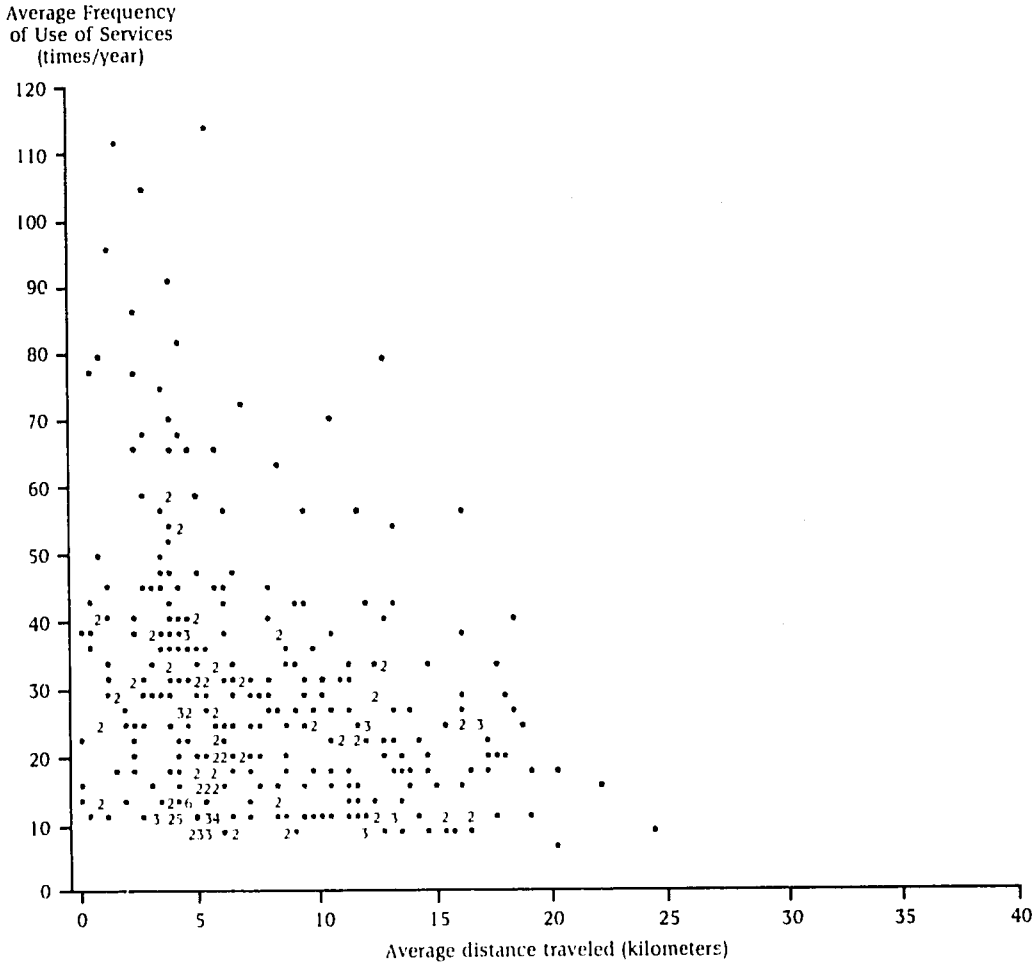
Source: Data from the household survey conducted by the International Food Policy Research Institute in Miryalguda Taluka, Andhra Pradesh, 1982.
Notes: The numbers in the figure show where more than one point fell

cane, and dairy products, were not found at all in the dry tract. Nor were some retail services, such as musical instruments. When both frequency of use per year and distances are categorized, as in Table 22, four types of service use are shown to be possible: low service use (less than 6 times a year) where services are demanded and supplied at shorter distances from the sample households (less than 6 kilometers); low service use where services are demanded and supplied at greater distances (mostly at more than 12 kilometers but some between 6 and 12 kilometers); high service use (more than 12 times a year) where services are demanded and supplied at shorter distances; and high service use where services are demanded and supplied at greater distances. It can be seen that some of the higher-order services, those requiring larger populations to support them, were being provided at shorter distances, at least in the irrigated tract.

Production-Oriented and Consumption-Oriented Services

It is also possible to categorize services by the goods offered. Thus a service can be production-oriented or consumption-oriented.

Figure 3—Relationship between frequency of use of services by households and the distance traveled to them, 1982



Source: Data from the household survey conducted by the International Food Policy Research Institute in Miryalguda Taluka, Andhra Pradesh, 1982.

Notes: The numbers in the figure show where more than one point fell.

Table 21—Distance to services and frequency of use of them in the irrigated and dry tracts, by service group, 1982

Service Group	Distance		Frequency of Use	
	Dry Tract	Irrigated Tract	Dry Tract	Irrigated Tract
	(kilometers)		(times/year)	
Communications	6.9	4.1	4.4	5.9
Credit and banking	17.6	10.3	1.2	1.9
Transportation	29.3	24.6	17.5	27.2
Animal husbandry	6.2	2.1	1.6	2.5
Marketing of agricultural produce	7.1	6.7	16.7	52.5
Food and personal services	5.2	3.9	51.4	56.0
Consumer durables	16.7	15.8	2.6	3.0

Source: Data from the household survey conducted by the International Food Policy Research Institute in Miryalguda Taluka, Andhra Pradesh, 1982.

Table 22—Average frequency of use by average distance of services, 1982

Frequency of Use	Distance: Less Than 6 Kilometers	6 to 12 Kilometers	More Than 12 Kilometers
(times/year)	(number of services)		
Irrigated tract			
Less than 6	20	20	...
6 to 12	1	2	...
More than 12	13	9	...
Dry Tract			
Less than 6	13	9	35
6 to 12	1	...	1
More than 12	12	1	7

Source: Data from the household survey conducted by the International Food Policy Research Institute in Miryalguda Taluka, Andhra Pradesh, 1982.

For the sake of the present discussion, assume that all rural services are production-oriented and that most retail services are consumption-oriented. Production-oriented services include all 27 rural services and 5 retail services: purchase of seeds, purchase of fertilizers, purchase of pesticides, sales and repair of agricultural implements, and tractor repair. Of the remaining 52 consumption-oriented services, 20 are food and personal services,[12] and the rest are consumer durables.

The average number of services used, the average frequency of use, and the average distance traveled for each of the above types of service in the study area are:

	Number	Frequency (times/year)	Distance (kilometers)
Agricultural services	7	3.41	13.36
Food and personal services	14	36.16	4.79
Consumer durables	9	0.68	16.80

This clearly shows the differences in both availability and use of the services in the study area. Food and personal services, which are used most frequently, were near at hand; consumer durables, which were used least frequently, were the furthest away. Agricultural services come somewhere between.

Use of and Access to Services Among Households

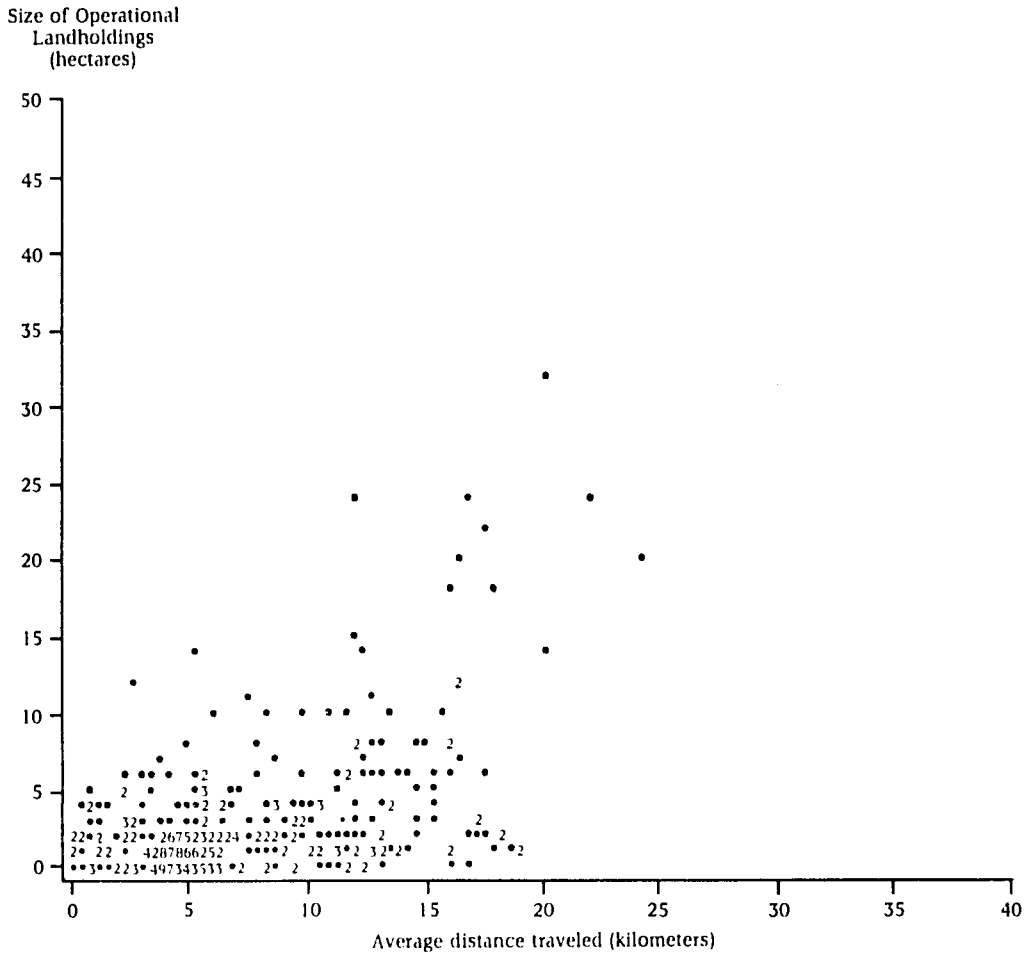
In Chapter 4 it was hypothesized that the economic status of households influences the pattern of use of services and access to them. How does the pattern of use change? Simply put, higher economic status might mean that a household uses more services, is willing to travel greater distances, and tends to travel less frequently. The last implies trips combining several purposes. This hypothesis was confirmed. The coefficients of correlation with the amount of operational land held in the study area for the number of services used was 0.59; for the length of distance traveled, 0.52; and for the frequency of visits, −0.18 (see Figures 4, 5, and 6). All coefficients were significant at the 0.01 level.

Poorer households use fewer services; richer households use more. To bring more clearly into relief the implications this relationship has for policy, households were categorized into the following three groups: the landless, households holding less than 2 hectares of operational land, and those holding more than 2 hectares. It can be seen from the Appendix, Table 29, that many services that were not used at all by landless households and that almost all services were used by those owning some land. On the whole, retail services were used more than rural services.

In the dry tract, of the 27 rural services, the landless did not use 22, those with less than 2 hectares of land did not use 8, and those with more than 2 hectares did not use 5. Of the 57 retail services, the landless did not use 17, those with less than 2 hectares of land did not use 4, and those with more than 2 hectares used all but 1.

[12] The food and personal services are blacksmith, carpenter, cobbler, moneylender, retail *kirana* store, tea and coffee shop, laundry, bakery, fuel, local wine, purchase of vegetables, purchase of fruit, purchase of poultry products, purchase of meat, purchase of dairy products, cold drinks, sweets, chemists and druggists, general provision, and restaurants (see the Appendix, Table 29).

Figure 4—Relationship between the size of operational landholdings and the distance traveled to services by households, 1982



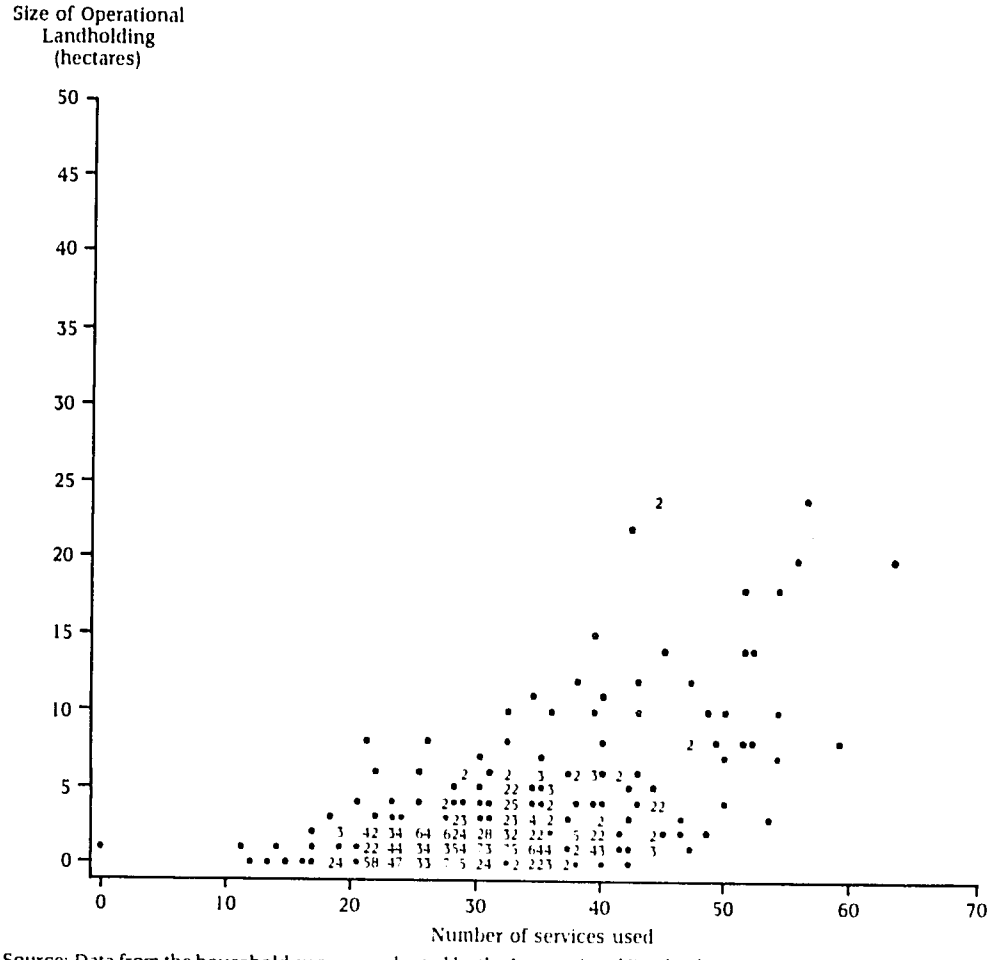
Source: Data from the household survey conducted by the International Food Policy Research Institute in Miryalguda Taluka, Andhra Pradesh, 1982.
Note: The numbers in the figure show where more than one point fell.

In the irrigated tract the landless did not use 20 of the rural services; those with less than 2 hectares of land did not use 11; and those with more than 2 hectares of land used all. The landless did not use 18 of the retail services, those with less than 2 hectares of land did not use 4; and those with more than 2 hectares of land used all services.

The perception of distance is directly influenced by the economic status of the consumer. A rich farmer may be able to overcome distance more easily than a poor farmer (see Table 23); a service equally far from two households may not be equally inaccessible to them.

All the same, greater distance discourages the use of a service. Households in the dry tract found it difficult to use more distant services, not only because transportation cost more but also because, in general, these households had less money to spend than those in the irrigated tract. The distances traveled to use the services in the irrigated tract indicates an ability to overcome distance on the part of those who were economically better placed.

Figure 5—Relationship between the size of operational landholdings and the number of services used by households, 1982



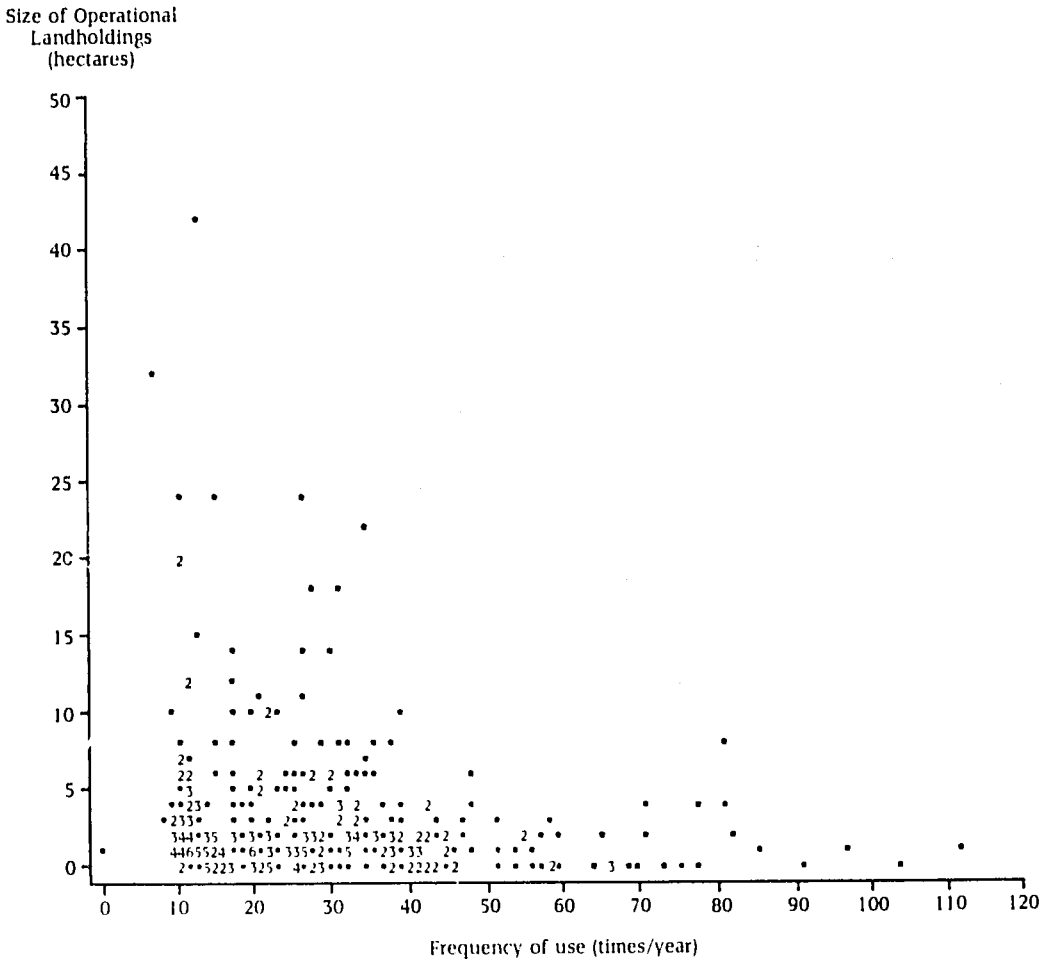
Source: Data from the household survey conducted by the International Food Policy Research Institute in Miryalguda Taluka, Andhra Pradesh, 1982.
Note: The numbers in the figure show where more than one point fell.

The Effects of Spatial and Economic Factors on Service Use

It should be clear from the foregoing discussion that the frequency of use of services is reduced by the distance to these services and increased by the economic status of the households. In purely economic terms this would mean that a household's consumption of services is influenced by their price and by the household's income. But economic-geographical data may reveal a causal relationship between frequency, distance, and economic status, a relationship that, of course, is not purely economic.

What kind of relationships can be expected to emerge? The number of times a service is used or a good is purchased can be a function of the degree of "replacement" of that service or good. Some goods and services were required by the households in the study more often than others. And some were used more regularly than others. Similarly, it was also seen that the goods and services used more frequently and more regularly were also available closer to the households.

Figure 6—Relationship between the size of operational landholdings and the frequency of use of services by sample households, 1982



Source: Data from the household survey conducted by the International Food Policy Research Institute in Miryalguda Taluka, Andhra Pradesh, 1982.
Note: The numbers in the figure show where more than one point fell.

Given these patterns of both service use and provision, both distance and income can influence the frequency of use of services. If neither distance nor income is an important variable, services are used more frequently and more regularly and are located closer to households. People do not have to be rich to be able to use them, and their distance from them becomes irrelevant. If income is the more important variable, services are used less frequently and less regularly and are provided further away from the households. People have to be rich to use them. If distance and income are both important, then, although the services are used less frequently, they are at least used more regularly than if income alone were important; and they are provided at a greater distance from the households. In this case, the more frequent and regular the use, the more important the distance. Income alone does not explain access to services or lack of it.

Regression Analysis

A simple linear regression analysis was conducted in which the frequency of use of

Table 23—Distances traveled by sample households to use services, 1982

Size of Operational Landholding/Tract	Communications	Credit and Banking	Transportation	Animal Husbandry	Marketing of Agricultural Produce	Food and Personal Services	Consumer Durables
(hectares)				(kilometers)			
0							
Dry	0.28	1.91	1.05	0.92	0.60	4.65	0.75
Irrigated	2.28	3.00	4.07	0.72	0.58	4.26	0.66
Less than 2							
Dry	0.42	9.59	1.05	6.79	3.57	5.63	9.07
Irrigated	2.97	6.71	4.37	2.10	3.00	6.39	4.20
More than 2							
Dry	7.22	13.75	15.98	6.80	9.87	8.76	24.02
Irrigated	9.44	7.86	9.31	2.67	8.49	8.51	36.96

Source: Data from the household survey conducted by the International Food Policy Research Institute in Miryalguda Taluka, Andhra Pradesh, 1982.
Note: For each group of services, the average is calculated using the number of households using those services.

services was a dependent variable and the value of households' goods, the size of per capita operational landholdings, and the distance of services from households were independent variables. When a number of observations in the independent variable are zero, certain nonlinear procedures are more efficient. For the present purpose, hypothesis testing, however, the benefits of using such techniques do not justify the extra difficulties in computation. In any series of 84 regressions, it can be expected from probability theory that some coefficients will appear to be statistically significant, indicating causality where there is none. Since the analysis here is concerned with general patterns and not with specific equations, such occasional, misleading occurrences were not considered.

The value of household goods and the size of per capita operational landholdings were used to indicate the economic status of households and distance was used to show access to services. Distance may be considered to be a proxy for a major part of the cost of acquiring services. Monthly expenditures, the volume of goods and services purchased, and the cost and time spent overcoming distance would have been more suitable indicators of both frequency of use and distance traveled. Without this data, however, the analysis uses the number of visits made and the distance traveled to use or purchase a good or service (in addition to the two indicators of income) to understand the relationships between frequency of use and distance. The results of the analysis, therefore, are only a first approximation of the processes involved. Improvements using data now lacking can be incorporated in the future. Since the frequency of use of services and access to services varied between households as well as between services, a series of causal relationships can be expected to emerge from the regression analysis.

The Results

Eighty-four regressions were run, one for each service, in order to find out whether the hypothesized relationships between the independent variables on the use of services hold. No significant relationships were observed for 31 of the services (see Table 24 for the rest). This could mean that these 31 services were not only available in almost all places in the study area but were also used by all people, making them accessible in both the physical and economic senses.[13] Households walked or used bullock carts to get to these services.

The regressions show two other relationships worth noting here. Where the mean for

[13] These services are road transportation; sales of vegetables, fruit, paddy, bajra, jowar, pulses, and dairy products; blacksmith; carpenter; cobbler; moneylender; general provisions; chemists and druggists; household utensils; timber; fuel; stone; lime; hardware; transistor sales and repair; bicycle repair; seeds; sales and repair of agricultural implements; furnishings; bed mattresses; local wine; leather goods; and purchase of poultry, meat, and dairy products.

Table 24—Effects of distance and economic status on the frequency of use of services, 1982

Service Used	Mean for Frequency[a]	Mean for Distance[a]	Distance Coefficient[b]	Value of Household Goods Co-efficient[b]	Per Capita Operational Land Co-efficient[b]	R^2[c]
	(times/year)	(kilometers)				
Postage	12.995	1.333	0.436	0.000361*	0.966	0.064
	(17.911)	(2.782)	(1.329)	(3.267)	(0.773)	(8.349)
Money orders	0.832	1.230	0.091	0.000025	0.549*	0.078
	(2.709)	(2.256)	(1.485)	(1.513)	(2.914)	(9.829)
Registration	0.125	2.837	0.020*	0.000002	0.130*	0.045
	(0.622)	(3.457)	(2.191)	(0.499)	(2.982)	(5.778)
Postal orders	0.119	9.653	0.008*	0.000020*	0.224*	0.190
	(0.939)	(18.652)	(3.273)	(3.721)	(3.676)	(28.480)
Telegrams	0.149	0.604	0.010	0.000023*	0.330*	0.280
	(0.886)	(0.903)	(1.358)	(4.871)	(5.965)	(47.261)
Radio licenses	0.108	11.767	0.003	0.000013*	0.024	0.221
	(0.311)	(6.093)	(1.365)	(7.415)	(1.167)	(34.539)
Telephones	0.125	7.816	0.011*	0.000004	0.191*	0.093
	(0.639)	(6.667)	(2.168)	(0.966)	(4.286)	(12.489)
Primary credit society	0.125	5.198	0.011*	0.000005*	0.142*	0.164
	(0.411)	(6.367)	(3.518)	(1.850)	(5.161)	(23.789)
Land development bank	0.271	24.149	0.007*	0.000014*	0.036	0.126
	(0.544)	(13.532)	(3.524)	(4.311)	(0.980)	(17.496)
Cooperative bank	0.062	18.314	0.001	0.000002	0.052*	0.024
	(0.253)	(12.033)	(1.052)	(1.141)	(2.845)	(3.004)
Grameena bank	0.079	12.323	0.010*	0.000000	0.027	0.023
	(0.341)	(4.801)	(2.616)	(0.182)	(1.108)	(2.847)
Nationalized bank	0.155	15.954	0.002	0.000003	0.122*	0.025
	(0.774)	(6.938)	(0.411)	(0.424)	(2.18[illegible])	(3.148)
Lead bank	0.022	18.518	0.001	0.000007*	0.055*	0.165
	(0.275)	(10.466)	(1.106)	(4.433)	(2.995)	(24.033)
Bus service	58.951	1.428	3.795*	0.001647*	6.610	0.077
	(63.784)	(2.567)	(3.027)	(4.205)	(1.499)	(10.153)
Train service	0.195	96.426	0.001*	0.000020*	0.153*	0.196
	(0.703)	(58.333)	(1.931)	(4.857)	(3.359)	(29.667)
Veterinary dispensary	1.426	4.862	0.048*	0.000007	0.324*	0.027
	(1.923)	(4.477)	(2.148)	(0.606)	(2.358)	(3.315)
Sale of castor	0.211	8.759	0.017*	0.000002	0.100*	0.101
	(0.409)	(7.326)	(5.927)	(0.885)	(3.505)	(13.604)
Sale of groundnuts	0.173	12.477	0.003	0.000005*	0.066*	0.075
	(0.386)	(6.732)	(1.006)	(2.180)	(2.398)	(9.858)
Sale of sugarcane	0.016	16.810	0.003*	0.000008*	0.053*	0.193
	(0.265)	(7.752)	(1.661)	(4.917)	(3.054)	(29.174)
Retail *kirana* store	68.081	2.732	2.310*	0.000013	4.799	0.035
	(81.054)	(6.152)	(3.405)	(0.032)	(0.837)	(4.371)
Retail cloth shop	2.320	10.816	0.008	0.000011	0.063	0.021
	(1.091)	(9.635)	(1.410)	(1.600)	(0.801)	(2.629)
Tea and coffee shop	41.420	2.924	5.018*	0.000006	0.471	0.066
	(89.322)	(4.422)	(4.892)	(0.000)	(0.756)	(8.596)
Laundry	124.835	0.100	4.933	0.001476	33.804*	0.031
	(144.743)	(1.129)	(0.747)	(1.624)	(3.298)	(3.900)
Readymade garments	1.295	13.271	0.018*	0.000001	0.397*	0.053
	(1.526)	(12.675)	(2.748)	(0.095)	(3.634)	(6.817)
Glassware and pottery	0.331	12.255	0.009*	0.000006	0.174*	0.072
	(0.744)	(13.005)	(2.860)	(1.244)	(3.343)	(9.486)

(continued)

Table 24—Continued

Service Used	Mean for Frequency[a]	Mean for Distance[a]	Distance Coefficient[b]	Value of Household Goods Coefficient[b]	Per Capita Operational Land Coefficient[b]	R^2[c]
	(times/year)	(kilometers)				
Electrical goods	0.550	17.130	0.010	0.000038*	0.596*	0.310
	(1.503)	(7.233)	(1.045)	(4.719)	(6.478)	(54.702)
Footwear	1.344	10.732	0.005	0.000011*	0.122*	0.080
	(0.806)	(11.552)	(1.158)	(2.268)	(2.101)	(10.590)
Bricks and tiles	0.179	3.661	0.003	0.000003	0.138*	0.102
	(0.461)	(5.163)	(0.620)	(1.114)	(4.335)	(13.747)
Cement	0.192	19.005	0.001	0.000005	0.141*	0.049
	(0.740)	(9.283)	(0.257)	(1.094)	(2.656)	(6.172)
Wooden furniture	0.371	12.493	-0.002	0.000002	0.158*	0.080
	(0.552)	(8.116)	(0.492)	(0.646)	(4.125)	(10.560)
Steel furniture	0.339	14.233	0.008*	-0.000001	0.145*	0.405
	(0.609)	(7.866)	(1.822)	(0.255)	(3.286)	(5.181)
Optical equipment	0.076	30.098	0.000	0.000002	0.093*	0.104
	(0.294)	(28.062)	(0.799)	(1.028)	(4.603)	(14.168)
Stationery	1.428	13.496	0.036	0.000070*	0.368	0.027
	(3.941)	(8.061)	(1.379)	(2.815)	(1.270)	(3.352)
Watch sales and repair	0.225	34.534	0.002*	0.000010*	0.132*	0.155
	(0.484)	(25.934)	(1.815)	(3.307)	(4.125)	(22.290)
Radio sales and repair	0.214	28.127	0.002*	0.000015*	0.037	0.159
	(0.434)	(22.142)	(2.137)	(5.848)	(1.305)	(22.951)
Bicycle sales	0.165	17.545	0.003*	0.000006*	0.206	0.030
	(0.386)	(11.171)	(1.904)	(2.237)	(0.100)	(3.775)
Scooter repair	0.016	26.442	0.000	0.000004*	0.018*	0.110
	(0.147)	(26.970)	(0.632)	(4.056)	(1.843)	(15.063)
Automobile repair	0.052	36.076	0.000	0.000004*	0.052*	0.096
	(0.245)	(25.343)	(0.952)	(2.436)	(3.085)	(12.909)
Tractor repair	0.052	30.398	0.001	0.000026*	0.087*	0.468
	(0.330)	(28.816)	(1.504)	(16.665)	(5.043)	(107.163)
Purchase of fertilizers	1.352	11.672	0.014*	0.000009	0.180*	0.049
	(1.187)	(8.098)	(1.903)	(1.158)	(2.153)	(6.313)
Purchase of pesticides	1.352	13.005	0.025*	0.000013	0.100	0.027
	(1.716)	(7.524)	(2.100)	(1.227)	(0.819)	(3.336)
Gasoline, diesel fuel, and lubricants	1.255	16.317	0.012	0.000234*	0.457	0.133
	(5.945)	(6.935)	(0.285)	(6.607)	(1.130)	(18.588)
Jewelry	0.236	26.035	0.002*	0.000006*	0.120*	0.085
	(0.501)	(22.858)	(1.831)	(1.968)	(3.485)	(12.347)
Liquor	1.929	16.182	0.169*	0.000089	6.377*	0.300
	(11.541)	(7.123)	(2.342)	(1.433)	(9.042)	(52.160)
Sweets	7.306	12.613	0.156*	0.000012	1.040	0.040
	(11.583)	(14.753)	(3.772)	(0.167)	(1.248)	(5.027)
Printing	0.054	20.778	0.001	0.000002	0.054*	0.053
	(0.280)	(10.136)	(0.693)	(1.213)	(7.367)	(6.796)
Musical instruments	0.003	23.027	0.000*	0.000001*	0.011*	0.216
	(0.052)	(27.362)	(3.552)	(4.755)	(3.378)	(33.469)
Photography	0.818	15.889	0.009	0.000006	0.149*	0.032
	(0.892)	(9.304)	(1.705)	(0.978)	(2.257)	(4.026)
Purchase of vegetables	112.041	2.209	4.418*	0.001230*	8.381	0.052
	(110.413)	(5.031)	(3.921)	(1.687)	(1.076)	(6.623)
Purchase of fruit	21.965	10.190	0.586*	8.381680	0.052	0.052
	(24.653)	(9.122)	(4.214)	(2.538)	(0.762)	(6.623)

(continued)

Table 24—Continued

Cold drinks	8.084	12.274	0.104	0.000423*	1.409	0.162
	(12.797)	(7.295)	(1.207)	(5.642)	(1.636)	(23.496)
Restaurants	24.529	12.986	-1.930*	0.000279	2.575	0.069
	(59.647)	(8.096)	(5.086)	(0.790)	(0.612)	(9.008)

Source: Data from the household survey conducted by the International Food Policy Research Institute in Miryalguda Taluka, Andhra Pradesh, 1982.
Note: The numbers not marked by an asterisk are not significant at the 0.05 level.

*Significant at the 0.05 level.

[a] The standard deviations are in parentheses.

[b] The t-statistics are in parentheses.

[c] The F-values are in parentheses.

the frequency of use was less than 2 times a year and the mean for distance was more than 12 kilometers, either income or distance significantly influenced the frequency of use. Distance alone was significant for services used more regularly, but income alone was significant for services used less regularly.[14]

There is a qualitative difference between the patterns of interaction identified by the mode of transportation. A distance of more than 12 kilometers was usually covered by bus, shorter distances were usually covered on foot. Both sets of distances were sometimes covered by bullock carts. These carts are usually used to carry agricultural produce, inputs, building material, and fuel, but they are sometimes used to carry agricultural machinery for repairs as well.

A majority of services for which neither income nor distance were significant are food and personal services. Services for which income appeared to be the significant variable are consumer durables. And services for which distance was the more significant variable are agroservices. It can also be said that households get to food and personal services by foot or bullock cart, to consumer durables by bus, and to agroservices by bullock cart or bus.

It can therefore be said that the regression analysis, in general, confirms the relationships hypothesized. The implications of these results are important for the design of distribution systems for goods and services. Given the complex relationships that are a consequence not only of the interplay between the variables under study but also of the regularity with which services are used and the modes of transportation, it is clear that income alone cannot explain the spatial patterns that the use of services follow. The distance to services is also important. Either by itself or in conjunction with economic status, distance significantly influenced the pattern by which services are used. Any reduction in distance and, therefore, any improvement in households' access to services is likely to increase the use of services, at least the use of services with negative distance elasticities (see Table 25). How this is to be achieved is discussed in the concluding chapter.

Distance Elasticities

Distance was an important factor in the use of over half of the services included in Table 24 (28 out of the 52). Of these, 13 are

[14] The first type of services are registration, postal orders, telephones, primary credit society, land development bank, *grameena* bank, bus service, train service, veterinary dispensary, sales of castor, sales of sugarcane, readymade garments, glassware, steel furniture, watch sales and repair, bicycle sales, purchase of fertilizers, jewelry, liquor, musical instruments, purchase of vegetables, retail *kirana* stores, tea and coffee shops, purchase of pesticides, sweet shops, purchase of fruit, and restaurants. The second type of services are postage, money orders, telegrams, radio licenses, cooperative bank, nationalized bank, lead bank, sale of groundnuts, laundry, electrical goods, footwear, bricks and tiles, cement, wooden furniture, optical equipment, stationery, scooter repair, automobile repair, tractor repair, gasoline, diesel fuel, and lubricants, printing, photography, and cold drinks.

Table 25—Distance elasticities, 1982

Service	Distance Elasticity
Registration	-0.4641
Postal orders	0.6347
Telephones	0.6652
Primary credit society	0.4608
Land development bank	0.6267
Grameena bank	-1.5421
Bus service	-0.0920
Train service	0.5425
Veterinary dispensary	0.1638
Sale of castor	0.7049
Sale of sugarcane	2.8092
Retail *kirana* store	0.0927
Tea and coffee shop	0.3543
Readymade garments	0.1844
Glassware and pottery	0.3163
Steel furniture	0.3162
Watch sales and repair	0.2543
Radio sales and repair	0.2631
Bicycle sales	0.3699
Purchase of fertilizers	0.1238
Purchase of pesticides	0.2396
Jewelry	0.2243
Liquor	1.4176
Sweets	0.2690
Musical instruments	2.6831
Purchase of vegetables	0.0871
Purchase of fruit	0.2720
Restaurants	1.0219

Source: Data from the household survey conducted by the International Food Policy Research Institute in Miryalguda Taluka, Andhra Pradesh, 1982.

Note: A *grameena* bank provides loans for livestock.

rural services and 15 are retail services. Most of these are also services for which the distance elasticities were negative (see Table 25).[15]

The positive distance elasticities for postal orders, the sale of sugarcane, purchases of fertilizers, purchases of pesticides, and musical instruments are a puzzle. An explanation is that these services were located so that if people had to use them, there was no alternative to traveling to them, no matter what the distance. Thus households did not and could not forgo the use of these services simply because the distance was great. The size of per capita operational landholdings was used to pick up the production effects in addition to the value of household goods, which was a proxy for income. Items such as fertilizers would be picked up only by this variable. However, only the effect of the value of household goods is discussed here.

Of the two indicators of economic status, the value of household goods is the more interesting because it reflects how those without land actively participated in the economic transactions of the regional economy. It has, by itself, significant influence on the use of such services as postage, radio licenses, telegrams, electrical goods, stationery (stationery stores in India also sell toiletry goods), gasoline, diesel fuel, and lubricants, and cold drinks.

[15] The rural services are registration, telephones, primary credit society, land development bank, *grameena* bank, bus service, train service, veterinary dispensary, and sale of castor. The retail services are retail *kirana* store, tea and coffee shops, readymade garments, glassware and pottery, steel furniture, watch sales and repair, radio sales and repair, bicycle sales, jewelry, liquor, sweets, purchase of vegetables, purchase of fruit, and restaurants.

6

CHANGING PATTERNS OF HOUSEHOLD ECONOMY AND SERVICE

The basis for making a comparative analysis of service use for 1968 and 1982 in the study area is somewhat weak. There are several reasons for this. Only nonhousehold data was collected in 1968, so a strictly comparative study cannot be made: the data on which the "findings" for 1968 are based was collected by "recall" during the 1982 survey; and many of the answers to questions given to households could not be verified.

Despite these methodological problems, there are other features of the recall data that encourage one to go ahead and make the comparisons. The recall date of 1968 was tied specifically to the construction and operation of Nagarjunasagar Irrigation Project. This being a major event in the area, it was easier for the people to remember what they did at that time. This was particularly true of service provision and use patterns. For example, when questioned about the availability of credit and banking, it was possible for them to say whether or not a particular facility was located in the village; and if not, what distance they traveled to avail themselves of it, how frequently, and by what means of transportation.

Furthermore, it was easy to obtain details about the size of the operational landholdings, irrigation status, and the farm and nonfarm buildings of households in 1968 and to check the information thus obtained in the official records of the villages. But it was not as easy to gather accurate information for 1968 about livestock, household goods and implements, farm and nonfarm expenses, and stocks of farm and nonfarm products because this depended entirely on the memory of the respondents. Therefore, it was decided to exclude these variables from the comparative study.

Despite these clarifications, the household data for 1968 cannot be relied upon to support substantive statements regarding the process of change. Bearing this in mind, an attempt is made to speculate on the direction of changes in the economic status of households and in the provision and use of services in the study area.

Changes in the Economic Status of Households

The average values of the economic characteristics of the two regions of the study area show that positive change occurred among the households and that it was greater in the irrigated tract than in the dry tract (see Table 26). The indexes of change in the economic status of households demonstrate a similar trend, with the indexes of households in the irrigated tract being larger (see Table 27). The medium and large farmers appear to have been in an advantageous position in both tracts; on the other hand, as far as the value of farm and nonfarm buildings is concerned, the small farmers and the landless did better in the irrigated tract.

Thus the observations made in Chapters 4 and 5 regarding richer and poorer regions and richer and poorer households can now be put in a better perspective. Tables 26 and 27 show that the irrigated tract developed faster than the dry tract. Rich households alone, however, did not continue to get richer; incomes of the marginal, the small, and the medium farmers also grew, at least in the irrigated tract. In the dry tract whatever limited irrigation facilities were available in the recent past were used by the large and the largest farmers.

This difference in access to, and availability of, irrigation waters has been the main cause of the differences in the economic status of the households in the study area. Generally speaking, the economic conditions of households and of the study area have improved considerably. The cumulative effect of this improvement on the pattern of service provision and use could mean that the use and the frequency of use of services increased and, because of the general improvement in the regional economy, more services became available. This last improvement, in turn, could have resulted in a reduction of the distances at which the services were available to the households.

Table 26—Economic status of sample households by tract, 1968 and 1981

Tract/Year	Size of Operational Landholding	Irrigated Area	Value of Farm and Nonfarm Buildings	
			Unadjusted	Adjusted[a]
	(hectares)		(Rs)	
Dry				
1968	5.89	0.93	2,379.36	5,216.75
1981	3.60	0.75	4,863.97	...
Irrigated				
1968	6.28	0.69	2,579.80	5,656.21
1981	2.23	1.78	6,574.95	...

Sources: The data for the size of operational holdings and irrigated area are from the offices of the Tahsildar in Miryalguda and Nidmanoor. The data for the value of farm and nonfarm buildings are from those same offices and from the survey conducted by the International Food Policy Research Institute in Miryalguda Taluka, Andhra Pradesh, 1982. The consumer price indexes for agricultural labor in Andhra Pradesh are from Montek S. Ahluwalia, "Rural Poverty in India: 1956/57 to 1973/74," in *India: Occasional Papers*, World Bank Staff Working Paper No. 279 (Washington, D.C., World Bank, 1978), p. 9.

[a] These figures are the adjusted values at 1980/81 prices. They were calculated using the ratio of the consumer price indexes for agricultural labor in Andhra Pradesh in 1980/81 (353) and 1967/68 (161). (For these indexes, 1960/61 equalled 100.)

Table 27—1982 indexes showing the change in the economic status of sample households since 1968 by size of operational landholding

Size of Operational Landholding/Tract	Index of the Size of Operational Landholding	Index of Irrigated Land	Index of the Value of Farm and Nonfarm Buildings[a]
(hectares)			
0.00			
Dry	100.00	100.00	58.91
Irrigated	100.00	100.00	75.05
0.00–0.99			
Dry	91.37	117.64	77.41
Irrigated	98.24	414.28	71.53
1.00–1.99			
Dry	168.03	95.65	84.97
Irrigated	103.03	317.[illegible]4	100.51
2.00–3.99			
Dry	99.21	144.89	141.24
Irrigated	101.63	430.76	164.31
4.00–9.99			
Dry	95.53	211.11	127.08
Irrigated	89.54	420.00	120.86
10.00 or more			
Dry	45.37	59.31	90.17
Irrigated	48.79	379.76	104.05

Source: Data from the household survey conducted by the International Food Policy Research Institute in Miryalguda Taluka, Andhra Pradesh, 1982.

[a] These figures are the adjusted values at 1980/81 prices. They were calculated using the ratio of the consumer price indexes for agricultural labor in Andhra Pradesh in 1980/81 (353) and 1967/68 (161). (For these indexes, 1960/61 equalled 100.)

Changes in the Provision and Use of Services

For the study area as a whole, the use of services increased more in the irrigated tract than in the dry tract. This finding is commensurate with the finding of an earlier study that the irrigated tract, with its better provision of services, would have higher use, too.[16] It should be borne in mind that some groups of services, such as credit and banking, transportation, and animal husbandry, were used very little in 1968, whereas others, such as retail services (particularly those used by a majority of households) were used more often (see Table 28).

The actual distances at which the services were available declined impressively between 1968 and 1982 (see Table 28). This is also commensurate with an earlier observation that greater numbers of services would make them more accessible to consumers.[17]

The frequency of use of services also improved between 1968 and 1982 (see Table 28). The increased frequency denotes a higher standard of living, which, in turn, results in a progressively increasing demand for goods and services within the study area. Considering that the distances and frequency of use are themselves aggregated by service group (such as credit and banking) the changes are impressive.

The data from the two time periods elicit a number of observations about the use of services. Services located further away from the sample households were used less frequently, and services located closer to the sample households were used more frequently. Households used mechanized means of transportation to use more distant services. The reverse can also be noted: households used bullock carts or went on foot to use services closer to them. Lastly, because services were being located nearer the households than before, they were more accessible. The data from the field demonstrate that these observations hold true for both time periods, both tracts, and for the study area as a whole.

Some clear spatial and societal relationships emerged in the study area after the irrigation waters were first released in 1968. The irrigated tract seems to have been provided with a better base for development, particularly for agricultural development and for the provision and use of services. The empirical evidence shows a sequence for this development: after development in the irrigated tract and among the large and largest farmers reached a point of saturation, other regions (such as the dry tract) and other sections of society (such as the landless and medium, small, and marginal farmers) began to benefit from it.

Table 28—Distance of services from sample households and frequency of use among sample households, 1968 and 1982, and 1982 index showing changes in service use since 1968

Service	Distance		Frequency of Use		1982 Index of Service Use
	1968	1982	1968	1982	
	(kilometers)		(times/year)		(1968 = 100)
Communications	12.2	7.9	4.0	5.0	148.0
Credit and banking	13.9	13.0	1.3	1.5	174.0
Transportation	2.6	1.5	14.0	20.0	149.7
Animal husbandry	9.3	8.2	3.2	8.1	167.8
Marketing of agricultural produce	7.7	6.1	100.0	120.0	137.7
Retail services	17.8	12.9	20.0	23.0	112.0

Source: Data from the household survey conducted by the International Food Policy Research Institute in Miryalguda Taluka, Andhra Pradesh, 1982.

[16] Wanmali, *Service Provision and Rural Development*.

[17] Ibid.

As was noted in the earlier study, some settlements were selected to act as service centers in which most of the rural services were provided in a hierarchically planned manner.[18]

Insofar as these changes took place first in regions, settlements, and households that were well-endowed structurally and economically, without apparent regard to whether they were urban or rural, before diffusing to other regions, settlements, and households not as well endowed, it can be said that the process of development in the study area appears to have had not merely an urban or a rural bias, but a hierarchic one.[19]

---

[18] Ibid.

[19] For more on urban bias, see Michael Lipton, "Strategy for Agriculture: Urban Bias and Rural Planning," in *The Crisis of Indian Planning*, ed. Paul Streeten and Michael Lipton (Oxford: Oxford University Press, 1968); and Michael Lipton, *Why Poor People Stay Poor: A Study of Urban Bias in World Development* (Cambridge, Mass.: Harvard University Press, 1977).

For more on rural bias, see Sudhir Wanmali, "Rural Based Models for Rural Development: The Indian Experience," in *Understanding Green Revolutions: Agrarian Change and Development Planning in South Asia*, ed. Tim Bayliss-Smith and Sudhir Wanmali (Cambridge: Cambridge University Press, 1984).

7

POLICY IMPLICATIONS

The findings of this study have important implications for policy. These implications present development administrators with options that can help put plans of action on a solid basis. It is hoped that although taken from a small part of rural India, both the findings and the policy implications will have a wider relevance.

Implications for Regional Policy

The analysis has clearly demonstrated that the distance of services from households is significant in explaining the spatial pattern of use of these services. It influences the spatial patterns in a variety of ways singly and in combination with the economic status of households. This conclusion offers a useful basis on which to plan service provision more realistically. For the sake of this discussion the services thus influenced are treated separately as rural and retail services.

Improved Access to Rural Services

It was seen in an earlier study that the government provided some rural services in a planned manner in about 20 service centers. It also planned to make these services accessible to as many villages as possible by locating them in a "fixed" manner in more centers during the Fourth and Fifth Plan periods.[20] These services were provided in order to facilitate the development of agriculture in the study area.

The present analysis has noted that some of these services were not used frequently by households and that this low frequency of use was, among other things, related to distance (see Chapter 6). These are also the services for which the distance elasticities were negative.

The access to these services can be improved by having them provided closer to households. This can be achieved either by making them available at appropriate distances in a fixed location or by making them mobile, traveling from a service center through a specific area. Mobile service provision would considerably reduce the costs of establishing and maintaining these services.[21]

Advantage should be taken of existing service centers by making mobile services available from them to the areas the service centers cover.[22] The provision of such services as credit and banking, animal husbandry, and marketing could be timed to account for the period of heavy demand. Other types of services, such as communications, could be made available throughout the year; a mobile service van could visit villages (or groups of villages) in the service area on predetermined days of the week. These days of mobile service provision could coincide with the days of the periodic local markets in the study area. Access to bus service could be improved by extending its coverage and by increasing the frequency with which buses travel over existing routes.

The problems of administering and managing mobile services would also have to be identified, but these could be looked at in detail once the decision is made to provide the services in this way. There remains the tricky question of the economics of providing these services. Since most of the services recommended to be made mobile are the responsibility of government, the decision to make them mobile may have to be made because it would make them more effective rather than because it would make them more efficient. There is the hope, of course, based on experience with fixed rural services, that once the government takes the lead in providing such services, the private sector will follow.[23]

---

[20] Wanmali, *Service Provision and Rural Development*.

[21] Ibid.

[22] Ibid.

[23] Ibid.

Improved Access to Retail Services

As was noted earlier, there were 15 retail services whose use was significantly influenced by distance. With the exception of steel furniture, radio sales and repair, watch sales and repair, and bicycle sales, all retail services were available in the service centers of the study area. These emerged as a consequence of demand for them in the region. That demand, in its turn, was a consequence of the development of agriculture.[24] In providing these services in other villages in the future, a number of economic factors will also come into play. Two that are quite significant are the incentives and the benefit/cost ratios that will govern the suppliers' decision about where to locate. Insofar as the service centers have the necessary infrastructure, one can assume that incentives will cause no problem. A proper benefit/cost study of the alternatives for the provision of services would certainly complement the findings of this analysis.

With the exception of the services noted above, all the retail services are currently being provided in the periodic local markets of the study area. These markets are held in a village on a particular day of the week and in other villages on other days of the same week. The locations of these markets are governed by ease of access to both traders and consumers. The former serve the population of the surrounding villages from temporary stalls and establishments. However, new periodic markets in the study area have emerged only in the irrigated tract. This is a response to demand created by the development of agriculture. It can be predicted that this process of development in agriculture will continue as cultivation becomes extensive, intensive, and diversified, ensuring that the established local markets will continue to grow and that some new ones will emerge. Insofar as the periodic markets serve areas that otherwise would have more difficulty gaining access to these retail services, this dovetailing of distribution of retail goods with periodic markets by the provision of mobile services will improve the pattern of access to these services.

Implications for Households

This analysis also has findings on equity. For example, the poorer sections of the society (the landless, agricultural laborers, and marginal and small farmers) have benefited and continue to benefit from the patterns of service provision and use in the region. Greater employment opportunities on the farm and off it, better access to water, production-oriented services, and other consumer goods, and greater diversification of the rural occupational structure have all contributed to the improvement of the quality of rural life.

There is, as expected, a good deal of evidence in the study area that the economic status of households also influences the use of services. Thus the frequency of use of services will increase as economic status does, requiring that more outlets be established to meet the demand. Use of some services—such as retail cloth stores, laundry, electrical goods, footwear, building materials, wooden furniture, optical equipment, scooter repair, automobile repair, tractor repair, printing, and photography—is significantly influenced only by economic status (especially by the size of per capita operational landholdings), even though the distances traveled to obtain these goods are greater. These services were originally available only in Miryalguda and Vijayapuri, but are now also available in the other service centers of the study area.

To follow up this study, one could explore the relationships between household expenditure patterns and the use of specific goods and services or the consequences of seasonality of demand on the provision of services.

---

[24] For details of the discussion on this aspect, see John W. Mellor and Uma Lele, "Growth Linkages of the New Foodgrain Technologies," *Indian Journal of Agricultural Economics* 28 (January-March 1973): 35-55; B. F. Johnston and P. Kilby, *Agriculture and Structural Transformation* (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); and Peter B. R. Hazell and Ailsa Röell, *Rural Growth Linkages: Household Expenditure Patterns in Malaysia and Nigeria*, Research Report 41 (Washington, D.C.: International Food Policy Research Institute, 1983).

Planning of Distribution Systems

The additional incomes in the study area are being spent on agricultural and non-agricultural goods and services, among other things. These services are being provided by both the government and the private sector and increasingly by the latter, at least in the irrigated tract of Miryalguda Taluka. It can be argued that with access to goods and services improving, savings in the costs and time of obtaining these services would increase. These savings could, and would, be retained locally and be used in both the producing and consuming sectors of the economy. Whichever way one looks at it, planning for an appropriate regional distribution system of goods and services is likely to further strengthen the service and demand linkages in the study area.

APPENDIX: SUPPLEMENTARY TABLES

Table 29—Percentage of sample households using services, by size of operational landholding

Service	Size of Operational Landholding					
	0 Hectares		Less Than 2 Hectares		More Than 2 Hectares	
	Dry Tract	Irrigated Tract	Dry Tract	Irrigated Tract	Dry Tract	Irrigated Tract
	(percent)					
Rural services						
Communications						
Postage	0.00	0.00	62.95	75.34	81.33	100.00
Money orders	0.00	0.00	7.42	8.21	37.33	40.90
Registration	0.00	0.00	0.00	0.00	3.26	18.18
Postal orders	0.00	0.00	0.00	0.00	5.33	4.54
Telegrams	0.00	0.00	0.00	0.00	9.33	31.81
Radio licenses	0.00	14.28	0.00	16.20	20.00	68.18
Telephones	0.00	0.00	0.00	0.00	12.00	40.90
Credit and banking						
Primary credit society	0.00	0.00	1.23	1.36	13.33	13.63
Land development bank	0.00	0.00	11.11	17.80	33.33	86.36
Cooperative bank	0.00	0.00	3.70	4.10	14.66	9.09
Grameena bank	0.00	4.76	1.23	1.36	6.66	9.09
Nationalized bank	2.46	9.52	6.17	6.84	17.33	13.63
Lead bank	0.00	0.00	2.46	2.73	1.33	4.54
Transportation						
Bus service	100.00	100.00	97.53	100.00	100.00	100.00
Road transportation	0.00	0.00	0.00	0.00	4.00	9.09
Train service	11.76	4.76	12.34	9.58	20.00	36.36
Animal husbandry						
Veterinary dispensary	5.88	52.38	56.79	71.23	94.66	95.45
Marketing of agricultural produce						
Sale of vegetables	0.00	0.00	6.17	0.00	9.33	4.54
Sale of fruit	0.00	0.00	1.23	0.00	1.33	4.54
Sale of paddy and rice	0.00	0.00	...	72.85	...	82.23
Sale of bajra	0.00	0.00	8.64	4.10	57.33	13.63
Sale of jowar	0.00	0.00	6.17	4.10	48.00	13.63
Sale of pulses	0.00	0.00	3.70	0.00	8.00	9.04
Sale of castor	0.00	0.00	24.69	0.00	38.66	4.54
Sale of groundnuts	0.00	0.00	4.93	13.69	38.66	27.27
Sale of sugarcane	0.00	0.00	0.00	0.00	0.00	9.09
Sale of dairy products	2.50	14.28	8.22	5.47	14.36	9.09
Retail services						
Blacksmith	23.52	66.66	97.53	71.23	90.66	180.90
Carpenter	29.41	76.19	83.95	84.93	97.33	85.71
Cobbler	58.82	71.42	93.82	89.04	94.66	90.47
Moneylender	23.52	38.09	33.33	46.57	26.66	23.80
Retail *kirana* store	88.23	100.00	96.29	94.52	100.00	100.00
Retail cloth store	100.00	100.00	97.53	84.93	98.66	100.00
Tea and coffee shop	58.82	57.14	49.38	47.94	49.33	59.09
Laundry	0.00	0.00	62.96	13.69	78.66	86.36
Bakery	52.94	38.09	40.74	52.05	50.66	59.09
General provisions	88.23	76.19	82.71	87.67	94.66	86.36
Chemists and druggists	44.26	48.10	54.32	55.83	57.33	61.18
Readymade garments	17.64	57.14	56.79	53.42	72.00	72.72
Household utensils	88.23	100.00	93.82	97.26	96.00	100.00
Glassware and pottery	0.00	0.00	17.28	8.21	29.33	13.63
Electrical goods	0.00	0.00	3.70	4.10	61.33	19.56
Footwear	88.23	80.95	76.54	90.41	97.33	100.00
Timber	11.76	14.28	23.45	31.50	37.33	54.54
Fuel	94.11	90.47	98.76	94.52	96.00	86.36
Bricks and tiles	0.00	0.00	7.40	15.06	29.33	40.90

(continued)

Table 29—Continued

Service	Size of Operational Landholding					
	0 Hectares		Less Than 2 Hectares		More Than 2 Hectares	
	Dry Tract	Irrigated Tract	Dry Tract	Irrigated Tract	Dry Tract	Irrigated Tract
	(percent)					
Cement	0.00	0.00	2.49	15.06	29.33	54.54
Stone	17.64	0.00	32.09	34.24	34.66	36.36
Lime	52.94	42.85	56.79	57.53	56.00	36.36
Hardware	23.52	47.61	67.90	75.34	81.33	100.00
Wooden furniture	35.29	28.57	18.51	27.39	54.66	54.54
Steel furniture	5.88	28.57	24.69	32.87	34.66	45.45
Optical equipment	0.00	0.00	3.70	9.58	13.33	13.63
Stationery	17.64	23.80	18.51	38.35	45.33	72.72
Watch sales and repair	11.76	19.04	3.70	15.06	40.00	63.63
Radio sales and repair	0.00	23.81	7.40	21.91	30.66	72.72
Transistor sales and repair	5.86	9.52	5.23	9.58	6.66	13.63
Bicycle sales	11.76	28.57	4.93	17.80	21.33	40.90
Bicycle repair	17.64	28.57	6.17	19.17	22.66	40.90
Scooter repair	0.00	0.00	0.00	0.00	4.00	4.54
Automobile repair	0.00	0.00	1.23	1.36	13.33	13.63
Tractor repair	0.00	0.00	0.00	0.00	4.00	36.36
Seeds	0.00	0.00	71.60	83.56	76.00	86.36
Purchase of fertilizers	0.00	0.00	55.55	87.67	96.00	100.00
Purchase of pesticides	0.00	0.00	53.08	87.67	88.00	100.00
Gasoline, diesel fuel, and lubricants	0.00	0.00	0.00	2.73	16.00	40.90
Sales and repair of agricultural implements	0.00	0.00	71.60	71.23	86.66	100.00
Jewelry	11.76	14.28	9.87	24.65	30.66	54.54
Furnishings	82.35	66.66	77.77	72.60	72.00	68.18
Bed mattresses	82.35	66.66	77.77	72.60	72.00	68.18
Local wine	64.70	52.38	79.01	54.79	60.00	36.36
Liquor	5.88	0.00	1.23	6.84	16.00	13.63
Sweets	41.17	80.90	66.66	65.75	86.66	90.90
Printing	0.00	0.00	0.00	0.00	10.66	13.36
Musical instruments	0.00	0.00	0.00	0.00	4.00	4.54
Photography	70.58	71.42	43.20	68.49	78.66	86.36
Leather goods	70.58	71.42	43.20	68.49	78.66	86.36
Purchase of vegetables	94.11	100.00	93.81	98.63	98.66	100.00
Purchase of fruit	76.47	90.47	83.95	86.30	92.00	95.45
Purchase of poultry products	64.70	76.19	74.04	73.97	66.66	81.81
Purchase of meat	88.23	95.23	92.59	90.41	86.66	95.45
Purchase of dairy products	47.05	47.61	30.86	28.76	26.66	27.28
Cold drinks	52.94	47.61	30.86	52.05	54.66	63.63
Restaurants	70.58	71.42	64.19	64.38	69.33	59.09

Source: Data from the household survey conducted by the International Food Policy Research Institute in Miryalguda Taluka, Andhra Pradesh, 1982.

Note: Jowar is sorghum and bajra is a kind of pearl millet. A *grameena* bank provides loans for livestock.

Table 30—Aggregated percentages of sample households using services, 1982

Service	Used by Less than 20 Percent of Households		Used by 20-80 Percent of Households		Used by More than 80 Percent of Households	
	Dry Tract	Irrigated Tract	Dry Tract	Irrigated Tract	Dry Tract	Irrigated Tract
Rural services						
Communications						
Postage			x			x
Money orders	x			x		
Registration	x	x				
Postal orders	x	x				
Telegrams	x	x				
Radio licenses	x	x				
Telephones	x	x				
Credit and banking						
Primary credit society	x	x				
Land development bank	x			x		
Cooperative bank	x	x				
Grameena bank	x	x				
Nationalized bank	x	x				
Lead bank	x	x				
Transportation						
Bus service					x	x
Road transportation	x	x				
Train service	x	x				
Animal husbandry						
Veterinary dispensary			x	x		
Marketing of agricultural produce						
Sale of vegetables	x	x				
Sale of fruit	x	x				
Sale of paddy and rice			x	x		
Sale of bajra		x	x			
Sale of jowar		x	x			
Sale of pulses	x	x				
Sale of castor		x	x			
Sale of groundnuts	x	x				
Sale of sugarcane		x				
Sale of dairy products		x				
Retail services						
Blacksmith			x	x		
Carpenter					x	x
Cobbler					x	x
Moneylender			x	x		
Retail *kirana* store					x	x
Retail cloth store					x	x
Tea and coffee shop			x	x		
Laundry			x	x		
Bakery			x	x		
General provisions					x	x
Chemists and druggists					x	x
Readymade garments			x	x		
Household utensils					x	x
Glassware and pottery					x	x
Electrical goods			x	x		
Footwear					x	x
Timber			x	x		
Fuel					x	x
Bricks and tiles	x	x				
Cement	x			x		
Stone			x	x		
Lime			x	x		
Hardware			x	x		
Wooden furniture			x	x		
Steel furniture			x	x		
Optical equipment	x	x				

(continued)

Table 30—Continued

Service	Used by Less than 20 Percent of Households		Used by 20-80 Percent of Households		Used by More than 80 Percent of Households	
	Dry Tract	Irrigated Tract	Dry Tract	Irrigated Tract	Dry Tract	Irrigated Tract
Stationery			x	x		
Watch sales and repair	x			x		
Radio sales and repair	x			x		
Transistor sales and repair	x	x				
Bicycle sales	x			x		
Bicycle repair				x		
Scooter repair	x	x				
Automobile repair	x	x				
Tractor repair	x	x				
Seeds			x	x		
Purchase of fertilizers			x			x
Purchase of pesticides			x			x
Gasoline, diesel fuel, and lubricants	x	x				
Sales and repair of agricultural implements					x	x
Jewelry	x			x		
Bed mattresses			x	x		
Local wine			x	x		
Liquor	x	x				
Sweets		x	x			
Binding	x	x				
Printing	x	x				
Musical instruments		x				
Photography			x	x		
Leather goods			x	x		
Purchase of vegetables					x	x
Purchase of fruit					x	x
Purchase of poultry products			x	x		
Purchase of meat					x	x
Purchase of dairy products			x	x		
Cold drinks			x	x		
Restaurants			x	x		

Source: Data from the household survey conducted by the International Food Policy Research Institute in Miryalguda Taluka, Andhra Pradesh, 1982.
Note: Jowar is sorghum and bajra is a kind of pearl millet. A *grameena* bank provides loans for livestock.

Table 31—Use pattern of services: frequency and distance, by percent of sample households using services

Percent of Households that Use Service/Service	Frequency of Use		Distance	
	Dry Tract	Irrigated Tract	Dry Tract	Irrigated Tract
	(times/year)		(kilometers)	
Less than 20				
Money orders	4.2	*	0.7	*
Registration	2.0	2.5	2.0	0.6
Postal orders	2.9	7.0	6.4	4.0
Telegrams	2.2	3.2	15.6	9.5
Radio licenses	0.9	1.0	12.9	8.3
Telephones	2.5	2.5	9.6	5.0
Primary credit society	1.2	1.4	4.4	0.3
Land development bank	1.2	*	24.9	*
Cooperative bank	1.0	1.0	19.0	5.3
Grameena bank	1.0	1.3	14.6	8.8
Nationalized bank	1.8	1.1	17.4	9.5
Lead bank	1.0	5.0	25.0	25.0
Road transportation	1.4	2.8	26.0	14.6
Train service	0.8	1.8	59.8	59.0
Sale of vegetables	149.0	212.0	4.9	4.0
Sale of fruit	0.7	2.0	5.3	8.0
Sale of bajra	*	0.2	*	1.7
Sale of jowar	*	0.3	*	1.5
Sale of pulses	0.9	0.7	13.4	5.3
Sale of castor	*	0.7	*	4.5
Sale of groundnuts	0.9	0.7	13.4	5.5
Sale of sugarcane	...	3.0	...	27.5
Sale of dairy products	...	300.0	...	2.6
Bricks and tiles	1.1	1.1	33.0	2.3
Cement	0.9	*	18.8	*
Optical equipment	1.1	1.1	33.0	31.7
Watch sales and repair	1.0	*	38.0	*
Radio sales and repair	1.0	*	31.8	*
Transistor sales and repair	1.1	1.2	40.0	25.0
Bicycle sales	0.8	*	20.1	*
Bicycle repair	1.0	*	32.0	*
Scooter repair	1.0	1.0	22.8	20.0
Automobile repair	1.0	1.2	20.6	20.0
Tractor repair	1.0	1.2	25.3	20.0
Gasoline, diesel fuel, and lubricants	13.9	18.2	14.0	11.6
Jewelry	1.0	*	20.6	*
Liquor	30.2	32.0	17.4	11.6
Binding	1.8	1.8	17.4	11.7
Printing	1.2	1.2	22.9	15.8
Musical instruments	...	1.0	...	130.0
Between 20 and 80				
Postage	16.0	*	1.6	*
Money orders	*	4.8	*	0.5
Land development bank	1.2	1.3	24.9	12.6
Veterinary dispensary	1.6	2.5	6.2	2.1
Sale of paddy and rice	5.1	2.2	11.6	6.6
Sale of bajra	5.1	*	8.8	*
Sale of jowar	6.2	*	8.8	*
Sale of castor	1.0	*	4.8	*
Blacksmith	3.0	2.6	0.3	0.1
Moneylender	2.0	2.3	1.1	0.4
Tea and coffee shop	73.0	93.8	2.3	0.8
Laundry	163.0	182.0	0.2	0.1
Bakery	14.5	10.0	12.3	8.7
Readymade garments	2.2	2.4	13.1	13.1
Electrical goods	3.0	4.0	20.3	14.7
Timber	1.7	1.8	12.8	12.0
Cement	*	1.4	*	12.7
Stone	1.1	1.1	1.2	0.8

(continued)

Table 31—Continued

Percent of Households that Use Service/Service	Frequency of Use		Distance	
	Dry Tract	Irrigated Tract	Dry Tract	Irrigated Tract
	(times/year)		(kilometers)	
Lime	1.1	1.1	5.9	5.9
Hardware	1.7	2.4	15.8	9.7
Wooden furniture	1.1	1.1	13.7	9.7
Steel furniture	1.2	1.2	15.7	11.0
Stationery	4.2	4.3	15.1	10.6
Watch sales and repair	a	1.1	a	27.1
Radio sales and repair	a	1.0	a	19.6
Bicycle sales	a	0.9	a	6.8
Bicycle repair	a	4.5	a	5.7
Seeds	1.3	1.5	5.5	4.8
Purchase of fertilizers	1.7	a	13.6	a
Purchase of pesticides	1.9	a	15.7	a
Jewelry	a	1.0	a	17.8
Bed mattresses	1.2	1.3	14.4	13.5
Local wine	160.0	165.0	0.1	0.1
Sweets	17.2	16.1	13.3	10.3
Photography	1.3	1.3	18.0	12.6
Leather goods	1.9	2.2	15.5	9.5
Purchase of poultry products	53.1	47.4	0.8	1.1
Purchase of dairy products	186.0	188.0	0.8	1.4
Cold drinks	16.8	19.5	14.2	8.8
Restaurants	23.2	43.4	14.5	9.7
More than 80				
Postage	a	20.2	a	0.6
Bus service	50.0	77.0	1.6	0.3
Carpenter	3.3	2.6	0.5	0.3
Cobbler	2.6	2.3	0.4	0.3
Retail *kirana* store	57.0	93.0	3.0	2.2
Retail cloth store	2.3	2.5	11.0	10.4
General provisions	21.0	21.0	12.7	9.5
Household utensils	1.3	1.4	11.8	10.8
Chemists and druggists	9.1	10.8	13.3	10.4
Glassware and pottery	2.5	2.5	6.0	6.0
Footwear	1.5	1.6	10.7	10.7
Fuel	40.0	62.6	0.4	0.1
Purchase of fertilizers	a	2.1	a	9.7
Purchase of pesticides	a	2.0	a	9.7
Sale and repair of agricultural implements	1.3	1.4	12.2	10.4
Purchase of vegetables	126.0	97.0	1.5	3.3
Purchase of fruit	23.7	27.0	10.6	8.9
Purchase of meat	33.0	33.0	0.8	0.6

Source: Data from the household survey conducted by the International Food Policy Research Institute in Miryalguda Taluka, Andhra Pradesh, 1982.

Note: Jowar is sorghum and bajra is a kind of pearl millet. A *grameena* bank provides loans for livestock.

[a] Not all services were used equally in both tracts; the data for the service in this tract are found elsewhere in this table.

BIBLIOGRAPHY

Administrative Staff College of India. *All India Grain Storage and Distribution: Supporting Studies.* Hyderabad: ASCI, 1976.

Ahluwalia, Montek S. "Rural Poverty in India: 1956/57 to 1973/74." In *India: Occasional Papers.* World Bank Staff Working Paper No. 279. Washington, D.C.: World Bank, 1978.

Alam, Shah Manzoor and Khan, Waheeduddin. *Metropolitan Hyderabad and Its Region: A Strategy for Development.* Bombay: Asia Publishing House, 1972.

Andhra Pradesh, Department of Finance and Planning. *Sixth Five Year Plan,* Draft-Vol. 1. Hyderabad: Andhra Pradesh Government Press, 1980.

Andhra Pradesh, Department of Planning and Cooperation. *Area Planning Approach: Integrated Services Through Select Centers.* Hyderabad: Andhra Pradesh Government Press, 1975.

———. *Fifth Five Year Plan: Draft Outline.* Hyderabad: Andhra Pradesh Government Press, 1973.

———. *Perspective Plan for Telangana: Resource Inventory.* Hyderabad: Andhra Pradesh Government Press, 1972.

———. *Planning and Development of Backward Regions: A Case Study of Rayalseema.* Hyderabad: Andhra Pradesh Government Press, 1971.

———. *A Study of Social Service Facilities in Anantpur District.* Hyderabad: Andhra Pradesh Government Press, 1970.

———. *A Study of Social Service Facilities in Chittoor District.* Hyderabad: Andhra Pradesh Government Press, 1970.

———. *A Study of Social Service Facilities in Cuddapah District.* Hyderabad: Andhra Pradesh Government Press, 1970.

———. *A Study of Social Service Facilities in Kurnool District.* Hyderabad: Andhra Pradesh Government Press, 1970.

Andhra Pradesh, Office of the Director of Census Operations. *1981 District Census Handbook.* Nalgonda District. Hyderabad: Andhra Pradesh Government Press, 1982.

Bhat, L. S., *Micro-Level Planning: A Study of Karnal Area, Haryana, India.* New Delhi: K. B. Publications, 1976.

Food and Agriculture Organization of the United Nations. *Agricultural Credit Bibliography.* Rome: FAO, 1979.

———. *Bibliography on Fertilizers.* Rome: FAO, 1977.

———. *Bibliography on Food and Agricultural Industries.* Rome: FAO, 1979.

———. *Bibliography on Food and Agricultural Marketing.* Rome: FAO, 1979.

Hazell, Peter B. R. and Röell, Ailsa. *Rural Growth Linkages: Household Expenditure Patterns in Malaysia and Nigeria.* Research Report 41. Washington, D.C.: International Food Policy Research Institute, 1983.

India, Ministry of Works and Housing. *National Urbanization Policy.* New Delhi: Manager of Publications, 1975.

India, Town and Country Planning Organization. *Planning Regions of India.* New Delhi: Manager of Publications, 1968.

_____. *Regional Imbalances in India: Some Policy Issues and Problems.* New Delhi: Manager of Publications, 1971.

Islam, Nurul, ed. *Agricultural Policy in Developing Countries.* London: MacMillan, 1974.

Johnson, E. A. J. *The Organization of Space in Developing Countries.* Cambridge, Mass.: Harvard University Press, 1970.

Johnston, B. F. and Kilby, P. *Agriculture and Structural Transformation.* London: Oxford University Press, 1975.

Lele, Uma. *The Design of Rural Development: Lessons from Africa.* Baltimore, Md.: The Johns Hopkins University Press, 1975.

_____. *Foodgrain Marketing in India: Private Performance and Public Policy.* Ithaca, N.Y.: Cornell University Press, 1971.

Lipton, Michael. "Strategy for Agriculture: Urban Bias and Rural Planning." In *The Crisis of Indian Planning.* Edited by Paul Streeten and Michael Lipton. Oxford: Oxford University Press, 1968.

_____. *Why Poor People Stay Poor: A Study of Urban Bias in World Development.* Cambridge, Mass.: Harvard University Press, 1977.

Mellor, John W. *The New Economics of Growth: A Strategy for India and the Developing World.* Ithaca, N.Y.: Cornell University Press, 1976.

Mellor, John W. and Lele, Uma. "Growth Linkages of the New Foodgrain Technologies." *Indian Journal of Agricultural Economics* 28 (January-March 1973): 35-55.

Misra, R. P., ed. *Million Cities of India.* New Delhi: Vikas, 1978.

Misra, R. P.; Sundaram, K. V.; and Rao, V. L. S. Prakasa. *Regional Development Planning in India: A New Strategy.* New Delhi: Vikas, 1974.

Mitra, Ashok. *Levels of Regional Development in India.* Census of India Technical Paper. New Delhi: Manager of Publications, 1961.

Mosher, Arthur T. *Creating a Progressive Rural Structure to Serve a Modern Agriculture.* New York: Agricultural Development Council, 1969.

_____. *Getting Agriculture Moving.* New York: Frederick A. Praeger, 1966.

National Council of Applied Economic Research. *Market Towns and Spatial Development in India.* New Delhi: NCAER, 1965.

Ohio State University. *Annotated Bibliography on Agricultural Credit and Rural Savings.* Columbus, Ohio: Ohio State University Press, 1980.

Rao, V. L. S. Prakasa. *Towns of Mysore State.* London: Asia Publishing House, 1964.

Schwartzberg, J. E. "Three Approaches to the Mapping of Economic Development in India." *Annals of the Association of American Geographers* 52 (1962): 455-468.

Sen, Lalit K.; Wanmali, Sudhir; Bose, Saradindu; Misra, G. K.; and Ramesh, K. S. *Planning Rural Growth Centres for Integrated Area Development: A Study in Miryalguda Taluka.* Hyderabad: National Institute of Community Development, 1971.

Shah, S. M. "Growth Centers as a Strategy for Rural Development: India Experience." *Economic Development and Cultural Change* 22 (January 1974): 215-228.

Sundaram, K. V. *Urban and Regional Planning in India.* New Delhi: Vikas, 1977.

Wanmali, Sudhir. "Hierarchy of Towns in Vidarbha, India and its Significance for Regional Planning." Discussion Papers Nos. 23 and 24. Graduate School of Geography, London School of Economics and Political Science, London, 1968.

———. *Periodic Markets and Rural Development in India.* New Delhi: B. R. Publishing Corporation, 1981.

———. "Popular Participation and Organization, Distribution and Consumption of Social Services and Facilities in Rural Human Settlements: An Indian Experience." Institutional Development and Popular Participation Section, Social Development Division of the United Nations, New York, 1976 (mimeographed).

———. *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.

———. "Rural Based Models for Rural Development: The Indian Experience." In *Understanding Green Revolutions: Agrarian Change and Development Planning in South Asia.* Edited by Tim Bayliss-Smith and Sudhir Wanmali. Cambridge: Cambridge University Press, 1984.

———. *Service Provision and Rural Development in India: A Study of Miryalguda Taluka.* Research Report 37. Washington, D.C.: International Food Policy Research Institute, 1983.

———. "Service Provision, Spatial Intervention and Settlement Systems: The Case of Nagpur Metropolitan Region, India." *Annals of the National Association of Geographers of India* 3 (No. 2, 1983): 27-65.

Wanmali, Sudhir and Khan, Waheeduddin. "Role of Location in Regional Planning with Particular References to the Provision of Social Facilities." *Behavioural Sciences and Community Development* 4 (1970): 65-91.

IFPRI RESEARCH REPORTS (continued)

21 *AGRICULTURAL PROTECTION IN OECD COUNTRIES: ITS COST TO LESS-DEVELOPED COUNTRIES*, December 1980, by Alberto Valdés and Joachim Zietz

20 *IMPACT OF IRRIGATION AND LABOR AVAILABILITY ON MULTIPLE CROPPING: A CASE STUDY OF INDIA*, November 1980, by Dharm Narain and Shyamal Roy

19 *A COMPARATIVE STUDY OF FAO AND USDA DATA ON PRODUCTION, AREA, AND TRADE OF MAJOR FOOD STAPLES*, October 1980, by Leonardo A. Paulino and Shen Sheng Tseng

18 *THE ECONOMICS OF THE INTERNATIONAL STOCKHOLDING OF WHEAT*, September 1980, by Daniel T. Morrow

17 *AGRICULTURAL RESEARCH POLICY IN NIGERIA*, August 1980, by Francis Sulemanu Idachaba

16 *A REVIEW OF CHINESE AGRICULTURAL STATISTICS, 1949-79*, July 1980, by Bruce Stone

15 *FOOD PRODUCTION IN THE PEOPLE'S REPUBLIC OF CHINA*, May 1980, by Anthony M. Tang and Bruce Stone

14 *DEVELOPED-COUNTRY AGRICULTURAL POLICIES AND DEVELOPING-COUNTRY SUPPLIES: THE CASE OF WHEAT*, March 1980, by Timothy Josling

13 *THE IMPACT OF PUBLIC FOODGRAIN DISTRIBUTION ON FOOD CONSUMPTION AND WELFARE IN SRI LANKA*, December 1979, by James D. Gavan and Indrani Sri Chandrasekera

12 *TWO ANALYSES OF INDIAN FOODGRAIN PRODUCTION AND CONSUMPTION DATA*, November 1979, by J. S. Sarma and Shyamal Roy and by P. S. George

11 *RAPID FOOD PRODUCTION GROWTH IN SELECTED DEVELOPING COUNTRIES: A COMPARATIVE ANALYSIS OF UNDERLYING TRENDS, 1961-76*, October 1979, by Kenneth L. Bachman and Leonardo A. Paulino

10 *INVESTMENT AND INPUT REQUIREMENTS FOR ACCELERATING FOOD PRODUCTION IN LOW-INCOME COUNTRIES BY 1990*, September 1979, by Peter Oram, Juan Zapata, George Alibaruho, and Shyamal Roy

9 *BRAZIL'S MINIMUM PRICE POLICY AND THE AGRICULTURAL SECTOR OF NORTHEAST BRAZIL*, June 1979, by Roger Fox

8 *FOODGRAIN SUPPLY, DISTRIBUTION, AND CONSUMPTION POLICIES WITHIN A DUAL PRICING MECHANISM: A CASE STUDY OF BANGLADESH*, May 1979, by Raisuddin Ahmed

7 *PUBLIC DISTRIBUTION OF FOODGRAINS IN KERALA – INCOME DISTRIBUTION IMPLICATIONS AND EFFECTIVENESS*, March 1979, by P. S. George

6 *INTERSECTORAL FACTOR MOBILITY AND AGRICULTURAL GROWTH*, February 1979, by Yair Mundlak

5 *IMPACT OF SUBSIDIZED RICE ON FOOD CONSUMPTION AND NUTRITION IN KERALA*, January 1979, by Shubh K. Kumar

4 *FOOD SECURITY: AN INSURANCE APPROACH*, September 1978, by Panos Konandreas, Barbara Huddleston, and Virabongsa Ramangkura

3 *FOOD NEEDS OF DEVELOPING COUNTRIES: PROJECTIONS OF PRODUCTION AND CONSUMPTION TO 1990*, December 1977

2 *RECENT AND PROSPECTIVE DEVELOPMENTS IN FOOD CONSUMPTION: SOME POLICY ISSUES*, July 1977

1 *MEETING FOOD NEEDS IN THE DEVELOPING WORLD: LOCATION AND MAGNITUDE OF THE TASK IN THE NEXT DECADE*, February 1976

Research Fellow Sudhir Wanmali came to IFPRI in 1981 from St. John's College and the Centre of South Asian Studies, University of Cambridge, England.

IFPRI RESEARCH REPORTS

47 *EVOLVING FOOD GAPS IN THE MIDDLE EAST/NORTH AFRICA: PROSPECTS AND POLICY IMPLICATIONS.* December 1984, by Nabil Khaldi

46 *THE EFFECTS ON INCOME DISTRIBUTION AND NUTRITION OF ALTERNATIVE RICE PRICE POLICIES IN THAILAND.* November 1984, by Prasarn Trairatvorakul

45 *THE EFFECTS OF THE EGYPTIAN FOOD RATION AND SUBSIDY SYSTEM ON INCOME DISTRIBUTION AND CONSUMPTION.* July 1984, by Harold Alderman and Joachim von Braun

44 *CONSTRAINTS ON KENYA'S FOOD AND BEVERAGE EXPORTS.* April 1984, by Michael Schluter

43 *CLOSING THE CEREALS GAP WITH TRADE AND FOOD AID.* January 1984, by Barbara Huddleston

42 *THE EFFECTS OF FOOD PRICE AND SUBSIDY POLICIES ON EGYPTIAN AGRICULTURE.* November 1983, by Joachim von Braun and Hartwig de Haen

41 *RURAL GROWTH LINKAGES: HOUSEHOLD EXPENDITURE PATTERNS IN MALAYSIA AND NIGERIA.* September 1983, by Peter B. R. Hazell and Ailsa Röell

40 *FOOD SUBSIDIES IN EGYPT: THEIR IMPACT ON FOREIGN EXCHANGE AND TRADE.* August 1983, by Grant M. Scobie

39 *THE WORLD RICE MARKET STRUCTURE, CONDUCT, AND PERFORMANCE.* June 1983, by Ammar Siamwalla and Stephen Haykin

38 *POLICY MODELING OF A DUAL GRAIN MARKET: THE CASE OF WHEAT IN INDIA.* May 1983, by Raj Krishna and Ajay Chhibber

37 *SERVICE PROVISION AND RURAL DEVELOPMENT IN INDIA: A STUDY OF MIRYALGUDA TALUKA.* February 1983, by Sudhir Wanmali

36 *AGRICULTURE AND ECONOMIC GROWTH IN AN OPEN ECONOMY: THE CASE OF ARGENTINA.* December 1982, by Domingo Cavallo and Yair Mundlak

35 *POLICY OPTIONS FOR THE GROWTH OF ECONOMY OF THE EUROPEAN COMMUNITY: IMPLICATIONS FOR DEVELOPING COUNTRIES.* November 1982, by Ulrich Koester

34 *EGYPT'S FOOD SUBSIDY AND RATIONING SYSTEM: A DESCRIPTION.* October 1982, by Harold Alderman, Joachim von Braun, and Sakr Ahmed Sakr

33 *AGRICULTURAL GROWTH AND INDUSTRIAL PERFORMANCE IN INDIA.* October 1982, by C. Rangarajan

32 *FOOD CONSUMPTION PARAMETERS FOR BRAZIL AND THEIR APPLICATION TO FOOD POLICY.* September 1982, by Cheryl Williamson Gray

31 *SUSTAINING RAPID GROWTH IN INDIA'S FERTILIZER CONSUMPTION: A PERSPECTIVE BASED ON COMPOSITION OF USE.* August 1982, by Gunvant M. Desai

30 *INSTABILITY IN INDIAN FOODGRAIN PRODUCTION.* May 1982, by Peter B. R. Hazell

29 *GOVERNMENT POLICY AND FOOD IMPORTS: THE CASE OF WHEAT IN EGYPT.* December 1981, by Grant M. Scobie

28 *GROWTH AND EQUITY: POLICIES AND IMPLEMENTATION IN INDIAN AGRICULTURE.* November 1981, by J. S. Sarma

27 *AGRICULTURAL PRICE POLICIES UNDER COMPLEX SOCIOECONOMIC AND NATURAL CONSTRAINTS: THE CASE OF BANGLADESH.* October 1981, by Raisuddin Ahmed

26 *FOOD SECURITY IN THE SAHEL: VARIABLE IMPORT LEVY, GRAIN RESERVES, AND FOREIGN EXCHANGE ASSISTANCE.* September 1981, by John McIntire

25 *INSTABILITY IN INDIAN AGRICULTURE IN THE CONTEXT OF THE NEW TECHNOLOGY.* July 1981, by Shakuntla Mehra

24 *THE EFFECTS OF EXCHANGE RATES AND COMMERCIAL POLICY ON AGRICULTURAL INCENTIVES IN COLOMBIA: 1953-1978.* June 1981, by Jorge García García

23 *GOVERNMENT EXPENDITURES ON AGRICULTURE IN LATIN AMERICA.* May 1981, by Victor J. Elías

22 *ESTIMATES OF SOVIET GRAIN IMPORTS IN 1980-85: ALTERNATIVE APPROACHES.* February 1981, by Padma Desai

(continued on inside back cover)

International Food Policy Research Institute
1776 Massachusetts Avenue, N.W.
Washington, D.C. 20036 USA