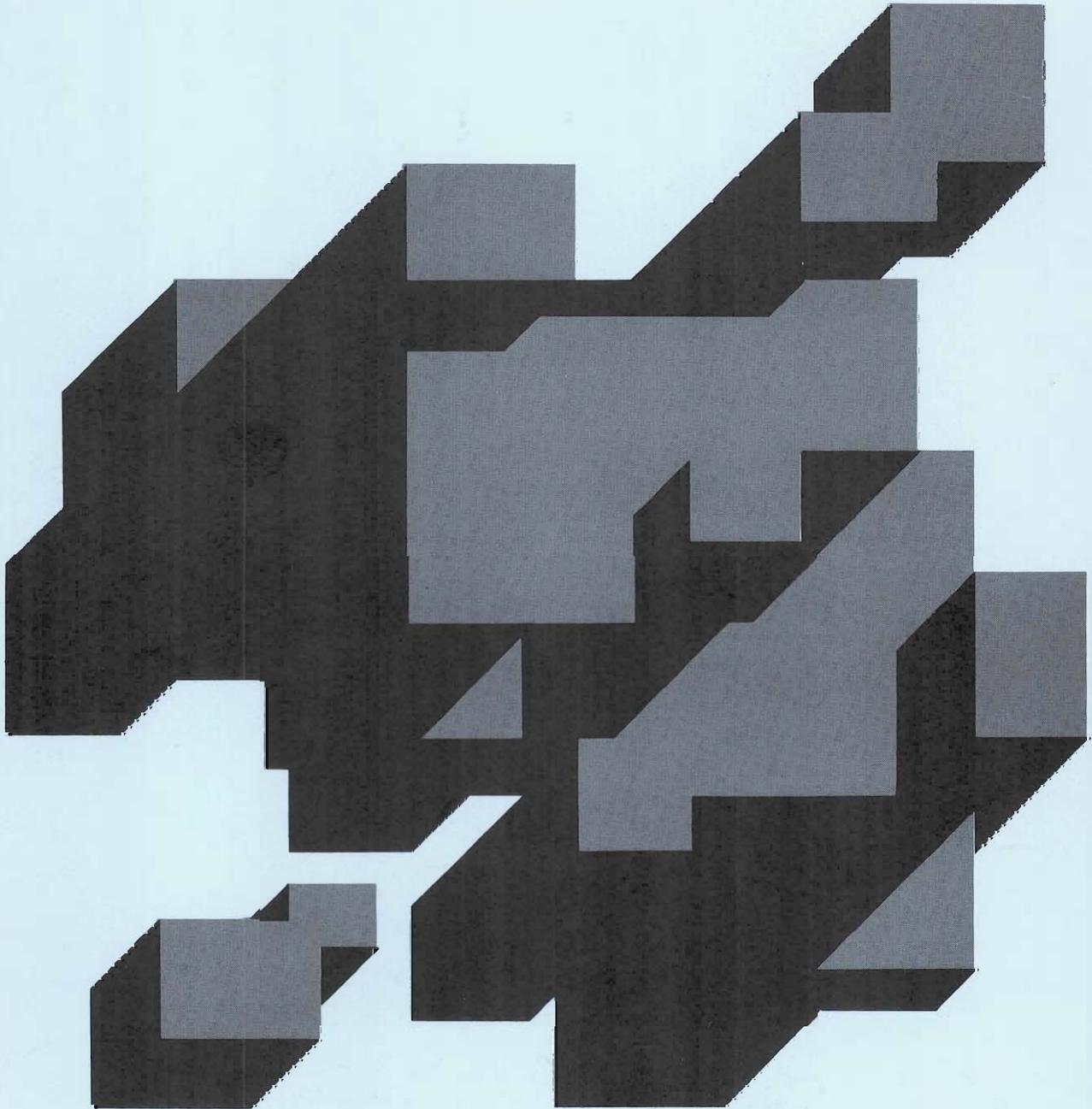


Regional Development

A Review of the State-of-the-Art



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FOREWORD

This is a revision of a document which first appeared in 1974. What then was considered to be an "idea whose time had come" is very much a program staple today. Evidence of the increased attention which is being given to subnational geographic regions and to the spatial dimensions of development can be found in programs of rural, area, and regional development in field mission-funded and centrally-funded projects.

The original review of the state-of-the-art of regional development continues to be a "best seller"; it has had to be printed several times. Seasoned practitioners, as well as academicians and nascent professionals in planning, geography, economic development, rural development, and related fields worldwide, have requested and used it and have told others about it.

In light of these developments and of the continuing need, it seemed appropriate to revise the original study, in order to reflect what has been learned about regional development from theoretical and practical experience in the intervening five years. It was most fortunate that the original author was available to undertake this assignment immediately following three years of regional planning experience at the "grass roots" level in a developing country.

Following the revised and edited second chapter, which presents a model of the regional development process, is a reorganized third chapter on strategies for regional development. This chapter has been enhanced by a considerable amount of new material based on empirical results. In the concluding chapter an alternative model of regional development is summarized and discussed.

The Office of Urban Development is most grateful to Mr. Miller especially for this contribution and also for his continuing professional dedication to the field.

June 1979

FOREWORD TO THE ORIGINAL EDITION

The idea for doing this study has "simmered on a back burner" in the Office of Urban Development (TA/UD) for a long time. From the inception of TA/UD there has been a concern for the fundamental interdependencies between urban and rural areas and for finding ways of creating more effective and more productive linkages between them.

Productive urban-rural linkages are at the heart of the Agency's "Guidance Statement on Urban Development" (June 1973) and the subsequent related key problem area on urban development, both of which are designed to help developing countries alleviate the stresses of urban growth by improving their understanding of and ability to guide the urban growth process more efficiently and equitably.

Concern for these urban-rural interdependencies has been manifested in the growing popularity of the concept of subnational regional development among developing country planners as well as academicians and development specialists in more economically developed countries. Evidence that the concept is being applied can be found in national development plans and in strategies designed to develop lagging regions, to locate growth poles or centers, to create market towns and service centers, and to stem the flow of rural-urban migration, among other things.

Thus, the idea began to "boil more vigorously" in TA/UD late last year, and the writer was approached to undertake this study.

When the study was started in mid-May, the situation was that of "an idea whose time has come." A Working Group on the Rural Poor had been organized recently in the Agency to help A.I.D. mobilize the resources needed to assist developing countries in stimulating agricultural production and in generating employment and other opportunities in rural areas. Some of the ideas about subnational regional development have claimed the attention of this Working Group. This study, therefore, serves an additional and even more immediate need in the Agency.

The study is a review of the state-of-the-art of the theory and practice of regional development. It is oriented toward the application of the regional development process to effect urban-rural integration and development in developing countries.

Following an introductory statement on the problem of regional inequality and some of the "models" of regional development, the writer examines more fully three essential characteristics of the regional development process. In doing so he focusses on a number of better-known concepts, which then are traced through strategies for regional development in approaches to national and regional spatial organization in more than a dozen countries. Four conclusions are drawn at the end of the study.

The Office of Urban Development and the Agency are most grateful to James Miller for his professional assistance and contribution.

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I. INTRODUCTION

THE PROBLEM OF REGIONAL INEQUALITY

The regional development problem is one of inequality in the rates of development of subnational geographic regions and of the inequalities in the distribution of wealth and income that result. It is a spatial manifestation of the phenomenon known as the "dual economy": often described as a dynamic, growing, modernizing, urbanizing region co-existing with a stagnant, declining, traditional, rural region. The results of this dichotomy are debilitating for both regions; in the rural areas, it results in continued low levels of welfare through underemployment, out-migration of capital, and of the most productive segments of the population, and further dependence on subsistence means of production; while in the urban areas, it has contributed to an unprecedented flood of immigrants from the rural areas, causing serious deficiencies in housing, social services, and employment, and a potential for political unrest.

Empirical studies by Williamson and others suggest that regional inequality is endemic to the national development process (Williamson, 1965; Gilbert and Goodman, 1976). In his oft-cited study of the United States and other countries, Williamson attributes the tendency for regional inequalities to increase as development proceeds to four factors:

- (1) The migration of educated and skilled people in the productive age groups to the wealthier regions where wages are higher;
- (2) The migration of capital to wealthier regions where returns are higher;
- (3) Central government policies which concentrate social and economic overhead capital in wealthier regions, where perceived need is greater, and which favor industrial development of wealthier regions through tariff regulations;

- (4) A lack of linkages between regional markets, retarding the spread effects of innovations and income multipliers. (Williamson, 1965: 5-8).

Other writers on regional inequality have described its occurrence in terms of a center-periphery, or polarized development, model. This model, which has appeared in a number of formulations, portrays development as occurring at a limited number of urban-industrial centers (core regions) which attract resources from surrounding rural hinterlands (periphery regions). Growth at these centers tends to be self-sustaining and cumulative, causing regional disparities to intensify rather than lessen. Myrdal attributes this polarized development to a "circular and cumulative causation" process (which he offers in opposition to the equilibrium model), whose beneficial impacts on the periphery (spread effects) are overcome by its exploitative impacts (backwash effects). (Myrdal, 1971). Location theorists see agglomerated development as the result of location decisions by firms which take advantage of the economies of production and transportation, and of well-developed factor and product markets which urban agglomerations provide. (Hoover, 1948). Hirschman attributes the continued concentration of economic activity to the over-estimation of the size of agglomeration economies by firms. (Hirschman, 1958). Friedmann explains the core region's growth as the result of the ability of its populace to generate, adopt, and control the distribution of development-generating innovations. (Friedmann, 1973).

While there is agreement on the point that regional inequalities increase in the initial stages of development, there has been considerable disagreement as to the degree to which such inequalities will lessen at later stages. Williamson's empirical study indicated that inequalities do lessen, and regional levels of welfare do converge. He attributes this process to several factors: a reversal of the outflow of labor and capital, as a result of the equalization of returns between the poor but developing regions and the wealthier regions; the creation of agglomeration economies in the developing regions; and, a conscious redistribution of wealth and investment among regions by the central government. (Williamson, 1965: 9-10). This convergence process is a long one, however; Williamson's study notes a clear trend toward convergence in the United States and other developed countries only since 1940.

Product cycle theory offers an alternative rationale for convergence. It notes that as a product matures beyond the early, innovative stages of its development to the point where its production is standardized, labor costs become the overriding cost consideration, and the availability of low-cost labor becomes a chief location factor. Consequently, overall growth in the national economy will result in the "trickle-down" of development to lagging regions through the establishment of branch plants to meet the increased demand for goods. (Vernon, 1966).

Proponents of the core-periphery model contend that, rather than an equilibrium mechanism operating to adjust regional inequalities, these inequalities will grow unless there is strong intervention to reverse the process. A recent study by Gilbert and Goodman, which duplicated Williamson's methodology with more recent data, indicates that this may be the case; their study found much less occurrence of convergence than did Williamson's. (Gilbert and Goodman, 1976).

While regional inequalities create considerable problems for planners and policy-makers concerned with generating economic growth, it has created severe challenges for those concerned with social justice and national integration. In a 1974 article, Albert Waterston observed "...there is much evidence that subnational regional pressures have intensified in recent years and that they will continue to do so." (Waterston, 1974). He noted that regional separatist movements and complaints of differential treatment in many developed and developing countries have sparked an expanding awareness of regional problems.

Faced with lagging rural production, a high level of rural-urban migration, and growing political threats to national unity, many countries have turned to regional planning as a means of resolving these problems. What Friedmann has called the "spatial systems approach" of regional planning combines the urban core with its rural periphery in a system of interdependent flows of resources, information, and people. It has as its objectives the more efficient utilization of the region's productive resources (land, labor, and capital) and improved integration of the region with the national economy. In doing so, it seeks to serve the goals of raising the standard of living of people in the region, increasing the rate of national development, and bringing about a more equitable distribution of development benefits.

This report presents an introductory survey to regional planning. Underlying it is the notion that a major impediment to the development and growth of less-developed nations has been the deficient spatial organization of their economies; i.e., the absence of a hierarchical system of cities, towns, and smaller central places through which development impulses are transmitted. The next section of the paper discusses the theoretical underpinnings of this notion, drawing together and synthesizing elements of economic development theory, central place theory, location theory, and information theory into a model of the spatial incidence and diffusion of economic growth. The third section discusses strategies for spatial development which are derived from this model, and provides some examples of how these strategies have been implemented.

II. A MODEL OF THE REGIONAL DEVELOPMENT PROCESS

To be effective, planning must be based on a theory which identifies the key elements of the problem and the processes which link these elements together. For regional development planning, such a theory would identify the basis for regional growth, the means by which such growth is initiated and sustained, and how the regional economy is integrated into the national system. Unfortunately, a well-developed theory along these lines does not exist. However, John Friedmann has suggested a series of propositions concerning regional development which in many ways provides the necessary guiding framework (Friedmann, 1968):

- (1) Regional economies are open to the outside world and subject to external influence.
- (2) Regional economic growth is externally induced.
- (3) Successful translation of export sector growth into growth of the residentiary sector depends on the socio-political structure of the region and the local distribution of income and patterns of expenditure.
- (4) Local leadership is decisive for successful adaptation to external change. Yet the quality of leadership depends on the region's past development experience.
- (5) Regional economic growth may be regarded, in part, as a problem in the location of firms.
- (6) Economic growth tends to occur in the matrix of urban regions. It is through this matrix that the evolving space economy is organized.

- (7) Flows of labor tend to exert an equilibrating force on the welfare effects of economic growth. But contradictory results may be obtained.
- (8) Where economic growth is sustained over long periods, its incidence works toward a progressive integration of the space economy.

These propositions may be distilled further into three key points: (1) regional development is a function of how effectively a region's export base is exploited; (2) regional development requires the mobilization of government and individuals to take advantage of development opportunities as they arise; and (3) regional development takes place within the framework of an integrated spatial system.

The Export Base

The best-known discussion of the importance of the export base for regional development is Douglas North's "Location Theory and Regional Economic Growth." (North, 1955; also, Williamson, 1975). North, drawing primarily on the regional experience of the U.S. and Canada, argues that the production of export commodities is the basis for regional growth. The development of industry in these commodities is a result of comparative cost advantages (including transport costs) the region has in their production. Regions work to keep this advantage by constantly making improvements designed to lower costs, e.g., improving transportation facilities and infrastructure.

As regions grew up around the export base, external economies developed which improved the competitive cost position of the exportable commodities. The development of specialized marketing organizations, improved credit and transport facilities, a trained labor force, and complementary industries, was oriented to the export base. (North, 1955: 245).

In addition to building up the regional infrastructure, export base activities are major determinants of regional income, both in terms of the income they generate directly and through the multiplier effects on the residentiary sector. Because the demand for export goods is exogenously determined, the export base helps to diffuse income changes in other regions into the region.

The export base in the growing region is composed of not one product, but a mixture of products in which the region has a comparative advantage. Indeed, specialization in the export base can be detrimental to regional development (Goldsmith and Rothschild, 1974). These products need not be manufactured goods; agricultural goods can and do perform the same function. (North, 1955: 249).

Mobilizing Resources

The mobilization of government and individuals to take advantage of development opportunities is a major problem. As Hirschman and Johnson have pointed out, the ability to recognize, evaluate, and act on investment opportunities, often called entrepreneurial ability, is often lacking in developing regions. (Hirschman, 1958; also Johnson, 1970: 185-191). Further, the ability to adopt innovations and the willingness to accept risk in attempting new methods are frequently not found in these regions. The causes of these deficiencies include cultural limitations, lack of information, lack of education and training, absence of risk-bearing institutions, and a lack of incentives. In a great many cases, however, the failure to mobilize resources effectively for regional development is the result of decisions by political elites, often urban-based, to promote development closer to their own interests, or to protect their interests at the expense of general regional welfare. Examples of this include artificially lowering prices for agricultural produce so as to benefit urban dwellers and blocking effective land reforms necessary for making available that resource to a wider segment of the rural population.

The problem of effectively mobilizing resources for development has been the focus of most writing and research in the areas of economic, political, and social development, and cannot be dealt with fully in this paper. The regional planning approach discussed here is but one aspect of this general problem.

The Space Economy

The notion that economic growth takes place within the framework of an integrated spatial system - the space economy - is a very important, but often ignored aspect of national and regional development planning. The concern with national sectoral planning that has been the tendency among developing countries and development agencies over the past fifteen years has failed, for the most part, to take into consideration the questions of where growth takes place and how it diffuses through the space economy. This neglect of the spatial dimension of economic development, combined with a greater concern with short-run efficiency criteria rather than long-term development criteria, have contributed in a significant way to the present urban-rural dichotomy.

There has been a considerable amount of work done during the last fifty years on the spatial aspects of economic development. The model of economic growth and diffusion that has emerged can be summarized in two propositions:

- (a) Economic growth and development are initiated and reach their highest levels at a limited number of centers;
- (b) Economic growth and development are diffused from these growth centers, nationally through the urban hierarchy, and regionally from the urban centers to their respective hinterlands. The mechanisms by which growth and development are diffused are (1) growth-inducing innovations, and (2) market mechanisms.

Perroux's Notion of the Growth Pole

The tendency for economic growth to take place at a limited number of centralized points and to diffuse from these points to the remainder of the space economy, is a basic, observed feature of economic development. The main characteristics of these 'growth centers' or 'growth poles' have been described in detail in economic development theory and in location theory. In the former case, the theory has had a dynamic orientation in an attempt to describe the process of economic growth and development, while the latter theory has been primarily static and descriptive in nature.

The major work done in dynamic growth pole theory is credited to the French economist, Francois Perroux. Intended primarily as a description of the growth and development of a nation's industrial structure, the components of the theory are placed in a setting of functional economic space rather than geographic space. (Perroux, 1950b). However, the model has features which can easily be seen in the context of geographic space, and it is indeed within this context that the theory has had its greatest use.

The basis of Perroux's growth pole theory is his theory of dominance:

Between any two economic units, A and B, the domination effect is present when in a definite field, unit A exercises on unit B an irreversible or partially reversible influence. (Perroux, 1950a).

A unit demonstrating this effect exerts a powerful influence on its environment, determining the direction and rate of growth and development of those units falling under its power.

On the basis of this theory, Perroux erects a hierarchy of types of firms and industries which exert varying degrees of dominance. Especially important among these is the propulsive industry, a relatively new industry, operating at a high level of technology, facing markets with high income elasticities of demand for its products, and exerting considerable influence

on the industrial environment through strong inter-industry linkages; i.e., supply relationships between it and the producers of its inputs. (Hermansen, 1972). An industrial complex is formed by the clustering of propulsive industry.

The prominent feature of such a complex is that the expansion of any of the industries would set in motion a process of development sustained by a very high super-multiplier - i.e., the combined effect of the ordinary final demand multiplier and induced inter-industry deliveries which are further supported by the accelerator. (Hermansen, 1972: 169).

The industrial complex is the basic structure of the development (growth) pole.

However, an industrial complex would constitute a development pole in industrial space only if the propulsive industries constituting its core also belong to the category of leading industries; i.e., those propulsive industries that are relatively new, working at an advanced technological level, facing rapidly increasing demand, and having a strong capacity to generate, adopt, and transmit innovations throughout their sphere of influence. Furthermore, the pole as a whole should be large enough to exert a dominant influence over its industrial environment. (Hermansen, 1972: 170).

The Perrouxian growth pole concept is a dynamic concept because it seeks to describe the process by which these poles are born, grow and develop, and sometimes disappear. The primary moving force in this process is innovation, the developing of new products and of new cost-reducing means of production. An example of an actual development pole in the Perrouxian sense has been described by the Belgian economist, Jean Paelinck:

Parting from an economy based essentially on textiles, the Lyon region progressively developed the construction of machines for the textile industry (a derived pole) and, by induction, specialized mechanical and foundry sectors (lateral pole). At the same time, there developed an industry producing chemical products for the textile industry, which in turn stimulated the chemical sector in general; the latter became a lateral development pole of the greatest importance for the region. (Quoted in Hansen, 1967).

Location Theory

The location theorists, also noting the tendency of economic activities to cluster in a limited number of centers, have attempted to describe the characteristics of these centers that make their growth self-sustaining. These characteristics can be summarized in two concepts: inter-industry linkages and economies of agglomeration.

Vertical linkages, the relationships between firms producing intermediate goods and the firms using these goods as inputs in their production process, are major factors in the development of growth centers. The presence of firms with strong backward linkages, vertical linkages extending back from firms

consuming intermediate goods to firms producing intermediate goods, is an influential factor in attracting intermediate good-producing firms to the center. The presence of firms with strong forward linkages, vertical linkages extending forward from the producing firm to the consuming firm, is a major attraction to firms which are heavy consumers of intermediate goods, and thus locationally sensitive to the price and supply of these inputs. In the case of both types of linkages, the opportunity to minimize transport and warehousing costs is a major inducement to strongly-linked firms to locate near each other. (Hoover, 1971: 215-216).

Of equal importance to the presence of interindustry linkages are economies of agglomeration, economies which are external to the firms in the center and internal to the center itself, which are appropriated by firms in the center so as to reduce their costs of operation. Among the most important of these economies are transport cost economies. Growth centers not only allow for the minimization of transport costs between firms located in the centers, but also enable the minimization of the costs of shipping goods and materials to and from the growth centers and areas outside it; e.g., its hinterlands, other centers, or other parts of the world. The large volume of traffic generated in centers provides the opportunity for economies in terminal facilities frequent service, and bulk shipping rates, thus establishing the center as a nodal point on the transportation network. (Hoover, 1948: 120).

Important agglomeration economies are provided by the factor and product markets in growth centers. Such centers offer a broad, flexible labor market composed of a large well-trained and highly-skilled labor force. For firms locating in the center, this can mean higher productivity, as well as the trained manpower needed when shifting production processes to higher levels of technology. Centers also offer a high availability of specialized auxiliary services, such as financial institutions, utilities, government services, and business services of various types, which tend to keep down the costs of firms operating at the center.

The presence of a large market for consumer and producer goods is an important advantage of growth centers. The ability to react quickly to changes in consumer tastes and demands is a major attractive feature, as is the ability to minimize the cost of transporting finished goods to market. Further, the presence of a large demand pool, combined with the advantages of being at a transportation node, allows firms to realize economies of scale in their production processes, thus further decreasing their operating costs.

Central Place Systems

The hierarchical ordering of centers of economic activity in the space economy is a well-recognized and much-studied phenomenon. The concept has been developed largely during this century, with the major work attributed to Christaller (1966), Lösch (1954), Zipf (1941), Berry and Garrison (1958a). Basically, the concept describes a hierarchical system of central places with each element containing the same economic activities as the elements below it, plus an additional number of activities. In fact, the concept has been developed along two lines; one (the Christaller formulation) based on distribution activities; the other (the Löschian formulation) focusing on production activities. The formulations, in turn, have given rise to two empirically observable spatial patterns - the regional central place hierarchy, and the national urban hierarchy.

The rationale behind the existence of the hierarchy lies in the notion of threshold requirements; i.e., minimum conditions which must be met if an economic activity is to operate efficiently. Christaller based his hierarchical ordering on the range of a good, which is the economic distance over which a good is distributed. Economic distance is determined "...by the costs of freight, insurance, and storage; time and loss of weight or space in transit; ... and, as regards passenger travel, the costs of transportation, the time required, and the discomfort of travel." (Christaller, 1966: 22). The size of a central place and its complementary region is a function of the lower range limits of the central goods; i.e., the minimum area in which the level of consumption will make the sale of the goods profitable, and the upper range limits, the farthest distance from the central place that the goods with the greatest range can be obtained.

Lower order central places will offer goods with the smallest range limits, while higher order places offer goods with greater range limits, in addition to the lower order goods. Centers of the same size offer the same type and number of goods. (Christaller, 1966: 60-64).

Christaller's central place concept was deductively arrived at following assumptions of perfect competition and, in geographic space, a flat homogeneous plain. Its geometric manifestation is a series of hexagons, with a single central place in the center of the hexagon surrounded by six smaller places at each of the vertices, each being itself the center of another smaller hexagonal system. This is the so-called 'K=3' or marketing principle arrangement, which is the most efficient system possible in terms of the distribution of goods and services. Christaller also envisioned a 'K=4' system which minimized transport costs, and a 'K=7' system which maximized administrative efficiency. Both systems were hexagonal, but with additional centers in the interstices between the vertices, and both were considered inefficient by Christaller. (Berry, 1967).

Although it was arrived at deductively, the Christaller central place hierarchy has been shown to exist in economically integrated regions which meet the flat, homogeneous plain assumption. (Abiodun, 1968; Berry and Garrison, 1958b; Berry and Barnum, 1963; Brush, 1953; Preston, 1971; Skinner, 1964). Its importance for regional development lies in its capacity to link urban and rural economies through a system of collection and distribution points. As collection points, central places are the locales to which rural produce, primarily agricultural goods, is brought to be sold, initially processed, and shipped for the eventual consumption by people in more industrially-oriented higher order centers. As such, these central places are the location of marketing activities, storage facilities, grinding mills, and similar processing activities. As distribution points, central places provide the sites at which the rural population can obtain the goods and services needed to raise their standards of living and levels of productivity. These include consumer goods manufactured or processed at higher order centers (e.g., durable goods); improved agricultural inputs

distributed from larger centers (e.g., better seeds, tools and fertilizer); and important services in the areas of health, education, agricultural extension, credit, and government. The central place system, then, is the major means of articulating the economic linkages between urban and rural areas.

National Urban Hierarchy and Hierarchical Diffusion

The second type of urban hierarchy that has been recognized in the space economy is the national urban hierarchy. The rationale for its existence, which has been explained by the location theorists (see discussion above), revolves around a number of production-oriented thresholds affecting the activities locating in the center. These thresholds include the size of the market (international, national, regional); economies of scale in production; infrastructure requirements; inter-industry linkages; and labor requirements. Thus, firms serving wide markets, enjoying increasing returns to scale, and requiring skilled manpower, will concentrate at points offering well-developed transportation services and a large manpower pool. Firms having strong vertical linkages to these firms will locate in the same area. In the meantime, firms operating at lower thresholds can locate at other centers around the nation, depending on their input and marketing needs. (Richardson, 1972).

It is an observed phenomenon that, in economically advanced nations, the second largest city has half the population of the largest city, the third largest city has one-third the population of the largest city, and so on (Zipf, 1941; Berry, 1961), while the pattern in less developed countries is a primary one - the space economy is dominated by a single urban center which is many times larger than the next center and which has a disproportionate percentage of the nation's non-agricultural economic activity. While the reasons for the development of such an ordering and its relationship to economic development are a matter of discussion, the hierarchy can be said to perform a number of functions which are basic to national and regional economic growth and integration.

Because of the relatively intensive interaction between the members of the national urban system, the urban hierarchy provides a means by which growth and development impulses are transmitted from the largest city (whose wider range of markets and activities cause it to grow the most) to the smaller cities in the nation. This it does in several ways: through the expansion of existing activities into new markets in a largest-to-smallest manner; by the movement of low-wage activities from larger to smaller cities as wages are forced up in the larger cities; by offering firms with different market area and infrastructure requirements an expanded choice of locations (thus allowing them to operate more efficiently) (Richardson, 1972; Hoover, 1948); and by the diffusion down the hierarchy of development-inducing 'entrepreneurial' innovations. (Berry, 1972; Pedersen, 1970).

Such a diffusion process has a number of limitations which can lead to regional inequalities:

- (1) Income effects are a declining function of time. Thus, those who adopt innovations at a later time (i.e., smaller cities at the end of the hierarchy) will receive fewer benefits than earlier adopters (i.e., larger cities at the top of the hierarchy). (Berry, 1972; Hoover, 1948). Further, the movement of low-wage, low-income firms to smaller cities has few growth effects on those cities.
- (2) Threshold limitations preclude diffusion beyond a certain size city. Pedersen notes that this is particularly true in less developed countries where the urban hierarchy is not well defined, i.e., where there are few major cities. (Pedersen, 1970).
- (3) The diffusion process is competitive. The early adoption of an innovation or initiation of an economic activity by a larger center often prevents later adoption by smaller centers. Berry notes that this was true in the diffusion of TV stations in the U.S.A. (1972: 118).

Diffusion to Hinterland Areas

The model thus far envisages economic growth as occurring first, and reaching its greatest levels at a limited number of growth centers and being diffused hierarchically through the space economy, nationally along the national urban hierarchy and regionally through the distribution-oriented central place hierarchy. At this point, the diffusion process takes a different form. The diffusion of growth impulses from the urban places to the hinterlands is characterized by a wave-like diffusion process.

In a true diffusion process, the loci of action are themselves expanding in space and time, rather like an impact wave, out from an origin, as from a rock dropped into the water. Here the occurrences of preceding time periods have a powerful influence on subsequent times; obviously, what has happened or not happened to a point or area just closer to the origin is of utmost consequence to the more distant point or area. (Morrill, 1968).

Conceptually, a wave diffusion process can be characterized as a probability function. The probability of an innovation or market opportunity being accepted increases as the crest of the wave approaches, in terms of physical distance, the receiver, and decreases as the wave passed due to a decline in the number of possible accepters. Temporally, the crest of the wave represents the point in time at which the maximum acceptance is taking place. As the wave diminishes in height and energy as distance and time from the origin increase, the probability of acceptance diminishes, and the development effects of the innovation or market opportunity decline.

The wave-like diffusion of development through market mechanisms has been described in the 'Urban-Industrial Impact Hypothesis' first set out by Schultz (1953) and since the object of a number of empirical studies. (Hathaway, 1964; Nicholls, 1961 and 1969; Ruttan, 1959; Sisler, 1959). The heart of the hypothesis is Schultz's three propositions concerning the spatial dimensions of economic development:

- (1) Economic development occurs in a specific locational matrix. There can be one or more such matrices in a particular economy. The process of economy development does not necessarily occur in the same way, at the same time, or at the same rate in different locational matrices and at different locations in the particular matrix (say, within the American economy).
- (2) These locational matrices are primarily industrial-urban in composition; the centers of these matrices in which economic development occurs are not mainly out in rural or farming areas, although some farming areas are situated more favorably than are others in relation to such centers.
- (3) The existing economic organization works best at or near the center of a particular matrix of economic development, and it also works best in those parts of agriculture which are situated favorably in relation to such a center; it works less satisfactorily in those parts of agriculture which are situated at the periphery of such a matrix. (Schultz, 1953: 205-206).

Schultz suggested that the beneficial effects of urban-industrial growth on rural development are transmitted through the improved workings of product and factor markets which are concomitant with urbanization. The problem of rural development is thus seen as a problem in economic organization.

The various empirical studies that have been based on the Schultz hypothesis have agreed that, except in agricultural areas oriented toward national and international rather than regional markets, there is a direct, positive relationship between rural income and the level of local urbanization. (Sisler, 1959). While these studies have emphasized the role of product and factor markets in bringing about this relationship, the way in which these markets operate has been described somewhat differently by the writers. Nicholls suggests that urban industrial growth results in greater capital formation in nearby agriculture, higher agricultural capital-labor ratios, more intensive cultivation, improved infrastructure, and absorption of excess labor, all resulting in increased agricultural outputs close to the urban-industrial center. (Nicholls, 1961). Ruttan found that, "Increased off-farm jobs by members of farm families were more important in raising the income level of farm families than even increased labor productivity in agriculture." (1955: 47-48). Sisler stresses the role of increased demand from the urban area and the increased adoption of innovations. (1959: 1103-1107). In most of the cases tested, the beneficial effects of these market forces decreased as the distance from the urban center increased.

In addition to explaining the spread of development-inducing market forces into the rural hinterland, the wave diffusion model serves also to explain the spread to the hinterland of development-related 'household innovations.' Pedersen defines household innovations as "...those which spread among private households or individuals and which might be accepted by all the population or by groups of the population having certain characteristics." (Pedersen, 1970: 205). Improved health and homemaking practices are examples of household innovations. Berry links household innovations with entrepreneurial innovations by suggesting that the spread of a household innovation is an indication of the use the population makes of an entrepreneurial innovation. In a study of the diffusion process, he notes that:

Household innovation declines with distance from the TV city, is greater in growing high income areas, and is retarded in low income communities and where age levels are lower. (Berry, 1972; 130).

Diffusion of household innovation continues until a saturation point is reached within the area accessible to the central place.

Summary of the Model

The previous pages have brought together theoretical and empirical findings from a number of related fields in an attempt to develop a model of the spatial incidence of economic growth and development. From the model can be drawn three key points, each of which has been ably summarized by writers in the field: (1) Economic growth and development take place within an integrated spatial framework. On this point, Berry and Rao have stated that

...it is only through the articulated development of a complete spatial system of urban centers arranged in a hierarchy from agro-urban market towns through several intermediate types to the metropolis, that growth and development can be achieved. It is through such a system that growth impulses can be transmitted downwards into the rural areas, with larger centers retaining activities of greater scale and capital intensity, and smaller centers acquiring functions that can be performed at lesser scale for more local markets, or in which the capital-labor ratio is low, and with all centers, to the limits of their ability, spreading growth into their hinterlands. (Berry and Rao, 1968).

(2) The city is the 'engine' of regional development and is the link between the regional economy and the national economy. In this regard, one again turns to Berry:

Cities are the instruments whereby specialized subregions are articulated in a national space economy. They are the centers of activity and innovation, focal points of the transport network, locations of superior accessibility at which firms can most easily reap scale economies, and at which industrial complexes can obtain the economics of localization and urbanization. Agricultural enterprise is more efficient in the vicinity of cities. The more prosperous commercialized agricultures encircle the major cities, whereas the inaccessible peripheries of the great urban regions are characterized by backward, subsistence economic systems. (Berry, 1971).

(3) An efficient framework for the distribution of goods and services required for rural development is a regional central place hierarchy whose range limits correspond to existing means of rural transportation. As regards this point, Johnson has noted that:

... a modern type of agriculture not only presupposes the existence of markets where produce can be sold as well as of markets where inputs can be purchased, but it is necessary that both types of markets be spatially dispersed in such a way that they will be within satisfactory distance and travel time of farmers for the single reason that farmers' relative mobility is always limited by the very nature of their space-bound occupation. (Johnson, 1970: 18).

III. STRATEGIES FOR REGIONAL DEVELOPMENT

As was stated in the introduction to this paper, the growing concern about regional inequalities in the development process, and the consequences of those inequalities - rural poverty, rural-urban migration, uncontrollable urban growth, and political unrest - has led to increased interest in regional development and planning as part of overall national development and planning efforts. Over the past 25 years, with varying degrees of commitment and success, a number of countries have attempted to implement regional development strategies based on the model set out in the previous pages. In this section, examples from several countries are discussed, followed by some critical observations on the problems to be faced in adopting and implementing these regional development strategies.

Experience with Growth Center Strategies

One of the most commonly recommended and tried approaches to regional development has been the growth center strategy, *i.e.*, the development of urban centers, either *de novo* or on the basis of existing settlements, which can generate the external economies necessary to attract and support rapidly-growing industrial activities with strong inter-industry linkages. The creation of such urban/industrial growth centers is suggested by the regional development model on three counts: (1) because the city is seen as the 'engine' of economic growth, the place where economic growth is most advanced and rapid; (2) because it is through the city that the region is most effectively linked into the growth impulses which are diffused throughout the national space economy; and, (3) because the benefits of this urban growth diffuse into the contiguous rural areas, resulting in greater rural productivity and improved rural standards of living.

The growth center strategy would seem most appropriate in developing countries which must face the problem of primacy, i.e., a situation in which a single large city, usually the capital, dominates the nation in terms of population, economic activity, income growth, social services, and other indicators of development; while the rest of the country lacks any urban centers with sufficient size, economic activity, or infrastructure to promote development away from the primate city. The absence of other urban centers will prevent the diffusion of growth impulses through an urban hierarchy, while most rural areas will not benefit from the proximity of urban product and factor markets.

It is for these same reasons that growth center strategies have been attractive to developed countries which contain regions and large pockets of poverty and underutilized human and natural resources. Such strategies also have been implemented in developed countries in an attempt to draw investment and population away from overgrown urban/industrial centers.

Successful implementation of a growth center strategy involves a considerable amount of planning, coordination, and investment. Findley (1977: 95-96) suggests the following steps, which provide some framework for discussing the examples that follow:

- Preparation of a regional plan
- Selection of growth centers
- Acquisition or control of land use within the center
- Stimulation of city and regional growth:
 - Physical and infrastructure development
 - Tax revenues and transfer measures to attract firms
 - Human resource development programs
 - Development of marketing, housing, and other support services
- Administrative decentralization and/or reorganization
- Rationalization of hinterland agricultural areas.

Italy

Many of the European nations have had considerable experience with growth centers and with industrial location strategies aimed at decentralizing economic activity. There is a considerable body of literature on this subject, references to which are contained in the bibliography. (Burghardt, 1975; Hansen, 1974; Hoffman, 1972; Huttman, 1973; Krumme, 1972; McCrone, 1969; Mihailovic, 1972; Robinson, 1969).

Italy has had one of the longest experiences, having initiated development policies for the southern region, the Mezzogiorno, in the early 1950s. Italy's regional problem is one of considerable inequality between the industrial, rapidly-growing North and the stagnant, agricultural South, a result of the North's favorable location relative to European markets and national economic policies following unification to support industrial development which took advantage of that favorable location (Cao-Pinna, 1974). Statistics indicate that per capita income in the South in 1950 was only 40% of that in the heavily industrialized Northwest (Holland, 1971); while the South, with 37% of national population and 33% of national employment, accounted for only 25.8% of gross national product, compared to the Northwest's 24.9% of population, 27.1% of employment, and 34.8% of GNP. (Cao-Pinna, 1974).

Early regional policy concentrated on investment in agriculture and infrastructure, much of it channeled to local authorities through the Cassa per il Mezzogiorno, a state institution established to promote the development of the South. It soon became apparent, however, that greater emphasis would have to be placed on industrial development, and in 1957 a number of measures to support such development were introduced, including partial grants toward the costs of industrial premises and equipment, increased infrastructure grants to local authorities, tax incentives, and a requirement that 60% of all new plant investment by state corporations be made in the South.

It was also at this time that the growth center strategy was introduced. (Allen and MacLennan, 1970). Local authorities were authorized to establish consortia for the purpose of promoting their jurisdictions (communes) as growth centers. The consortia were responsible for stimulating and guiding development in their areas; the central authorities established criteria for the centers and modified their plans.

Forty-two centers were established: 12 Areas of Industrial Development, and 30 Nuclei (or Nodes) of Industrialization. Areas were to have populations of at least 200,000, with a principal town having basic infrastructural needs, and were expected to experience a rapid increase in manufacturing employment. Similar requirements were set out for the nuclei, although they were to have populations of 75,000 or less, and were expected to attract smaller firms which would serve the local market or exploit nearby natural resources.

Further emphasis was placed on industrial development in 1965, with the Cassa's allocations for industrial development being increased to 10 times their level during the previous 15 years. The five-year plan stated that 80% of all new employment created in the region should be located in growth centers, and government investment would be concentrated in those centers.

Writers on the Italian growth center experience have generally been critical of its implementation and disappointed in its results. Holland (1971) notes that by the mid 1960s, 60% of the investment in the designated centers was concentrated in two areas (including a major steel complex) and two nuclei (including a petroleum refinery). These investments were by state corporations in largely non-propulsive industries, and there had been little private investment. Commenting on the implementation of the strategy, Holland stated:

No overall assessment was made of the suitability of some locations as against others for certain types of industry, and even the designation of the areas and nuclei depended on local authorities submitting claims to be recognized in the new classification. More vitally, no new instruments to promote the location of northern private industry in the South were adopted in order to make the legislation effective. (1971: 78).

Cao-Pinna goes on to criticize the contradiction between concentration and dispersion inherent in a program of 42 centers; the lack of coordination between public and private activities; and the lack of inter-industry linkages which characterized the industries which did become established in the South. She also notes that the strategy was weakened by the extension of the industrial development measures to depressed areas of the northern and central regions. Efforts in those areas were more successful than efforts in the South, due to the contiguity of those areas with the northern industrial centers, and almost certainly attracted investment which might have located in the South.

In the early 1970s, a number of measures were being discussed to provide further support to the industrialization of the South, including greater investment by state corporations, government review of private sector investment plans, and better coordination. Cao-Pinna remained skeptical, however, as to whether any major improvements would take place. Statistics indicated that while per capita income had risen to 48% of the Northwest's by 1967, this was largely due to out-migration from the South to the Northwest. (Holland, 1971). By 1971 the South's share of national population had declined to 34.2% and its share of GNP to 23.9%, while the Northwest had increased its shares to 28% of the population and 36.8% of GNP. (Cao-Pinna, 1974: 150-151).

The Netherlands

Regional planning in the Netherlands began evolving in 1952 in an attempt to overcome problems of structural unemployment in the North, South, and Southwest regions. Development areas were identified on the basis of unemployment and out-migration criteria. A program of support for industrial development was established, which provided funds for construction of industrial sites and improvement of transport facilities and public utilities, training and retraining of workers, and housing.

In 1953 the growth center strategy was introduced, based on the notions that the centralization of infrastructure investments would lead to sizable economies of scale, and increase the effectiveness of the various support programs being implemented in the regions (Hendriks, 1974: 189). The growth center strategy was supported by the offer of a 25% subsidy on construction costs for firms locating in the growth centers; this subsidy was later extended to the costs of land and capital. A further inducement introduced in the early 1960s was the payment of migration allowances to unemployed workers who migrated within problem areas to designated growth centers, and to workers who migrated with their companies from the highly developed West region to these growth centers. (Hendriks, 1974: 194).

Although only 15 to 20 centers were to be designated initially, political pressures dictated the designation of over 40 centers. This was seen to be too many centers for any effective implementation of regional policy, and in the mid 1960s, a differentiation was made between primary nuclei, which had experienced important industrial development in the past and could be expected to continue to do so, and secondary nuclei. Assistance to these secondary centers was gradually diminished, and finally terminated in 1972.

A further instrument to support the development of growth centers in the North region was introduced in 1972: a subsidy of up to 25% on the costs of machinery and equipment for firms locating in the North. This was done for the purpose of attracting to the region propulsive, capital-intensive industries which have strong linkages to other activities.

While programs for stimulating development in lagging regions were being initiated, concern was growing for the problems of congestion and declining quality of life in the Amsterdam-Rotterdam-The Hague-Utrecht area, known as Rimcity, Holland. Policy to develop the non-western regions became part of efforts to attract population and investment away from the Rimcity. This gave rise to several measures which have supported the growth center strategy, including a 1973 law which requires licensing of investments of a certain amount, the implications of which are that location will be a determining factor in the granting of licenses for new investment. A second measure has been the designation of Groningen, in the North, to act as a counter magnet to the Rimcity, and the announcement of measures to support this designation.

While evidence of the outcome of the most recent measures is not yet available, Hendriks (1974) cites several studies which suggest that the earlier efforts were having an impact. He notes that a number of industries whose growth rates are higher than the national average, including chemicals, paper, rubber, and printing, have shown a slight tendency to decentralize away from the West, while the metal industry has shown a marked tendency to do so. He also cites a study which suggests that employment growth in a number of lagging regions during 1950-60 was higher than what could be predicted, and attributes the better performance to regional policy. It would certainly seem that the Dutch approach of combining positive and negative measures to attract investment away from developed areas to a limited number of centers in lagging areas should have a strong chance of succeeding.

Spain

Spain faces a situation whereby its major economic centers are widely dispersed (at least 250 miles apart), with poor transportation linkages between them. Industry tends to be regionally rather than nationally oriented, and there are wide disparities between regions in income and standards of living. Thus, integration of the national economy is a major goal in Spain.

The approach to these problems has been the intensive development of specific locations. Three types of poles have been differentiated: development poles, poles of decongestion (industrial satellites of Madrid), and zones of preferred location (rural growth centers). The instruments of regional policy are investment grants, tax and import duty exemptions, and preference in obtaining official credit. The major selection criterion is location along existing or proposed transport and development axes. Poles are not located in the poorest regions, reflecting an emphasis on efficiency criteria in what is in many ways a developing country. Seven centers were designated in 1964 and kept that designation for a period of 5-8 years. Four new centers were established in 1972.

The progress of the policy thus far has not been encouraging. The number of jobs created has been small, equalling only .4% of the national labor force. Only a few sectors have been attracted; chemicals, metals, and food processing account for 75% of all investment. A number of poles have had severe negative 'backwash' effects on their hinterlands. (Richardson, 1975b).

United States

The major U.S. experience with growth centers has been in the Appalachian Region, under the auspices of the Appalachia Regional Development Act of 1965 (ARDA). That act was passed in order to promote the economic development of the 13-state Appalachian Mountain region, an area containing some of the worst poverty and lowest standards of living in the entire U.S. The act established the Appalachian Regional Commission to implement the program at the federal level, while giving the individual states considerable responsibility for planning and implementing their portions of the program. The act authorized major federal spending for investments in infrastructure roads, schools, health facilities, and resources; by the end of 1977, the ARC had spent or committed nearly \$1.9 billion for highway construction projects, and another \$1.3 billion for non-highway projects. (ARC, 1977).

The ARDA stipulated that investments in the region should be concentrated in places with the greatest potential for economic growth, particularly the attraction of industry and other employment-creating activities. This concentration of investment was justified on the basis of the desire to reap the advantages of concentrated economic activity and of the realization that funds were too meager to be dispersed with any significant effect. It was left to the ARC to give an operating definition for growth centers:

By a center or centers is meant a complex consisting of one or more communities or places which, taken together, provide or are likely to provide a range of cultural, social, employment, trade, and service functions for itself and its associated hinterland. Though a center may not be fully developed to provide all these functions, it should provide or potentially provide some elements of each, and presently provide a sufficient range and magnitude of these functions to be readily identifiable as the logical locations for service to people in the surrounding hinterlands. (ARC, 1972).

This definition has been further refined to delineate regional centers, metropolitan areas with major regional impacts; primary centers, growth points with more localized impacts; and secondary centers, which are service delivery points for hinterland areas. Recommended criteria for selection of growth centers were the presence and nature of commuting patterns, wholesale trade, education and cultural services, inter-firm and inter-industry trends, government services, natural resources, topography, and transportation networks.

Actual identification of growth centers has been left to the individual states which are part of the Appalachia region. The justification for this has been the absence of previous U.S. experience with growth center strategies, and the recognition of the diversity amongst the states, particularly in terms of the economic potential of areas within a state relative to other areas within that state. (Newman, 1975). While the ARC guidelines were to be used in selecting the centers, actual state definitions and criteria have varied considerably, although recent years have seen increasingly sophisticated criteria develop in several states. Approximately 125 centers have been identified, incorporating 63% of the regional population.

Recent years have indicated major improvements in the main statistical indicators of welfare in the Appalachia region, reversing the trend toward further deterioration that continued through the late 1960s. While regional population growth during the 1970-75 period was actually lower than national growth, 4.4% versus 4.8%, the flow of out-migration had been reversed, and the region experienced a net in-migration of 292,000 people. Total personal income per capita increased during the period to 84% of the U.S. average, compared to 78% in 1965; while due in part to the slower growth in population, the improvement in income per capita was largely due to a 61% regional increase in total personal income during 1970-1975, compared to the 56% increase for the U.S. as a whole. Total employment in the region grew slightly less than the nation as a whole for the 1965-1974 period, 29% vs. 32%; but was slightly greater for the 1970-1974 period, 11.4% vs. 10.9%. Unemployment rates in Appalachia and the U.S. were about the same during the mid 1970s. (ARC, 1977b).

It is difficult to determine the extent to which the improvements in the economic indicators for Appalachia are attributable to the growth center strategy. Major sources of improvement have been the energy crisis, which led to a 26% increase in coal mining employment, and spending by the ARC itself, reflected in the 54% increase in regional contract construction employment (compared to 40% nationally). Manufacturing employment, which would be expected to be the main target of a growth center strategy, has grown only slightly more in Appalachia than in the U.S., 18% vs. 15%.

While the writer has been unable to locate ARC studies on the effectiveness of the growth center strategy, Hansen (1974 and 1976) has suggested that the major benefit of the Appalachia program has been the provision of social services rather than employment creation, while out-migration has been the major contributor to lessening unemployment. Studies of non-metropolitan employment growth suggest that national growth in demand and regional availability of low-wage labor, rather than the availability of infrastructure and social services, govern decisions to locate in non-metropolitan regions such as Appalachia. (Erickson, 1976). All this would suggest that the Appalachian growth center strategy has not been a major factor in the development of the region.

Experience in Latin America

A number of Latin American countries have attempted growth center strategies, in many cases incorporating the strategy into national development plans as a guide for sectoral investments. (Stohr, 1975).

Chile faces the problem of extreme concentration of population and economic activity in the area around Santiago. During the 1960s, regional development policy attempted to disperse activity away from Santiago and to integrate better the nation. (ODEPLAN, 1971).

The nation was divided into 12 regions plus the Santiago region, and a two-part strategy was devised. The first part, intended only for the Santiago area, was to disperse industrial growth in the central region to large urban centers within 70 kilometers of Santiago. The second part included the identification of growth centers in the 12 other regions of the nation. The centers were given priorities according to growth potential, and resources were to be channeled to the centers according to their priority. The instruments to be used to guide industrial dispersion to these centers included the establishment of industrial estates, government loans, and exemptions from import duties. In several centers large scale industrial investments were made, e.g., petrochemicals and steel production at Concepcion, and automobile assembly at Arica.

The Chilean growth center program was never followed through, as it was abandoned by the Allende government. Richardson and Richardson (1975) cite a study, however, which looked at 7 of the centers and concluded that one center, Concepcion, was somewhat effective in inducing growth; four centers were ineffective; and two centers, Arica and Punta Arena, had negative impacts, due largely to their extreme geographic isolation. The weakness of the policy instruments was cited as a reason for the ineffectiveness of the strategy.

Peru suffers from the extreme primacy of the Lima/Callao area, which accounts for 20% of the national population, and 70% of national industry. Four planning regions and six growth centers have been delineated within these regions. Regional policy calls for the development of these poles based on utilization of surrounding natural resources and industrial production of export goods. Tools to implement this policy include tax incentives, government power to license new industrial establishments, and control over public investment and infrastructure. (Robin, et al., 1972b).

Richardson and Richardson found the Peruvian approach to be appropriate, but found its implementation lacking, observing that

...the industrial aspects of pole development have not been emphasized enough; policy instruments are weak, and no action has been taken to curb the growth of Lima. (Richardson and Richardson, 1975: 173).

Colombia, in its 1969-1972 national development plan, defined nine development regions and a growth center in each. A hierarchy of urban places for regional development was identified, including: 'centros locales', rural service and market centers; 'ciudades intermedias', cities of 30,000-200,000 population; 'metropolis de equilibrier', the cities of Medellin, Cali, and Barranquilla, which were to compete for economic activity with the capital; and the 'metropole nacional', Bogota. (Robin, et al., 1972a). Infrastructure development and subsidies for propulsive industries were to be the main tools for attracting investment away from Bogota to the 3 main growth centers.

The Colombian growth center strategy was never implemented, as the new administration that came to power in 1970 favored sectoral rather than regional development. Richardson and Richardson, however, criticized the approach as unjustified, given the already diversified nature of the three main growth centers, and criticized the lack of effective inducements to industry that could overcome the economic and psychic attractions of Bogota. (1975; 173).

Further doubt on the likely success of Colombia's approach to growth center strategy was cast by Gilbert (1975). In a detailed study of Medellin, one of the three main centers, and its region, he found that the center generated little positive economic benefit to its hinterland beyond the immediately contiguous areas, the spread effects tailing off rapidly within a 50 kilometer radius of the center.

Venezuela has implemented one of the best known growth center projects at Ciudad Guayana. The city was founded at the confluence of the Caroni and Orinoco Rivers by linking the two existing towns of San Feliz and Puerto Ordaz. The city is intended as the major growth center for a region rich in natural and energy resources.

Ciudad Guayana is, then, the response to the necessity of creating an important and stable urban nucleus, capable of promoting and accelerating the utilization of hydroelectric, mineral, agricultural, and forest resources of the whole region of Guayana, offering at the same time improvements in the social and economic order. (Robin, et al., 1972c).

The Government of Venezuela, through the Corporacion Venezolana de Guayana (CVG), has invested heavily in infrastructure and industry in the city. Steel mills, aluminum mills, natural gas, cement, and pulp processing facilities have been established. The city is expected to have a population of a half million by the late 1980s.

Richardson and Richardson's evaluation of the Ciudad Guayana to date was rather mixed:

Despite its enclave characteristic and its adverse effects on the secondary pole of Ciudad Bolivar, 100 kilometers up the River Orinoco, Ciudad Guayana has transformed a frontier region into an integral part of the national economy, and its links with its hinterlands should be achieved in time. (1975; 173).

Unfortunately, the authors provide little elaboration or justification for their statement. Blaut (1978: 346), however, does claim to have evidence that the city's linkages with its hinterland are considerable. He found that the growth of the city as a market for food and a source of employment for the rural population has led to considerable capital accumulation and adoption of technological change, as evidenced by the replacement of the traditional method of making cassava bread by a modern method, using a gasoline engine as its energy source. This technique, he says, was originally used in the city, but has diffused very widely throughout the rural hinterland.

Tanzania

Tanzania suffers from a colonial legacy which left it with only a few urban centers around its periphery, established to facilitate the export of products, such as sisal, and no significant towns in its interior. (Luttrell, 1972; Hirst, 1973). Regions with good potential for internally-oriented production suffer from the absence of markets and links to the national economy.

To overcome this deficiency, the second five-year plan identified nine towns, plus the capital city of Dar es Salaam, which were to be centers of urban/industrial development. An Industry Investment and Licensing Council was established to control new industrial investment and guide it to the designated centers. District development corporations were being established to invest in new productive activities, especially small-scale, agriculture-related enterprises. Further, one of the centers, Dodoma, has been selected as the site for the new national capital.

Commentators on the Tanzanian growth center strategy, notably Luttrell (1972) and Hirst (1973), have pointed out several deficiencies in the strategy which are common to other experiences with growth centers. A major problem, described by Hirst, is that of finding enough of the appropriate industries to propel growth:

It will be difficult in the short term to find enough of the necessary types of industry which are needed to initiate several growth centers, and which can be viably maintained in Tanzania, i.e., industries which are relatively large, generate significant growth through strong linkage effects, have a high ability to innovate, and belong to a fast growing sector. Indeed, many of the major opportunities for import substitution have now been exploited and the desired shift towards capital goods industries require a market far greater than Tanzania can offer. (Hirst, 1973: 49).

A second problem will be attracting industries away from Dar es Salaam, the already-congested primate city. Hirst sees the location of any industry outside Dar as fortuitous, since industries need locate outside of Dar only if they cannot show that locating at Dar is a necessity. Only 4 of the 9 centers outside of Dar, Arusha, Moshi, Mwanza, and Tanga, have such strong attractive qualities as a more complex employment structure, more intense inter-urban transition, and adequate infrastructure. The other 5 centers, Dodoma, Morogoro, Mbeya, Tabora, and Mtwara, lack these characteristics.

A further problem is that many of the centers lack necessary linkages with their hinterlands, a situation which would prevent benefits from flowing to the rural areas. Hirst found that most Tanzanian towns demonstrated little functional differentiation and, therefore, offered few services or benefits to the rural population. Only those towns which were located in regions growing export crops, and therefore containing processing facilities, showed improved linkages. Poor hinterland linkages result in a large portion of the growth opportunities generated in the region leaking out.

Funnell (1976) cites the example of the Morogoro tobacco factory having to import its main input, tobacco, from outside the Morogoro district. Luttrell argues that most of the centers are too small to offer more than a marginally-improved market for local agricultural produce.

Evaluation of Growth Center Experience

The previous discussion of various countries' experience with growth center programs suggests that the strategy has not been a highly successful one, and may not be an appropriate means of resolving the problem of regional inequality. A number of countries have abandoned their growth center efforts, while researchers and planners who have championed the approach in the past are pulling back from their previous positions.

One problem with growth center strategies may be that too much has been expected of them. Growth centers have often been seen as the answer to a wide range of problems, as Findley has observed:

The expectations are imposing:
redirect migration, pull a
region out of its depressed
condition, generate exports,
stimulate commercialization of
agriculture, integrate the
region's population into the
modern "mainstream." (1977: 75).

This notion that growth centers can accomplish so many objectives at once has been a major attraction to governments, observes Gilbert:

While the impression has not helped
the concept's effective implementation,
it has clearly assisted its widespread
adoption. In particular, growth center
strategies have definite virtues for
governments which wish to appeal to
regional sentiment and feelings of
exclusion, while effectively doing
nothing. (1975: 326).

While some writers argue that too much has been expected from growth centers, others have argued that significant results have been expected too soon. Richardson (1976) argues that the kind of structural changes which growth centers are expected to bring about require a 15-25-year time period, and cannot be expected to occur quickly, certainly not within the 10-year or less period with which most countries have had experience. "The trouble has not been wrong-headed policies, but the lack of realistic expectations of a sufficiently long time horizon and of sustained political will." (Richardson, 1976: 1).

Certainly a major problem has been that growth center strategies have not been implemented effectively. Findley has noted several major problems encountered in implementing such regional development strategies:

...definition and selection of the region, definition of the 'propulsive' firms, attracting these firms to the region, determining 'optimum' core city size, limiting the multiplier effects to the region, and establishing links with other regions. (1977: 95).

Defining the region and selecting growth centers were problems in most of the examples cited above. A major contributing factor to these problems has been the failure of the relevant regional development and growth center theory and research to provide adequate guidance in planning a growth center strategy (see Gilbert, 1975; Appalaraju and Safier, 1976). Despite the abundance of writing on this subject in the past 20 years, planners have gotten little help from academic researchers in identifying meaningful criteria for selecting and developing growth centers. Further, the political nature of regional development programs has often meant that planning criteria are overridden by the politician's desire to distribute benefits over a wide area.

Measures to attract industry to growth centers have usually been weak. The provision of infrastructure alone has had negligible impact, while infrastructure in combination with tax incentives and direct subsidies have not performed much better. While such dependence

on market forces is usually ineffective, national licensing measures which include location as a major determining element in whether or not to grant a license for a factory, have had some success in Great Britain, the Netherlands, and other European countries. Strict guidelines for investment by state-controlled firms can also be effective, although such investments, experience indicates, often result in the formation of industrial enclaves rather than dynamic centers linked to other growing economic sectors. In developing countries there are often few rapidly-growing, innovative industries available to play the role of the propulsive firm at a growth center.

Localizing the multiplier effects of growth centers by establishing vertical linkages has been difficult. Recent studies by Pred (1976) and Erikson (1975) have shown that in the U.S. (and, by extension, in other developed countries), the most important linkages between industrial activities are not with producers in the hinterlands of the urban centers where those activities are located, but rather in other major urban centers, and in the hinterlands of other major urban centers, considerable distances away. In many cases, this is due to the vertical integration of many activities within large corporations, but is also true for transactions between plants and offices of different firms. Localization of linkages has also been difficult in developing countries, as the example of the Morogoro tobacco factory illustrates.

While experience with growth center strategies has been disappointing, developments in the research literature have cast doubt on many of the assumptions on which the approach is based. The work of Pred and Erikson cited above, and of Mosely (1973a and b), have suggested that in developed economies, at least, growth impulses flow up, down, and horizontally, through the urban hierarchy, rather than just downward; and that impulses can flow directly from a center in one region to a hinterland in another region, thereby short-circuiting the flow of benefits to those hinterland areas that are contiguous to the center. Further, research by Erikson (1975) and others on non-metropolitan industrial development in the U.S. in the 1970s. indicates that the overall growth in demand in the economy and the availability of low-cost unskilled labor, are the main factors in a firm's decision to

locate in non-metropolitan areas, as would be predicted by Product Cycle Theory. The availability of incentives, such as social infrastructure and tax incentives, tend to have a secondary role, or no role at all, in the location decision.

Given the number, complexity, and interdependency of the factors involved in implementing a growth center strategy, it is clear that a great deal of analysis, planning, coordination, and investment would be required to implement the strategy successfully. Huge quantities of manpower, capital, and political resources would have to be marshalled and committed to bring this about. Most developed countries, with their considerable resources, have been unwilling or unable to carry out such a strategy successfully, while most developing countries cannot begin to accumulate the necessary human and capital resources. This, perhaps more than any other reason, would argue against the adoption of such a strategy for most developing nations.

Market Towns, Rural Growth Centers, and Rural Service Centers

The regional development model suggests, and experience shows, that the beneficial impacts of urban/industrial centers to their rural hinterlands are often limited to those areas immediately contiguous to the centers. Without a well-developed regional central place hierarchy to provide an integrated marketing and distribution system, the rural farmer who is not within commuting distance of a major city must depend on the village for marketing and other services. Since the level of transportation technology in most rural areas is rather low, this means that most rural farmers are caught in this situation.

As Johnson (1965) has pointed out, such a situation has severe retarding effects on rural development. Because the village market is small, monopoly conditions exist in which competition and consumer choice are minimized. Further, the small size of the market works to keep the scale of farm operations small so that modern techniques tend to be impractical.

The incentives to expand production and adopt new techniques are weakened in this situation. The diffusion of growth impulses and innovations is stopped at the urban center, rather than continuing to the rural areas. The result of this is to keep rural areas poor and underdeveloped.

The regional development approach to these problems is to attempt to resolve the deficiencies in the existing spatial structure. Such an approach would seek to increase competition and consumer choice, improve marketing, and improve the distribution of goods and services in rural areas by reinforcing the system of central places in the regions. A number of approaches have been tried or suggested in this regard.

Conceptual Approaches

An important means of linking farmers and villages with urban centers is through the creation of market towns, as proposed by E. A. J. Johnson (1965 and 1970). Market towns, Johnson states, will overcome the problems of the village economy (outlined above), because they will serve a larger market area and will offer more goods at lower prices, sold by a greater number of more specialized sellers. Such towns will help to fill the gap that exists between the village and the large urban center by providing a wider range of services for rural dwellers and providing an improved environment for investment in rural areas.

The radii of such towns must be short enough so that village farmers can come to these town markets by ox-cart, bicycle or bus, bringing their grain, eggs, ghee, or poultry and have time enough to sell these products, buy the consumers' goods, seed, tools and hardware they need, and yet, be able to return to their homes on the same day. Around such market towns, a whole range of rural activities can be effectively oriented. Viable

rural industries can flourish if they have the combined market demand of 40-45 villages; low-cost agricultural processing mills can be established if their scale of operations permit them to amortize fairly sizeable investments. (Johnson, 1965: 9).

Market towns have further advantages in that they can provide education and training facilities that would be infeasible on the village level, and can provide employment for rural workers without having to provide housing, since the towns will be within commuting distance of villages.

The development of market towns is a two-faceted problem: "how to lure village farmers to the emergent market towns; and secondly, how to persuade them that it will be in their interest progressively to inter-relate their activities with the new urban centers." (Johnson, 1965: 17). Johnson proposes that this problem can be resolved through the concentration of basic facilities and services in the market town. These would include grain storage facilities, commercial fertilizer mixing and storage facilities, a high voltage power line to serve these and other facilities, a water filtration plant with related infrastructure, sewer and sanitation equipment, modern milling and processing installations, facilities for the distribution of seed, pesticides, and implements, new and improved village-to-town roads, and a multi-purpose school. The town would also be the center for improved health programs, farm extension programs, and credit facilities. All this would be within one day's commuting distance of the rural villages, as determined by the level of local transport technology. Further, all this could be achieved through the spatial coordination of investments already programmed into national development plans.

A similar approach was taken by Bennett Harrison in a research proposal prepared for A.I.D. in 1967. Assuming essentially the same long-run objective as Johnson - i.e., the commercialization of the rural sector, including the provision of non-farm employment opportunities - Harrison proposed the development of a series of pilot rural growth centers. These centers would add a light industry sector to the market town base in order to achieve the long-run objective:

...the marketing function provides a handle (if not the handle) to the planned development of those inter-regional and inter-sectoral linkages necessary for successful growth. This is so for two reasons. First, efficient distribution of goods, services and productive factors is sorely lacking in most LDCs. The second reason is a bit more subtle: most farmers engage in at least limited institutionalized exchange. This effectively forces them to visit and congregate in central places which facilitate marketing. In other words, existing market towns already have a 'captive (albeit inadequate) audience' for the wares they have to display... . It is precisely this 'captive audience' property of existing centers which offers the greatest opportunity for transforming them into regional growth poles. (Harrison, 1967: 1-4).

A third approach to improving spatial organization for rural development is Mosher's notion of a progressive rural structure. The basic unit of the progressive rural structure is the farming locality, which is defined as

a rural area sufficiently small that a farmer anywhere within it can, with the means of transport available to him, go from his home to a market center where the off-farm facilities he needs are available and return home certainly within the same day. (Mosher, 1969: 3).

An effective farming locality has five elements: (1) a single market center for selling products and buying supplies and equipment; (2) rural access roads connecting farms and villages to the market center, and the market center to higher regional centers; (3) local verification trials, i.e., local demonstration projects for new techniques and crops; (4) an extension agent to aid farmers in increasing their productivity; and (5) production credit facilities to provide short-term credit to finance the purchase of production inputs. At the early stages

of the commercialization of agriculture, these localities would be relatively small and numerous. Their markets would not need to be permanent as long as they were held regularly.

The second level of a progressive rural structure would be the farming district, which would be composed of a number of adjacent localities and would serve the localities the way the localities serve the farmers. The district would be the smallest unit capable of supporting all the functions and services of a progressive rural structure. It would include a permanent district market and storehouse facilities for the purchase of agricultural inputs and the wholesaling of farm products to the consumer markets; a regional agricultural research center; a district extension administration to backstop the local extension agents; district banks to meet seasonal credit demands; and district transportation and communication facilities.

A progressive rural structure would have a number of non-agricultural development effects. For one, it would open rural areas to urban influences. Two, it would expand the market for industrial goods manufactured in urban centers. Thirdly, it would facilitate the development of small-scale rural industry. Fourth, it would facilitate activities contributing to rural welfare, e.g., schools and health clinics. Finally, it would contribute in all these ways to national integration.

International Experience

Unlike experience with urban/industrial growth centers, attempts to establish rural spatial structures to serve the objectives of rural development are largely recent, confined to developing countries, and usually left unevaluated. The experiences often reflect only one of the conceptual approaches discussed above, but in some cases combine them in an attempt to develop comprehensive central place systems.

Israel

Israel has undertaken since 1948 a comprehensive approach to developing a central place system. The Israeli program was derived from a number of objectives: the need to provide housing and employment

for in-migrants, overcome regional inequalities and the primacy of Tel Aviv, occupy the frontiers for defense, and better exploit the natural resources in the northern and southern regions. Most of the new towns have been planned as service centers for surrounding areas and must be at the focus of local economic activity. As a result the planners have used central place theory as their organizing principle. (Shachar, 1971).

To fill the gap between the metropolitan centers (E-level centers) and the rural villages (A-level centers), the Israelis have developed three intermediate centers: B-level centers, rural service centers of a few hundred population catering to 4-6 villages; C-level centers, small towns of 6,000-12,000 people with a 6-10 km. service radius; and D-level centers, middle-size towns of 15,000-60,000 people containing central regional institutions and services. Policies to implement the settlement building program have been of two types: directing migrants to the new settlements and providing public housing and employment there for them, and the inducement of economic development through a combination of incentives and infrastructure investments to attract industry. Central authorities were responsible for all aspects of urban development at the beginning, and this dependency has decreased only to a small degree.

Evaluation of the Israeli experience indicates that the results have been mixed. From 1948 through the mid 1960's, the program showed considerable success in dispersing the nation's population; population concentration along the coast had been reduced from 80% to less than 70% of the national population, with the new towns accounting for 20% of the national urban population. Studies indicate that good economic conditions, spurred by government investment, were a major attraction for migrants to the towns, while the large flow of immigrants into Israel was a major source of residents. (Comay and Hirschenbaum, 1973).

By the late 1960's, however, the new towns were beginning to experience an outflow of residents, with migrants moving to the large urban centers. A decline in economic opportunities, in the context of a national recession, was a major cause of this (Comay and Kirschenbaum, 1973), while Berler, et al. (1970: 89) cite the failure of government agencies to continue their institutional support to the towns.

Further, the new towns have failed to develop as rural service centers. There are several reasons for this. For one, the rural villages (e.g., Moshavim), belong to strong national organizations headquartered in Tel Aviv, which provide them with marketing and purchasing services and with an institutional framework. As a result, there is little need for the services provided by the new towns. A second reason is that many of the towns, especially the C-level centers, are too small to provide an effective range of services. There is a need for a smaller number of towns of larger size to provide more and better services, amenities, and a better industry mix. The third reason is that the size of the country and the well-developed transportation system combine to provide easy access to the larger cities and thus reduce the demand for local services.

Nepal

Nepal has also attempted a comprehensive approach in developing a central place hierarchy. Nepal's approach, which was part of its Fourth Five-Year Plan, was aimed at integrating the northern and southern regions of the nation through a series of north-south roads:

A north-south road becomes the background, as it were, of the growth of a development corridor and also emergence of 'growth centres' along the corridor. The growth centres will be urbanized centres for agricultural marketing and processing and for location of resource-oriented industries.
(Malhotra, 1971: 5).

The Fourth Plan designated four geographic sectors of the country and the appropriate centers for each. Each sector had one center in each of four geographic areas: the Terai (southern plain), Inner Terai, Hills, and Mountains.

"The role of these growth centers would be to facilitate the transition of the rural population into urban employment and to develop marketing and service centres for the regional population.

The Terai centres would provide primarily industrial employment to the presently agricultural population in the Terai and the hills. (Malhotra, 1971: 7).

It was expected that such a distribution of places would prevent the over-concentration of population and economic activity in Kathmandu and along the southern border with India.

Ghana

Ghana provides an interesting example of a combined market town/progressive rural structure strategy. The Volta River Resettlement Program in Ghana came about as a result of the need to resettle approximately 80,000 people due to the flooding caused by the construction of the dam at Akosombo. The planners decided to take advantage of the situation by relocating the people, who had come from some 700 villages, in a smaller number of larger, hierarchically arranged centers. The notion was to create

...a network of rural towns or 'townships' based upon the scientific production of food grains and livestock, and connected by a viable transport network with one another and with the rest of the country. (Harrison, 1967: 42).

Thus, the objective was to develop a spatial structure amenable to the modernization of agriculture. This would require a system of central places to provide marketing and related services, material inputs, labor - especially trained labor to operate mechanized equipment - and facilities for technical assistance.

The region was divided into seven planning areas, and in each area a hierarchy of centers composed of a central town, a service center village, and satellite villages:

The central town, with a population of 10,000, was to perform the functions of industry, trade, service and government in each of the seven planning areas. Each central town was located where the best combination of bulk water supplies for industry, road transportation, water transportation, accessible minerals and agricultural raw materials was available. The service centre villages, with an average population of 8,000 and not less than 5,000 were to be the local centres of trade, education, post and indigenous industry. Each village would serve a radius of ten or fifteen miles of smaller settlements and perform service functions for the surrounding agricultural and marine industries. The satellite villages were to be located in areas of intensive agricultural activity, where some secondary agricultural processing industries drawing upon local agricultural raw materials would be established. Six of these satellite villages would have population of 4,000. (Ghana, 1971).

On this basis, 52 settlements were established. Each contained septic latrines and standpipes, at least one school, and market stalls. Higher order centers had community centers, civic buildings, and health clinics. Experimental farms were set up to introduce new techniques to local farmers.

Mali

During the early 1960's Mali, with assistance from the United States Agency for International Development (U.S.A.I.D.), undertook a rural growth center program. Up to 10 villages were to be included in the program, and a pilot project was launched at Djoliba, a village of 1,600 people, approximately 45 km. from Bamako, the capital, along the Niger River. Djoliba was chosen due to its several locational advantages: at the center of a productive agricultural area, good transport access, a well-organized market, adequate water supply, and far enough from Bamako to prevent its becoming a dormitory community. The biggest single investment was for housing, while other investments included grain mills, an oil pressing mill, a Small Industries Training Institute, and health and school facilities.

New commercial crops were introduced in the area. The center was expected to have a population of 10,000 within 25 years. (Callaway, 1966).

The Mali rural growth center program was never implemented, as the country entered a period of considerable economic and political difficulties soon after work on Djoliba had been completed. No evaluation of the Djoliba rural growth center has been undertaken.

India

During the period, 1971-1974, the Community Development Department of the Ministry of Agriculture, with assistance from the Ford Foundation, undertook a pilot program to identify and plan for rural growth centers in 20 development blocks. Rural growth centers were seen as a means "...to improve systems for marketing agricultural produce and for the distribution of agricultural inputs, improve delivery of health care and education and to foster the development of agro-cottage and small-scale industries in rural areas and small towns." (Ford Foundation, 1973).

The pilot program itself was a combined research and action program to develop, test, and apply a methodology for identifying rural growth centers and their infrastructure requirements. (Shah, 1974). It involved collection of detailed socio-economic data of household, firm, and village levels, and the development of mathematical models using the data to identify the hierarchy of growth centers, service centers, and villages associated with them. (Bovergi and Fisher, 1974). General settlement plans were then prepared for each of the 20 development blocks, based on the data analysis. Work was carried out by planning units in each block, with direction and guidance from the Central Research Cell in the Department of Community Development.

By the end of the pilot program, general settlement plans for the 20 blocks were completed, a great deal of data had been collected, and several analytical methodologies had been developed and refined. However, little has been done to implement the plans, due in part to political events in India.

Bangladesh

The principles of Mosher's "progressive rural structure" concept are demonstrated by the development of the Comilla Academy. The academy was established in 1959 as a training center for civil servants, but then began to design development programs for farmers in its district. The 'farming district' in this case is the Comilla thana, a minor administrative unit of 107 square miles, with 300 villages, and characterized by small farms of less than three acres. The academy helped form cooperative societies at the village level to assist marketing of agricultural produce and inputs, thereby developing the 'farming localities.' Links to the district center were formed through the federation of village cooperatives into a Thana Central Cooperative Association, to provide extension, savings and credit, and purchasing services. The academy itself became a center for training of cooperative society leaders, and established a demonstration farm. Other development-oriented government services (e.g., education, agriculture) moved their offices to the academy campus, and a Thana Council was formed to coordinate their activities. (Choldin, 1968).

The Comilla model has been extended to over 200 thanas in Bangladesh, through the construction of Thana Training and Development Centers and replication of the two-tier cooperative structure. A major vehicle for this extension of the model was an Integrated Rural Development Programme, launched in 1970.

U.S.A.I.D. Initiatives

Responding to a mandate from the U.S. Congress that its programs must reach those segments of the population in developing countries which possess the fewest resources, the Agency for International Development has become, in recent years, increasingly involved in the development of spatial structures to support rural development. Important initiatives in this regard have come from the Office of Urban Development, which in 1976, commissioned a report entitled Urban Functions in Rural Development: An Analysis of Integrated Spatial Development Policy. (Rondinelli and Ruddle, 1976). The report summarized the argument that

has been developed over the past 20 years, that too great a share of the developing countries' resources have been invested in only a few large urban centers, leaving smaller urban centers without the infrastructure, facilities, services, and employment opportunities needed to link the rural economy with the modernizing national economy and promote development in the rural areas. The report recommended that international assistance agencies and developing countries devote investment resources to creating "an articulated and integrated network of cities and market towns closely linked to rural areas" for the purpose of expanding markets for rural produce, extending social and economic services to rural areas, providing new rural employment opportunities, and altering the pattern of migration. The report noted that extensive analysis of the spatial system and rural development would be required as a framework for such investment, the analysis to have three major components: Analysis of Rural Resources and Activities; Analysis of Central Places; and Analysis of Regional Spatial Linkages. (Rondinelli, 1978: 5-6).

Subsequent to its acceptance of the report, the Office of Urban Development has undertaken a series of pilot studies to develop and test methods for the types of analysis recommended by the report. The first of these studies has been carried out in the Bicol River Basin of the Philippines. The Basin was already the focus of an area planning and development program, under the direction of the Bicol River Basin Council, and would be receiving considerable investment in the near future. The pilot study sought to analyze the existing spatial system to determine the extent to which it was contributing to rural development in the region, with particular attention to agricultural development and the provision of services; to establish locational centers for future investment in the region; and to test analytical methods for spatial analysis which would become integrated into the planning process for the region. (Rondinelli, 1976: 1-2). The analysis consisted of the major components cited above, and a conceptual plan and set of recommendations was formulated based on the analysis and regional development objectives.

The study collected and analyzed a considerable amount of data on the region over a 16-month period, using techniques such as Guttman Scaling and Scalograms to identify regional central place hierarchies and patterns of interaction. The study made a number of important findings and recommendations regarding the spatial structure of the Bicol River Basin region:

1. That the Basin is not a cohesive region, but is composed of at least 5 economic sub-regions which operate independently of each other.
2. That the development sub-regions previously defined by planners on the basis of water resource and physical criteria fail to recognize existing socio-economic relationships and need to be changed.
3. That investment in a series of rural service centers, market towns, and regional urban centers is required to provide farmers in the region with the market access they require in order to increase their production. The study makes specific recommendations as to the range and level of services which must be provided in each center.

In 1978 the Office of Urban Development and the U.S.A.I.D. Mission to Upper Volta initiated a second pilot study in two rural development regions of Upper Volta in cooperation with that country's Ministry of Rural Development. A third demonstration project is about to begin in Bolivia.

In Panama, U.S.A.I.D. is participating in a project entitled "Rural Growth and Service Centers." The project is being undertaken in the Central and Western regions, which account for 46% of the national population, including much of Panama's rural population. The relatively poor land quality in the region results in a highly dispersed population. This leads to high costs in the provision of services; concentration of the population in subsistence activity outside the market economy; poorly developed infrastructure, contributing to high transportation costs; and rapid out-migration in the 15-44 age groups. (U.S.A.I.D., 1978).

The Rural Growth and Service Centers project is aimed at developing centers which will provide marketing facilities and linkages to promote agricultural development, and which will provide off-farm employment opportunities for people who cannot be supported in the agricultural sector and who would normally migrate to one of the country's major urban centers.

To identify the growth and service centers, settlements were analyzed on the basis of three criteria:

- a. Population and migration - to identify the rapidly growing centers.
- b. Provision of services - to identify the hierarchy of central places in the regions.
- c. Spacing - to eliminate centers which are geographically close to other centers.

On the basis of these criteria, two growth centers and six service centers were identified. The two growth centers, David (55,000 population) and Chitre-Los Santos (25,000), are expected to be net receivers of migrants and the foci of increasing industrial, commercial, and service activity. The six service centers, with populations of 5,000-12,000, will provide the links between the growth centers and the villages by providing social services, agricultural inputs, marketing facilities, and food processing facilities.

To support the development of these centers, the Panamanian authorities, with U.S.A.I.D. assistance, are planning to initiate a series of investments to include:

- Five public markets with storage facilities
- Three transport terminals to ease the flow of goods and people
- Two industrial sites at the growth centers
- Sewage systems at the growth centers
- Low-income housing programs at all eight centers
- Loans to small businesses and agro-industrial enterprises

It is expected that the two growth centers each will receive about 25% of the total project funds, with the remainder going to the service centers to support the investments being made in them.

Evaluation of Experience with Market Towns and Rural Growth Centers

As was noted in the introduction to this section, experience with market town and rural growth and service center strategies has been relatively recent and often unevaluated. The major exception to this has been the Israeli experience, which has shown some success, but which has taken place under conditions very different from those found in most developing countries. Where there is older relevant experience, for instance in the case of Djoliba, Mali, no effort has been made to evaluate the experiences despite recent attempts at similar approaches (e.g., the Panama project). Fuller evaluation of past experiences with these strategies may be a fruitful exercise for agencies promoting their adoption.

One area that has received considerable attention in recent applications of market town and rural growth center strategies has been the analysis and identification of centers and central place hierarchies in the affected regions. For the most part the methods applied have been time-consuming, data-intensive approaches often involving sophisticated mathematical manipulations. Such sophisticated methodological approaches can seriously hinder the adoption of these strategies in countries where planning resources and a reliable data base are scarce, but where there is considerable local knowledge about regional spatial structure, albeit not in a form which a Western-trained planner can easily manipulate. Planners might do well to find ways of using more directly this local knowledge in their efforts to develop appropriate spatial structures for rural development.

One such approach has been initiated by AID's Office of Urban Development. This project, titled "Rural Demand for Urban Service Systems," is designed to incorporate the views of farmers and farmer and village organizations into the market town and rural growth center planning and development process. A first field application has been started in Guatemala and further field tests are planned for countries in South America, Africa and Asia.

Finally, it might be noted that government efforts to develop market towns might not be necessary if the appropriate economic environment is present. Riddell (1974) has described the recent appearance in Sierre Leone of periodic markets where agricultural produce is sold to middlemen for resale and consumption in nearby urban markets; Funnell (1976: 96) cites a similar example from the Malagasy Republic. Taylor (1974: 184) describes the evolution of villages into larger centers offering a wide range of services in Kenya's Central Province during the 1960s. These examples would suggest that market towns and rural growth centers can evolve on their own when not restricted by government over-regulation or over-concentration of economic power.

IV. CONCLUSION

Summary

This paper has undertaken a review of the relevant theory and practice on regional economic development, in particular, the so-called "spatial systems approach" to regional economic development. The increasing interest in regional development and planning in recent years has been viewed as a result of dissatisfaction with the pace at which the benefits of national economic growth have spread to sub-national regions within developed and developing countries.

The paper developed a model of the spatial incidence of economic development derived from literature in the fields of economic geography, economic development, regional planning, location theory, and information theory. According to the model, economic growth and development are initiated and reach their highest levels at a few centers which offer advantages for industrial location and have a high capacity to generate and adopt innovations. Growth impulses, in the form of market demands for goods, and development-inducing innovations diffuse from these centers to the rest of the space economy through a hierarchy of urban industrial centers, and through a network of smaller central places which serve as marketing and service centers for the rural population. Diffusion from these centers into the surrounding rural hinterlands occurs in a wave-like process which is subject to considerable distance and time decay.

Several major regional development strategies have been based on these principles regarding the spatial incidence of growth. Experience in creating urban/industrial growth centers has been the longest and most evaluated. Growth centers have been established as centers of economic activity in regions with high levels of underutilized resources; as means of linking isolated regions to the national economy; and as alternative destinations for rural emigrants who normally migrate to primate cities. Experience with growth center strategies has been disappointing for a variety of reasons:

The long time needed to bring about regional structural change; poor guidance from the theory; lack of success in attracting industries to the centers; and problems in creating linkages between the centers and their rural hinterlands. Interest in, and enthusiasm for, the strategy have waned considerably, particularly in light of its high planning and investment costs, and mixed results.

More recently, a number of countries have undertaken programs to develop smaller central places, i.e., market towns, rural growth centers, and rural service centers. As Findley (1977: 79) has noted, this trend is closely related to the current interest in integrated rural development strategies which, as opposed to agricultural development programs, are concerned with a broader view of human welfare, and deal with means of off-farm employment and social service delivery as well as agricultural productivity. The smaller central places, as centers of marketing and storage of agricultural produce, sources of agricultural inputs, sources of small-scale industrial and other non-agricultural employment, and the locations of education, health and administrative services, are the geographic components of the integrated rural development programs. While some experience with market towns and rural growth centers is over 10 years old, most is quite recent and as yet unevaluated. Therefore, better understanding of the relevance of this strategy and problems in undertaking it must await the outcome of on-going endeavors.

An Alternative View

As with most approaches to development, the regional development model set forth in this paper has its opponents. The opposing view with, perhaps, the most far-reaching consequences is that of the "dependency model," which suggests that improving urban-rural linkages in the space economy will promote underdevelopment, rather than development.

One of the longest and most forceful proponents of this view is A. G. Frank (1970). Frank sets out a metropolis-satellite model akin to the center-periphery, but one which extends from the colonial or former colonial power to the colony; from the colonial or national capital to the sub-national regions; from the regional centers to their rural hinterlands. Each point in the network is both a metropolis for the satellite regions below it, and a satellite for the metropolis above it. Frank argues that

this network, rather than providing an efficient means of linking the urban and rural economies so as to promote growth and development in the rural areas, serves to keep the linked rural areas underdeveloped by facilitating their exploitation by economic powers in the metropoli. The important flows in the network, according to Frank, are not development-inducing innovations and growth-inducing market demands from the metropoli to the satellites, but the flow of capital and human resources and primary products from the satellites to the metropoli, upon which the rapid growth of the metropoli is based. Further, the structural changes which such linkages bring about in the regional economy are not beneficial to the population, but are quite the contrary, e.g., the agglomeration of small agricultural holdings into large estates for production of export products, requiring the farmers that are pushed off the land to work for low wages on the estates, or migrate to the large urban areas. Finally, Frank argues that those regions which had the closest links with the metropoli in the past are now experiencing the greatest levels of underdevelopment, e.g., the Brazilian Northeast, while those regions which have been isolated in the past demonstrate higher levels of development. Frank supports his contentions on the basis of his studies in Latin America, and other writers have come to similar conclusions, e.g., Gilbert (1975).

Frank's contentions present a formidable challenge to proponents of the conventional regional development approach, particularly to proponents of growth center strategies. A major source of disappointment with growth centers has been the prevalence of 'backwash' effects, i.e., negative effects on surrounding hinterland areas. Richardson, a growth center proponent, was forced to formulate a complex mathematical model to 'prove' that these effects can be overcome in time. Further, it has been common practice in many developing countries to hold down agricultural produce prices as a means of increasing government revenues (as in Ghana) or to appease urban populations (as in Zambia), a clear case of exploitation of rural areas. Market town strategies which furthered such exploitation could hardly be called beneficial to rural development. Banks are often loathe to lend to small farmers, despite the fact that much of their investment funds arise from rural savings or earnings from sale and export of rural produce.

Despite Frank's contentions, it cannot be realistically suggested that inter-regional linkages be severed in order to promote regional development. What the dependency model does prove, however, is that without appropriate supporting measures growth center and market town strategies should not be expected to bring about improvements in the welfare of the rural population. Appropriate land reform, pricing, credit, and labor policies are required if the desired developments in rural incomes and welfare are to be brought forth.

BIBLIOGRAPHY

- Abiodun, Josephine Olu. 1968. "Central Place Study in Abeokutu Province, Southwestern Nigeria," Journal of Regional Science. Vol. 8. 57-76.
- Ackerman, William V. 1975. "Development Strategy for Cuyo, Argentina," Annals of the Association of American Geographers. Vol. 65. 36-47.
- Allen, Kevin, and MacLennan, M. C. 1970. Regional Problems and Policies in Italy and France. Beverly Hills: Sage Publications.
- Appalachian Regional Commission. 1976. "Selected Facts About Appalachia," Appalachia. Vol. 10. October/November. 45-56.
- _____. 1977a. 1977 Annual Report. Washington, D.C.: Appalachian Regional Commission.
- _____. 1977b. Appalachia - An Economic Report. Washington, D.C.: Appalachian Regional Commission.
- Appalraju, Jaya, and Safier, Michael. 1976. "Growth Centre Strategies in Less-Developed Countries," Development Planning and Spatial Structure. London: John Wiley and Sons. 143-168.
- Banerji, Shyamodas, and Fisher, H. Benjamin. 1974. "Hierarchical Location Analysis for Integrated Area Planning in Rural India," Papers of the Regional Science Association. Vol. 33. 177-194.
- Berler, Alexander, et al., 1970. Urban-Rural Relations in Israel: Social and Economic Aspects. Rehovot: Settlement Study Center.

Berry, Brian J. L. 1961. "City Size Distribution and Economic Development," Economic Development and Cultural Change. Vol. 37. August.

. 1967. Geography of Market Centers and Retail Distribution. Englewood Cliffs, N.J.: Prentice Hall.

. 1970. "Commuting Patterns: Labor Market Participation and Regional Potential," Growth and Change. Vol. 1. October. 3-11.

. 1971. "Urban Hierarchies and Spatial Organization in Developing Countries," Rehovot Conference on Urbanization and Development in Developing Countries. Rehovot, Israel: Weizman Institute.

. 1972. "Hierarchical Diffusion: The Basis of Development Filtering and Spread in a System of Growth Centers," Growth Centers in Regional Economic Development. Niles M. Hansen, ed. New York: The Free Press.

Berry, Brian J. L., and Barnum, H. Gardiner. 1963. "Aggregate Patterns and Elemental Components of Central Place Systems," Journal of Regional Science. Vol. 4. 35-68.

Berry, Brian J. L., and Garrison, William L. 1958a. "Recent Developments in Central Place Theory," Papers and Proceedings of the Regional Science Association. Vol. 4.

. 1958b. "Functional Bases of the Central Place Hierarchy," Economic Geography. Vol. 34. 145-154.

Berry, Brian J. L., and Rao, U. L. S. Prakasa. 1968. Urban-Rural Inequality in the Regional Structure of Andhra Pradesh - A Challenge to Regional Planning and Development. Wiesbaden: F. Steiner Verlag.

- Blaut, James M. 1977. "Two Views of Diffusion," Annals of the Association of American Geographers. Vol. 67. 343-349.
- Bohannon, P., and Ralton, G.. 1965. Markets in Africa. New York: Doubleday and Co.
- Boudeville, J. R. 1966. Problems of Regional Economic Planning. Edinburgh: Edinburgh University Press.
- von Boventer, Edwin. 1975. "Regional Growth Theory," Urban Studies. Vol. 12. 1-29.
- Brush, J. E. 1953. "The Hierarchy of Central Places In Southwestern Wisconsin," Geographic Review. Vol. 43. 380-402.
- Burghardt, Andrew F., ed. 1975. Development Regions in the Soviet Union, Eastern Europe and Canada. New York: Praeger Publishers.
- Callaway, Thomas. 1966. "A Counter-Magnet to the Capital," International Development Review. Nile M. Hansen, ed. Cambridge, Mass.: Ballinger Publishing Co. 137-180.
- Chetwynd, Jr., Eric. Urban Functions in Rural Development in Upper Volta. Report of a Field Visit. Washington, D.C.: Office of Urban Development, Agency for International Development. Mimeograph.
- Chetwynd, Jr., Eric, and Farbman, Michael. 1978. Market Town Development and Employment Promotion in Bangladesh. Washington, D.C.: Office of Urban Development, Agency for International Development. Mimeograph.

- Choldin, Harvey M. 1968. "Urban Cooperatives at Comilla Pakistan: A Case Study of Local Level Development," Economic Development and Cultural Change. Vol. 16. January. 189-218.
- Christaller, Walter. 1966. Central Places in Southern Germany. Carlisle W. Baskin, trans. Englewood Cliffs, N.J.: Prentice Hall.
- Comay, Yochanon, and Kirschenbaum, Alan. 1973. "The Israeli New Town: An Experiment at Population Redistribution," Economic Development and Cultural Change. Vol. 22. October. 124-134.
- Connell, J. 1973. "Ujamaa Villages: Institutional Change in Rural Tanzania," Journal of Administration Overseas. Vol. 12. 273-283.
- Cumberland, John H. 1971. Regional Development: Experiences and Prospects in the United States of America. Paris: Mouton Publishers.
- Erickson, Rodney A. 1975. "The Spatial Pattern of Income Generation in Lead Firm, Growth Area Linkage Systems," Economic Geography. Vol. 51. 17-26.
- _____. 1976. "Non-metropolitan Industrial Expansion: Emerging Implications for Regional Development," The Review of Regional Studies
- Findley, Sally. 1977. Planning for Internal Migration: A Review of Issues and Policies in Developing Countries. Prepared for U.S. Department of Commerce, Bureau of the Census. Washington: U.S. Government Printing Office.
- Ford Foundation, Central Research Cell, India. 1973. The Project in Growth Centres: Third Progress Report. October.
- Frank, A. G. 1970. "The Development of Underdevelopment," Imperialism and Underdevelopment: A Reader. Robert I. Rhodes, ed. New York: Monthly Review Press. 4-17.

- Friedmann, John R. 1968. Regional Development Policy: A Case Study of Venezuela. Cambridge: M.I.T. Press.
- _____. 1973. "A Theory of Polarized Development," Urbanization, Planning and National Development. Beverly Hills: Sage Publications. 41-64.
- Friedmann, John R. and Alonso, William. 1964. Regional Development and Planning. Cambridge: M.I.T. Press.
- Funnell, D. C. 1976. "The Role of Small Service Centres in Regional and Rural Development: With Special Reference to Eastern Africa," Development Planning and Spatial Structure. A. G. Gilbert, ed. London: John Wiley and Sons. 77-111.
- Ghana, Ministry of Economic Affairs. 1971. "Industrial Location and Regional Development in Ghana," Industrial Location and Regional Development. Proceedings of Inter-regional Seminar, Minsk, 1968. Vienna: UNIDO.
- Gilbert, Alan. 1975. "A Note on the Incidence of Development in the Vicinity of a Growth Centre," Regional Studies. Vol. 9. 325-333.
- _____, ed. 1976. Development Planning and Spatial Structure. London: John Wiley.
- Goldsmith, William W. and Rothschild, Marie F. 1974. "The Effect of Regional Specialization on Local Economic Activity: A Study of Chile," Papers of the Regional Science Association. Vol. 32. 183-201.
- Gould, P. R. 1970. "Tanzania 1920-63: The Spatial Impress of the Modernization Process," World Politics. Vol. 22. 149-170.

Greenfield, Stuart Jay. 1975. "Growth and Poverty: An Analysis of Trickle Down in a Regional Context," Growth and Change. Vol. 7. July. 20-25.

Hansen, Niles M. 1967. "Development Pole Theory in A Regional Context," Kyklos. Vol. 20. 709-727.

_____, ed. 1974. Public Policy and Regional Economic Development: The Experience of Nine Western Countries. Cambridge, Mass.: Ballinger Publishing Co.

_____. 1976. "Are Regional Development Policies Needed?" The Review of Regional Studies. Vol. 6. Spring. 11-27.

_____, ed. 1978. Human Settlement Systems: International Perspectives on Structure, Change, and Public Policy. Cambridge: Ballinger Publishing Co.

Harrison, Bennett. 1967. Rural Growth Centers: A Strategy for the Rural Development of Low Income Countries. Washington: U.S. Agency for International Development.

Hathaway, Dale E. 1964. "Urban Industrial Development and Income Differentials Between Occupations," Journal of Farm Economics. Vol. 46. February. 56-66.

Hendriks, Ad. J. 1974. "Regional Policy in the Netherlands," Public Policy and Regional Economic Development. Niles M. Hansen, ed. Cambridge, Mass.: Ballinger Publishing Co. 181-198.

Hermansen, Tormad. 1972. "Development Poles and Related Theories: A Synoptic View," Growth Centers in Regional Economic Development. Niles M. Hansen, ed. New York: The Free Press.

- Hilhorst, J. G. M. 1972. "Development Axes and the Diffusion of Innovation," Development and Change. Vol. 4. 1-16.
- Hirschman, Albert O. 1958. The Strategy of Economic Development. New Haven: Yale University Press.
- Hirst, M. A. 1973. "A Functional Analysis of Towns in Tanzania," Tydschrift voor Economische and Sociale Geographie. Vol. 64. 34-51.
- Hoffman, George W. 1972. Regional Development Strategy in Southeast Europe: A Comparative Analysis of Albania, Bulgaria, Greece, Romania and Yugoslavia. New York: Praeger Publishers.
- Holland, S. K. 1971. "Regional Underdevelopment in A Developed Country: The Italian Case," Regional Studies. Vol. 5. 71-90.
- Hoover, Edgar M. 1948. The Location of Economic Activity. New York: McGraw-Hill.
- _____. 1971. An Introduction to Regional Economics. New York: Alfred A. Knopf.
- Huttman, John P. and Elizabeth D. 1973. "Dutch and British New Town: Self-Containment and Socio-Economic Balance," Growth and Change. Vol. 4. January. 30-37.
- Johnson, E. A. J. 1965. Market Towns and Spatial Development in India. New Delhi: Longmans.
- _____. 1970. The Organization of Space In Developing Countries. Cambridge: Harvard University Press.
- Kipnis, Baruch A. 1977. "Center-Hinterland Inter-Relationships in a Nodal Region: An Input-Output Analysis," Urban Studies. Vol. 14. 347-351.

- Krumme, Gunter. 1972. "Development Centres and Central Places in West German Regional Planning," Review of Regional Studies. Vol. 2. 215-34.
- Kuehn, John A., and Bender, Lloyd D. 1975. "A Dissent: Migration, Growth Centers, and the Ozarks," Growth and Change. Vol. 6. April. 43-48.
- Kublinski, Antoni, and Petrella, Riccardo. 1972. Growth Poles and Regional Policies: A Seminar. Paris: Mouton Publishers.
- Lefebvre, Louis, and Datlu-Chaudhwai, Mrinal. 1971. Regional Development: Experiences and Prospects in South and Southeast Asia. Paris: Mouton Publishers.
- Lösch, August. 1954. The Economics of Location. New Haven: Yale University Press.
- Luttrell, William R. 1972. "Location Planning and Regional Development in Tanzania," Development and Change. Vol. 4. 17-38.
- Malhotra, Ram C. 1971. "Urbanization and Development in Nepal," Rehovot Conference on Urbanization and Development in Developing Countries. Rehovot, Israel: Weizman Institute.
- McCrone, Gavin. 1969. Regional Policy In Britain. London: George Allen & Unwin, Ltd.
- Mihailovic, Korta. 1972. Regional Development: Experiences and Prospects in Eastern Europe. Paris: Mouton Publishers.
- Morrill, Richard L. 1968. "Waves of Spatial Diffusion," Journal of Regional Science. Vol. 8. 1-18.

- . 1973. "On the Size and Spacing of Growth Centres," Growth and Change. Vol. 4. April. 21-24.
- Moseley, M. J. 1973a. "The Impact of Growth Centres in Rural Regions - I: An Analysis of Spatial 'Patterns' in Britany," Regional Studies. Vol. 7. 57-75.
- . 1973b. "The Impact of Growth Centres in Regions, Part II: An Analysis of Spatial Flows in East Angolia," Regional Studies. Vol. 7. 77-94.
- . 1974. Growth Centres In Spatial Planning. London: Pergamon Press.
- Mosher, Arthur T. 1969. Creating A Progressive Rural Structure. New York: Agricultural Development Council.
- Mushkat, M., Jr. 1975. "Shift-Share Analysis of Spatial Development in Israel," Development and Change. Vol. 6. July. 75-82.
- Myrdal, Gunnar. 1971. Economic Theory and Underdeveloped Regions. New York: Harper and Row.
- Newman, Monroe. 1972. The Political Economy of Appalachia: A Case Study in Regional Integration. Concord: B. C. Heath and Co.
- . 1975. Growth Areas, Unique Development Opportunities, and the Areawide Action Program. Discussion Paper prepared for the Appalachian Regional Commission, Washington, D.C. Mimeograph.
- Nicholls, William H. 1961. "Industrialization, Factor Markets, and Agricultural Development," Journal of Political Economy. Vol. 69. August.

- _____. 1969. "The Transformation of Agriculture in a Semi-Industrialized Country - The Case of Brazil," The Role of Agriculture in Economic Development. Eric Thorbecke, ed. New York: Columbia University Press. 311-378.
- North, Douglas C. 1955. "Location Theory and Regional Economic Development," Journal of Political Economy. Vol. 63. June. 243-258.
- Obudho, R. A. 1970. "The Central Places of Nyanza Province, Kenya: A Tentative Study of Urban Hierarchy in a Developing Country," African Urban Notes. Vol. 5. 382-391.
- Onyemelukwe, J. O. C. 1974. "Some Factors in the Growth of West African Market Towns: The Example of Pre-Civil War Onitsha, Nigeria," Urban Studies. Vol. 11. 47-59.
- Pedersen, Paul Ove. 1970. "Innovation Diffusion Within and Between National Urban Systems," Geographical Analysis. Vol. 2. July.
- _____. 1975. Urban-Regional Development in South America: A Process of Diffusion and Integration. Paris: Mouton Publishing Co.
- Perroux, Francois. 1950a. "The Domination Effect and Modern Economic Theory," Social Research. Vol. 17. 188-286.
- _____. 1950b. "Economic Space: Theory and Applications," Quarterly Journal of Economics. Vol. 64. 89-104.
- Pred, Allan. 1976. "The Inter-urban Transmission of Growth in Advanced Economies: Empirical Findings Versus Regional Planning Assumptions," Regional Studies. Vol. 10. 151-171.
- Preston, R. E. 1971. "The Structure of Central Place Systems," Economic Geography. Vol. 47. 136-155.

Richardson, H. W. 1972. "Optimality in City Size, Systems of Cities, and Urban Policy: A Skeptic's View," Urban Studies. Vol. 9. February. 29-48.

_____. 1975a. "Regional Planning in Iran," Growth and Change. Vol. 6. July. 16-19.

_____. 1975b. Regional Development Policy and Planning in Spain. Farnborough: Saxon House, D. C. Heath, Ltd.

_____. 1976. "Growth Pole Spillovers: The Dynamics of Backwash and Spread," Regional Studies. Vol. 10. 1-9.

Richardson, Harry W., and Margaret. 1975. "The Relevance of Growth Center Strategies in Latin America," Economic Geography, Vol. 51. No. 2. April. 163-178.

Riddell, J. B. 1971. The Spatial Dynamics of Modernization in Sierra Leone. Evanston: Northwestern University Press.

_____. 1974. "Periodic Markets in Sierra Leone," Annals of the Association of American Geographers. Vol. 64. 541-548.

Robin, John P.; Terzo, Frederick C.; and Valenzuela, Jaime. 1972a. Urbanization in Colombia. An International Urbanization Survey Report to the Ford Foundation. New York: Ford Foundation.

_____. 1972b. Urbanization in Peru. An International Urbanization Survey Report to the Ford Foundation. New York: Ford Foundation.

_____. 1972c. Urbanization in Venezuela. An International Urbanization Survey Report to the Ford Foundation. New York: Ford Foundation.

- Robinson, E. A. G., ed. 1969. Backward Areas in Advanced Countries. New York: St. Martin's Press.
- Robinson, G., and Salih, K. B. 1971. "The Spread of Development Around Kuala Lumpur: A Methodology for an Exploratory Test of Some Assumptions of the Growth Pole Model," Regional Studies. Vol. 5. 303-314.
- Rodwin, Lloyd, and Associates. 1969. Planning Urban Growth and Regional Development: The Experiences of the Guayana Program of Venezuela. Cambridge: M.I.T. Press.
- Rondinelli, Dennis A. 1978. Bicol River Basin Urban Functions in Rural Development Project: Summary and Evaluation. Washington, D.C.: Office of Urban Development, Agency for International Development.
- Rondinelli, Dennis A. and Ruddle, Kenneth. 1976. Urban Functions in Rural Development: An Analysis of Integrated Spatial Development Policy. Washington, D.C.: Office of Urban Development Agency for International Development.
- Ruttan, V. W. 1955. "The Impact of Urban-Industrial Development on Agriculture in the Tennessee Valley and the South East," Journal of Farm Economics. Vol. 37. February. 38-56.
- Saylor, R. G. and Livingston, I. 1971. "Regional Planning in Tanzania," The African Review. Vol. 1. 53-70.
- Schultz, T. W. 1951. "A Framework for Land Economics - The Long View," Journal of Farm Economics. Vol. 33. May. 204-215.
- _____. 1953. The Economic Organization of Agriculture. New York: McGraw-Hill.
- Shachar, Arie S. 1971. "The Development Towns of Israel: A National Policy of Urbanization and Spatial Organization," Rehovot Conference on Urbanization and Development in Developing Countries. Rehovot, Israel: Weizmann Institute.

- Shah, S. M. 1974. "Growth Centers as a Strategy for Rural Development: India's Experience," Economic Development and Cultural Change. Vol. 22. January. 215-228.
- Sisler, Daniel G. 1959. "Regional Differences in the Impact of Urban-Industrial Development on Farm and Non-Farm Income," Journal of Farm Economics. Vol. 41. December. 1100-1112.
- Skinner, G. W. 1964. "Marketing and Social Structure Rural China," Journal of Asian Studies. Vol. 34. November.
- Soja, E. 1968. The Geography of Modernization in Kenya. Syracuse: Syracuse University Press.
- Stevens, Robert D. 1974. "Three Rural Development Models for Small Farm Agricultural Areas in Low Income Nations," Journal of Developing Areas. Vol. 8. April. 409-420.
- Stohr, W. B. 1975. Regional Development: Experiences and Prospects in Latin America. The Hague: Mouton.
- Stuckey, Barbara. 1975. "Spatial Analysis and Economic Development," Development and Change. Vol. 6. January. 89-101.
- Tauriainen, Juhani, and Young, Frank W. 1976. "The Impact of Urban-Industrial Development on Agricultural Incomes and Productivity in Finland," Land Economics. Vol. 52. May. 192-206.
- Taylor, D. R. F. 1972. "The Role of the Smaller Urban Place in Development: A Case Study from Kenya," African Urban Notes. Vol. 6. 7-23.
- _____. 1974. "Spatial Aspects of Kenya's Rural Development Strategy," Spatial Aspects of Development. B. S. Hagle, ed. London: John Wiley and Sons. 167-188.

- Vernon, R. 1966. "International Investment and International Trade in the Product Cycle," Quarterly Journal of Economics. Vol. 80. 190-207.
- Waterston, Albert. 1974. "The Coming Surge in Regional Planning," Finance and Development. June. 14-16.
- Watson, M. M. 1970. Regional Development Policy and Administration in Italy. London: Longman Grove, Ltd.
- Weinard, Herbert C. 1973. "Some Spatial Aspects of Economic Development in Nigeria," Journal of Developing Areas. Vol. 7. January. 247-264.
- Williamson, Jeffrey. 1965. "Regional Inequality and the Process of National Development," Economic Development and Cultural Change. Vol. 13. July. Part II.
- Williamson, Robert B. 1975. "Regional Growth: Predictive Power of the Export Base Theory," Growth and Change. Vol. 6. January. 3-10.
- Zipf, George K. 1941. National Unity and Disunity. Bloomington, Illinois: Principia Press.

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